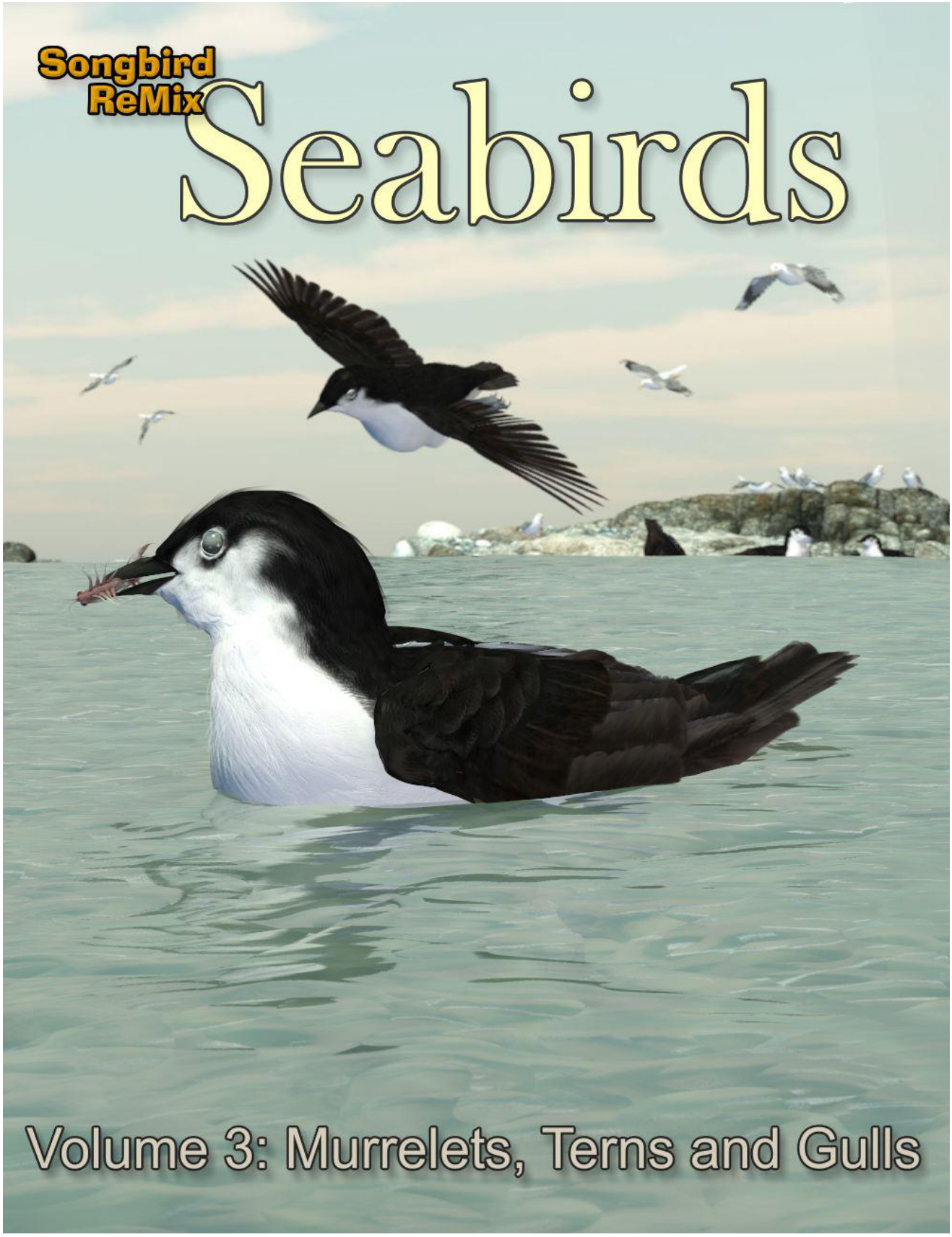

Avian Models for 3D Applications by Ken Gilliland

Songbird ReMix

Seabirds Volume 3

Contents

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Seabirds Volume 3

Introduction

“Seabirds Volume 3” adds 27 more seabirds birds to the Songbird ReMix library which include Albatrosses, Shearwaters, Murrelets, Boobies, Cormorants, Jaegers, Gulls and Terns. This worldwide collection has both iconic and rare species included.

Of the more unique birds included, none is more spectacular than the Red-footed Booby with its multi-colored bill and iconic crimson feet. Also included, are the rare and endangered Ivory Gull (in breeding and non-breeding plumages) and the Tristan Albatross. The Pomarine Jaegar is included in both "Light" and "Dark" forms, ready to hunt lemmings, and both the Scripps and Guadaulpe Murrelets are ready to inhabit your coastal renders. The Ring-billed Gull or Lesser Black-backed Gull will fit the “bill” whether you are rendering the coastline or a garage dump.

Whether you choose to create art with a message or you are simply looking for realistic and attractive birds for your imagery, this package will easily fulfill those needs.

This set comes in two versions; Poser 10+ and DAZ Studio and supports 3DL, Firefly, Iray and Superfly render engines.

Overview and Use

The set is located within the **Animals : Songbird ReMix** folder. Here is where you will find a number of folders, such as **Bird Library**, **Manuals** and **Resources** . Let's look at what is contained in these folders:

- **Bird Library:** This folder holds the actual species and poses for the "premade" birds. Birds are placed into a "type" folder (such as "Birds of Prey (Order Falconiformes)" which for example would hold falcons, hawks and eagles). The birds for this set can be found in the following folder(s):
  - **Albatrosses and Petrels (Order Procellariiformes)**
  - **Boobies and Gannets (Order Suliformes)**
  - **Gulls and Waders (Order Charadriiformes)**
- **Manuals:** Contains a link to the online manual for the set.
- **Props:** Contains any props that might be included in the set
- **Resources:** Items in this folder are for creating and customizing your birds
  - **Bird Base Models:** This folder has the blank, untextured model(s) used in this set. These models are primarily for users who wish to experiment with poses or customize their own species of bird. When using physical renderers such as Iray and Superfly, SubD should be turned to at least “3”.

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.

Posing & Shaping Considerations

This volume has various species, so when using generic poses not every pose will work perfectly with every bird. You may find that some minor alteration on the stock poses may be warranted.

Here are some of the most common alterations you may need to make:

- Birds will not be flat on the zero plane due to leg size and overall scale.
- Because of the numerous beak shapes, closing the beak may range from 0.5 to 1+. Usually 0.8-0.9 is about right.
- **Tongue poke-through** (especially when the beak is open). This can be easily solved by using the **Throat-Fuller1 & 2** morphs (*found in Creation Control/Head Shapes*).
- **Tail Spread2 and other morphs…** Because these are generic models, in some case, some morphs are provided that aren't normally used with a specific species of bird or have a limited use. They may find use in future expansions, so I've included them. **Tail Spread2** is one of those morphs. Very few seabird species would ever spread their tails this way, but there may come an occasion

when it does get used. This morph tends to create distortions when used with a combination of the 3 round tail morphs (Tail Round, Tail Round2 and Tail Rounder). Experimentation with those morphs will get you around the distortions.

- **“Fluff” lines.** With some lighting, seams where the “Fluff” transparency planes correct to the model may show badly. In these cases, there are 3 “work-arounds”… 1) reposition the lighting so the seam(s) doesn’t show; 2) smooth/paint it out in postwork; or 3) use the "Hide Fluff" morphs found in Correction Controls on the offending area.

IK Concerns

Some poses may go askew when IK is turned on. By default, Poser’s IK feature is turned off when loading a bird. To turn it on, select the “Figure” category from the main tool bar and “Use Inverse Kinematics” from the submenu.

By default, DAZ Studio’s IK feature is turned on when loading a bird. This will cause the thigh and shin rotations change when the character is moved. The **CTRL K** keypress will turn IK on and off in DAZ Studio. IK doesn’t work that well in Studio, so I suggest selecting the character in the **Scene tab** and simply deleting the two IK body parts to remove IK.

Where to find your Birds and Poses

Type Folder	Bird Species
Albatrosses and Petrels (Order Procellariiformes)	Tristan Albatross Fairy Prion Great Shearwater
Boobies and Gannets (Order Suliformes)	Great Cormorant Masked Booby Nazca Booby Red-footed Booby
Gulls and Waders (Order Charadriiformes)	Scripp's Murrelet Guadalupe Murrelet Black Noddy Ivory Gull Lesser Black-backed Gull Ring-billed Gull Gull-billed Tern Sooty Tern Pomarine Jaeger

Songbird ReMix

Seabirds Volume 3

Field Guide

Tristan Albatross
Fairy Prion
Great Shearwater
Great Cormorant
Masked Booby
Nazca Booby
Red-footed Booby
Guadalupe Murrelet
Scripps's Murrelet
Black Noddy
Ivory Gull
Lesser Black-backed Gull
Ring-billed Gull
Gull-billed Tern
Sooty Tern
Pomarine Jaeger

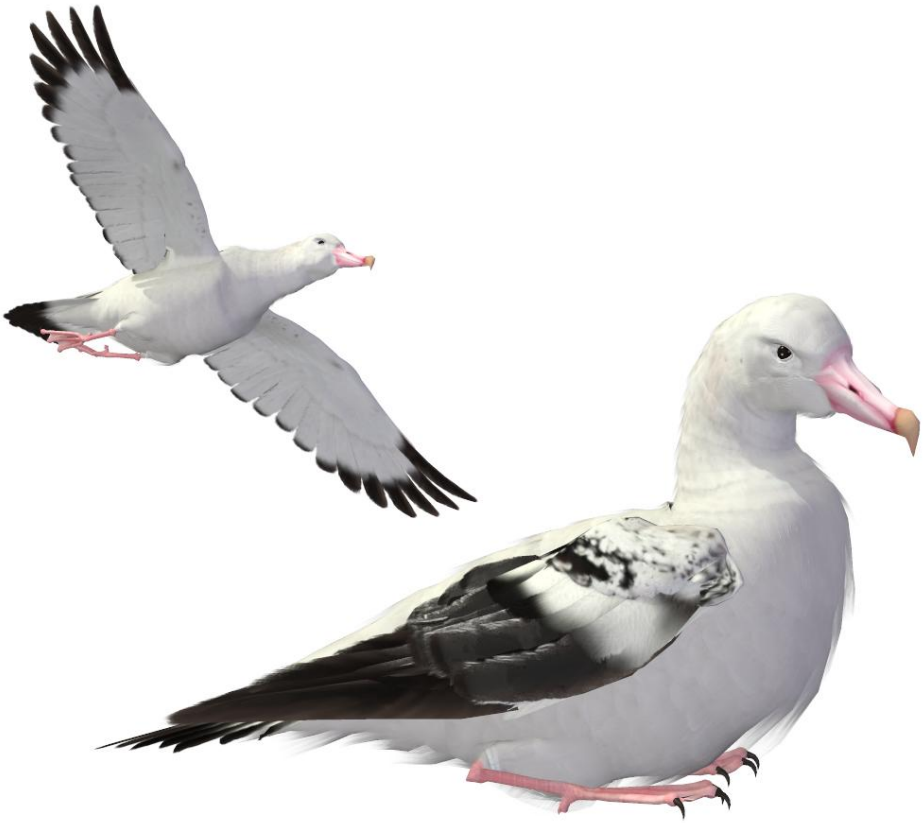
Common Name: Tristan Albatross
Scientific Name: *Diomedea exulans dabbenena*

Size: 42-53 inches (107–135 cm); Tristan subspecies: 43 inches (110 cm)

Habitat: Circumpolar range in the Southern Ocean. Wandering Albatross typically forages in oceanic waters; however considerable time is spent over shelf areas during certain stages of the breeding season. The breeding populations of the Tristan subspecies are essentially restricted to Gough Island, Tristan da Cunha, St Helena (UK), having become extinct on Tristan (although birds were seen prospecting in 1999), and 2-3 pairs breed annually on Inaccessible Island.

It nests at 400-700 m (rarely to 300 m), primarily in wet heath where it is open enough for take-off and landings.

Status: Critically Endangered. **Global Population:** 3,400-4,800 mature adults with a declining population. Interactions with longline fisheries represents a major threat, with a high proportion of bycatch in southern Brazilian water being of this species. It has been estimated that about 500 individuals of this species are killed every year by longliners. Satellite tracking of breeding birds indicates considerable overlap between bird distribution and areas of longline fishing. A study of great albatross bycatch from Uruguayan and Japanese longline fisheries in the south-west Atlantic off Uruguay found most Tristan Albatross bycatch occurred between September and November in pelagic waters where many other fleets operate.



On-land threats include predation by introduced species. On Inaccessible Island, population decline was probably due to predation by rats, feral pigs (now absent) and humans. The failure to recover is unclear, but may be because young birds become entangled in thick vegetation, or there is a high mortality in long-line fisheries. On

Tristan, its extirpation was probably the result of human exploitation, although predation by rats (and possibly mice) may have been a factor. At present, the greatest risk is posed by house mice, which causes very low breeding success on Gough and alone is sufficient to drive a population decline of over 50% over three generations. Mouse attacks on chicks peaked in May-June at the start of the austral winter and all predation took place at night, normally 1-2 mice were recorded attacking the chick, with death occurring 2-4 days after the first attack. An additional threat on Gough is peat slips caused by storms burying and killing nestlings and adults, although this is probably a very rare event.

Diet: Cephalopods, small fish, and crustaceans.

It is highly pelagic, spending the majority of the year wandering the southern oceans, and coming to land only once every two years to breed. Albatross feed mostly at night. They also follow sailing vessels, waiting for animal refuse thrown, and eating to such excess at times that they are unable to fly and rest helplessly on the water. They are prone to following ships for refuse. They can also make shallow dives.

Nesting: The adult male has a white head, usually with apricot or pinkish patch on uppermost neck-side during breeding, the eye ring is whitish to pale sky-blue or pale pink. The upper parts are white often patterned with fine dark gray vermiculation, becoming entirely white in old birds. The wing is blackish on upper wing-coverts, with variable amount of white on wing base and central wing, in older birds most upper wing-coverts are white, retaining most blackish feathers on distal wing and on greater and outer median coverts. The under wing white except flight-feathers, the dark secondaries showing as narrow trailing edge. The tail is white, often with some blackish on sides and tips, becoming whiter with age. The under parts are white in old birds; with some brown and gray vermiculations on the neck, breast and flanks in youth. The iris is dark brown and the bill is usually a pale pinkish, with yellowish-horn tinge at tip, The ramicorn is often paler and bluer near tip. The legs are light pinkish to pale bluish.
Sexes are similar, but the male is slightly larger than female (by 4% in wing length and up to 20% heavier). Some females have weak gray breast band and females do not normally achieve the ‘snowy stage’, generally having less white on the upper wing, some black at the edges of the tail, and often some black, gray or brown on the head (especially on the crown).

Juveniles are dark brown with a white face. Their plumage progressively whitens on the upper wing from the center outwards.

This albatross is a biennial breeding species, although about 30% of successful and 35% of failed breeders (on average) defer breeding beyond the expected year. Adults return to the colonies in November, and eggs are laid over a period of 5 weeks during December and January. The breeding colonies are at Crozet and Kerguelen Islands. Most eggs hatch in March, and the chicks fledge in December. Birds usually return to colonies when 5-7 years old (but can return when as young as 3 years old). Birds can start breeding as young as 7 or 8 years old. Wandering Albatross nests are placed on slopes with sparse grass tussocks and with an exposed site for easy takeoff.

Cool Facts: The Wandering Albatross has the largest wingspan of any living bird, with the wingspan between 2.51–3.50 m (8.2–11.5 ft) The longest-winged examples verified have been about 3.7 m (12 ft), but probably apocryphal reports of as much as 5.3 m (17 ft) are known. As a result of its wingspan, it is capable of remaining in the

air without beating its wings for several hours at a time (travelling 22 m for every meter of drop).

They also have a salt gland that is situated above the nasal passage and helps desalinate their bodies, due to the high amount of ocean water that they imbibe. It excretes a high saline solution from their nose.

Sailors used to capture the birds for their long wing bones, which they manufactured into tobacco-pipe stems. The early explorers of the great Southern Sea cheered themselves with the companionship of the albatross in their dreary solitudes; and the evil fate of him who shot with his cross-bow the "bird of good omen" is familiar to readers of Coleridge's The Rime of the Ancient Mariner. The metaphor of "an albatross around his neck" also comes from the poem and indicates an unwanted burden causing anxiety or hindrance. In the days of sail the bird often accompanied ships for days, not merely following it, but wheeling in wide circles around it without ever being observed to land on the water. It continued its flight, apparently untired, in tempestuous as well as moderate weather.

There are five subspecies. Many of the subspecies were considered at one time full species, but now have recently been moved into subspecies of the Wandering Albatross.

- *D. e. exulans.* First reported by Carl Linnaeus in 1758. The nominate subspecies is called the “Snowy” Wandering Albatross.
- *D. e. dabbenena.* First reported by Mathews in 1929. This subspecies is called the “Tristan” Wandering Albatross and is found in the southern ocean, breeding from South Georgia eastward to Kerguelen, Heard and MacDonald Islands and Macquarie Island. Until recently was treated as conspecific with *D. exulans,* but differs in its smaller size with considerably shorter bill. There are no plumage characters, however, constantly and definitively separate it, although adults generally do not reach the whiteness shown by those of Race *exulans*, and there appears to be a higher number of stages before full adult plumage attained.
- *D. e. antipodensis.* First reported by Robertson & Warham in 1992. This subspecies is called the “New Zealand” Wandering Albatross and is found in the southern Atlantic Ocean, breeding on Gough Island and occasionally Inaccessible Island, and formerly also on Tristan da Cunha.
- *D. e. gibsoni.* First reported by Robertson & Warham in 1992. The nominate subspecies is called the “Gibson's” Wandering Albatross and breeds in Auckland Islands (Disappointment Island, Auckland Island and Adams Island), south of New Zealand. It may forage mostly west of New Zealand over Tasman Sea and south of Australia. It was initially described as a race of *D. exulans* (as it is now) and later elevated to species level on basis of ecological differences. This appears to refer only to timing of breeding, and morphological diagnosability, consisting of the adult females dark brown, pattern resembling immature plumage of other taxa, and the adult male smaller with a shorter bill. However, “there are no simple plumage features to distinguish from other ‘wanderers’” so it was moved back into a subspecies category.
- *D. e. amsterdamensis.* First reported by Roux JP, Jouventin, Mougin, Stahl and Weimerskirch in 1983. This subspecies is called the “Amsterdam” Wandering Albatross and found the southern Indian Ocean, breeding on Amsterdam Island. It, too, was originally given a species status, owing to the chocolate-brownish breeding plumage with white face and throat, broad brown breast band, pink bill, and dark tip and the cutting edges of upper mandible, but it never was entirely free of uncertainty owing to view that dark plumage of adults simply an extreme form of neoteny.

Common Name: Fairy Prion
Scientific Name: *Pachyptila turtur*

Size: 9.8 inches (25 cm); wingspan 22 inches (56 cm)

Habitat: Southern Hemisphere; it is widely distributed and a common small seabird of the Southern Ocean, from the Falkland Islands and South Georgia east to the southern Indian Ocean and New Zealand.

Status: Least Concern. **Global Population:** 5,000,000+ mature adults with a stable population. Due to the remoteness of most of this species' breeding sites, most of the breeding habitat remains intact for this species, although notable efforts have been made at many subantarctic islands to remove invasive predators.

Diet: Predominately crustaceans, occasionally fish and other marine organisms.

It feeds mainly by seizing prey near the oceans surface. It often associates with other prions and storm-petrels when feeding around fishing boats.

Nesting: Sexes are alike, but the female averages marginally smaller than the male, especially when it comes to bill length. The upper parts are pale bluish gray. It is only marginally darker on the forehead, crown, and upper ear-coverts, and usually darkest just in front of the eye, with a contrasting blackish subterminal band on rearmost scapulars and tertials, framed at rear by narrower whitish-gray fringe. The upper wing shows a well-defined transversal blackish over spread wings that form a “M-like” shape. Its upper tail is pale gray or bluish gray, and paler at the sides with a broad black tip. The white superciliary stripe on the sides of the forehead to the cheeks and lower face. It contrasts with a slate-gray to blackish-gray mask from just in front of

the eye over most of the ear-coverts, and at rear meeting the broad paler gray to blue-gray neck sides. It is otherwise white below including the under wing and under tail, except for a broad dark area on central tail and small dark tips to the outer primaries. There is a diffuse demarcation between grayish and white on the rear body, and the thighs are largely gray. The juvenile is similar to the adult, but has an unmolted body and flight feathers during first year of life.

It breeds mostly on temperate and subantarctic islands, with just a handful of mainland breeding colonies in Australia and New Zealand. The colonies are generally found in open habitat near coasts including scrubland, tussock heathlands, and even pasture or open fields. It makes regular use of offshore rock stacks near larger islands or mainland, often due to being out-competed by Blue Petrel (*Halobaena caerulea*) or predation by introduced predators. It forages offshore, mostly over continental shelf break and slope. The nest itself is fairly basic, a simple scrape-styled nest lined with leaves and twigs. Usually, one egg is laid and incubation lasts about seven weeks with the nestling period lasting another seven weeks. During the early brooding period, a chick may be fed by the attendant adult throughout the day. Chicks are fed regularly by both parents during the night, with most adults returning between 22 to 24 hours.

Cool Facts: The fairy prion was formally described in 1820 by the German naturalist Heinrich Kuhl. They produce a stomach oil made up of wax esters and triglycerides that is stored in the proventriculus (area between the crop and gizzard). This is used against predators as well as an energy rich food source for chicks and for the adults during their long flights. They also have a salt gland that is situated above the nasal passage and helps desalinate their bodies, due to the high amount of ocean water that they take in. It excretes a high saline solution from their nose.

Common Name: Great Shearwater
Scientific Name: *Ardenna gravis*

Size: 16.9-20.1 inches (43-51 cm); wingspan 100-118 cm

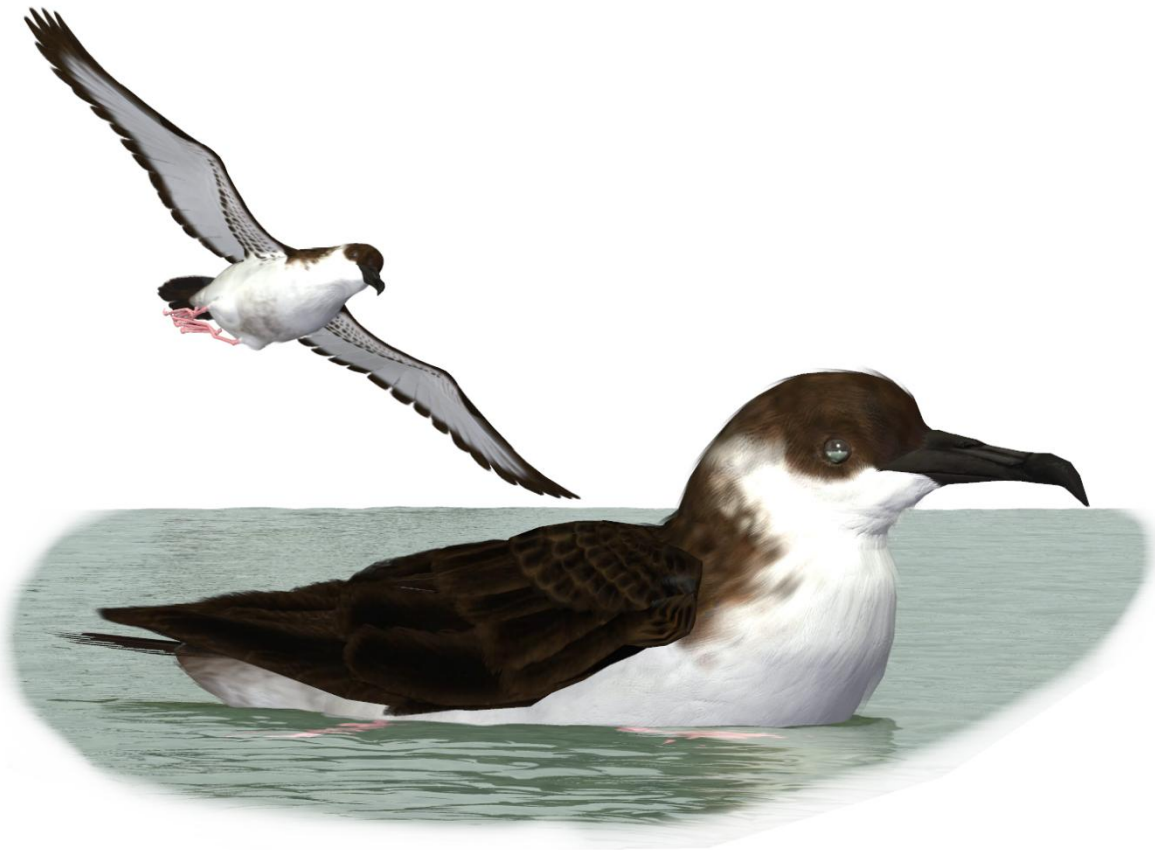
Habitat: Atlantic Ocean and SW Indian Ocean, breeding on Nightingale I and Inaccessible I (Tristan da Cunha), on Gough I, and on Kidney I (in the Falklands).

Marine, frequenting cool offshore and pelagic waters. Breeds on sloping ground , mainly in areas of tussock grass (Spartina arundinacea), ferns (Ctenitis aquilina) or Phylica woodland.

Status: Least Concern. **Global Population:** 15,000,000 mature adults with a stable population trend.

Diet: Mostly fish such as mackeral and capelin, squid and fish offal (scraps). It will eat some crustaceans, with breeding-season diet said to be dominated by cephalopods and, to lesser extent, crustacea.

Prey taken mainly by plunge-diving from height of 6–10 m, with dives typically lasting less than 12 seconds. It also catches prey using pursuit-diving and surface-seizing.



Nesting: It is a large drab and white, dark-capped shearwater, with a blackish bill. Sexes alike, but female averages slightly smaller. The cap to gape-level and back to nape are a sooty-brown, can have diffuse partial or complete whitish eye ring. It often

appears very dark at sea and strongly contrasting with bold white collar. The rest of the upper parts (including the upper wings) are a gray-brown or brown with pale fringes giving bird scaly pattern except for white at the rearmost upper tail-coverts. The primary-coverts are slightly darker brownish and less scaly. The remiges are slightly darker and grayer with rear scapulars and tertials dark but dorsal pattern usually does not form well-defined transversal “M”. The upper tail is blackish brown/ The under wing has dark grayish tips to remiges forming obvious trailing edge. It is broader at the wingtip with the bases of the remiges and most of coverts being white. There are dark stripes and spots on the lesser and median coverts forming a variable dark contrasting pattern on axillaries and at the leading edge of the wing. The partial brownish collar from the upper mantle to the sides of the upper chest. The rest of the under parts are white except for a diffuse and sometimes weak brownish patch or smudging on central belly and on the thighs and under tail-coverts. The iris is dark brown and the bill is a blackish gray. The legs are pink and usually dusky on outer side of tarsus and outer toe.

The juvenile (June–November) is similar to the adult, but lacks the whitish hind collar. It is often faded and worn by September–November. Second-cycle birds (May–August) can have a cap and hind neck pattern varying from adult-like to juvenile-like, and often retain some abraded juvenile outer primaries, while the dark belly patch is reduced in worn plumage and virtually absent in some (October–December).

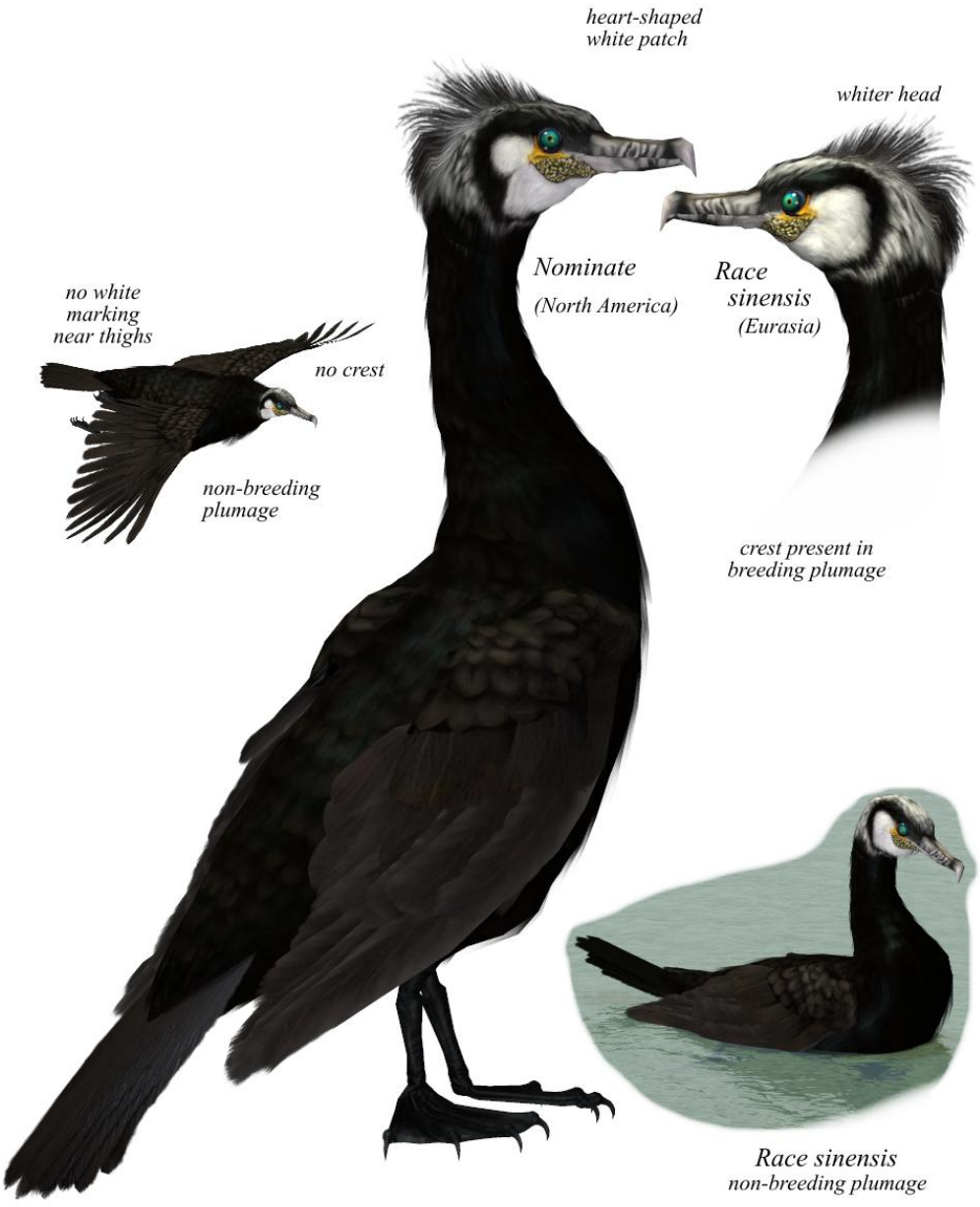
Birds return to their colonies in second half of September with mating usually occurring in October. They are less nocturnal at their colonies than most shearwaters, as their large size reduces the species’ vulnerability to attacks by skuas. They form long-term monogamous pair-bonds and are territorial around burrow entrance. They are highly colonial and nest in self-excavated burrows (up to 1 m long) or crevices among boulders. The female lays a single white egg. Nestlings appear in early to mid-January, and the young vacate colony between late April and mid-May.

Cool Facts: This large shearwater is easily identified by its distinctive plumage, marked by the dark cap and brown belly-patch, with the white underwing also relieved by variable brown markings. The Greater Shearwater breeds in very small numbers on one island in the Falkland Islands, but is otherwise confined as a breeding bird to Tristan da Cunha and the seabird ‘hotspot’ of Gough, where an estimated five million pairs breed.

Common Name: Great Cormorant
Scientific Name: *Phalacrocorax carbo*

Size: 31.5-39.4 inches (80–100 cm); Wingspan 130–160 cm

Habitat: Worldwide, with the exception of the polar regions; The nominate race is principally coastal throughout its breeding range, which extends from the northwestern Atlantic to western Iceland, Kola Peninsula of northern Russia, north and central Norway, British Isles, and northwestern France. In Britain and Ireland, small numbers nest inland and larger numbers winter there. Other subspecies widely distributed in Europe, Asia, Africa, Australia, and New Zealand.



In North America during non-breeding season, it occurs within its breeding range but often farther from breeding colonies. Small numbers of immatures seen regularly along Atlantic Coast south to Cape Cod, MA and, in recent years to Cape May, NJ, and are likely to be overlooked amongst numerous Double-crested Cormorants. It is exceptional south to Florida, and inland Pennsylvania. As in North America, individuals in Palearctic disperse in winter, some reaching Spain and also the Faeroe Islands where they formerly nested.

It frequents open waters, both marine and inland, with preference varying regionally (Race *carbo* is markedly marine while Race *sinensis* occurs mainly inland). At sea, rarely wanders far from the coast, preferring sheltered areas and estuaries. Inland, it occupies lakes, lagoons, reservoirs, wide rivers, salt pans and flood waters. Normally, it feeds in shallow water. It breeds on inshore islands, cliffs, stacks, amongst boulders and occasionally on wrecked ships and man-made structures.

Status: Least Concern. **Global Population:** 323,000,000 mature adults with an increasing population trend.

Diet: Almost entirely fish (mostly under 20 cm in length) with small numbers of crustaceans and amphibians.

It feeds mainly by pursuit diving, with evidence that depths attained are related to ambient light intensity. Deeper diving occurs under brighter light conditions. Very brown or discolored water of a river in spate does not prevent successful fishing.

It dives from surface, rarely engaging in plunge diving. Small prey may be swallowed underwater or very quickly on surfacing. Prey noticed at the surface likely to be larger or otherwise difficult to swallow. It may carry a very large fish to land for handling.

Nesting: Sexes alike in appearance, but males average 5–10% larger than females in linear dimensions, 20% in mass, and may sometimes be distinguishable in the field by more massive bill. Adults have generally black plumage with bluish gloss; wings browner with a greenish gloss and wing coverts and scapulars bronze with black margins. Characteristic pale-yellow skin of face and gular region (dark when breeding) has a broad posterior border of short white or light-colored feathers in adults at all seasons which is pale in all post-downy stages. In late winter and early in breeding season, breeding adult of nominate race (full Alternate plumage) have extensive short white plumes on head and upper neck and a conspicuous white patch on each thigh. This thigh-patch is present on some individuals by early Jan and on all adults in Mar. During breeding white filo-plumes and patch on flanks lost, and post-breeding pale area on lower head becomes less well defined and variably tinged dull brownish (especially on ear-coverts) so that head looks duller and less patterned, nape mane also lost, and black areas duller A short but substantial erectile black crest on nape and upper neck makes head appear large. The bare facial skin includes a small triangular patch below and behind the eye to gape that is variably bright orange (yellow to scarlet) about the time of egg-laying. Immatures duller and variable; they may be uniformly mottled or have dark throat and breast and paler belly. All plumages browner when faded and worn. In other parts of the species' range, in Africa, adults have extensive white plumage on head and breast.

It nests in colonies, often alongside other cormorants, darters, herons, spoonbills and ibises. In North America, it often nests with Double-crested Cormorants and gulls. Courting begins after the males establish nest sites within the colony. There is one brood per year.

In North America, Great Cormorant strictly a coastal breeder, nesting on rocky islets and cliffs. In Europe and Africa, inland breeders typically nest in trees and on the ground near rivers and lakes, sometimes in reedbeds. Both sexes participate in nest

building. After the pair is established, the female usually remains at the nest site while the male collects material from land or sea, and sometimes from unguarded or unoccupied nests. Upon his return, he gives the material to the female who constructs nest. The nest is often built on the remnants of previous years' nests. On rocks, the nest is a mound or heap of seaweed and sticks. Three to five eggs are laid and incubation generally lasts 27-31 days. The fledging period about 50 days, although first flights may occur at 42–45 days.

Cool Facts: It is the most widespread of all cormorant species.

- *P. c. carbo.* The nominate race is known as the "North Atlantic Great Cormorant" and is found in northeastern North America (Gulf of St. Lawrence southward to Maine) through southwestern Greenland and Iceland to Norway, northwestern Russia (Kola Peninsula) and British Isles. It winters in the southeastern United States, southern Europe and northern Africa. It is the largest and darkest of the subspecies.
- *P. c. novaehollandiae.* This race is called the "Australasian Great Cormorant" and is found in Australia, Tasmania, New Zealand, the Chatham Islands, and has recently recorded breeding in New Caledonia (Grand Terre) and the Solomon Islands (Rennell). The white head plumes of breeding season are much sparser than in the nominate or Race *sinensis* and are confined to the sides of the upper neck. It is closest to Race *sinensis* in the extension of bare facial skin, but has bluer and less bright gloss.
- *P. c. sinensis.* This race is referred to as the "Eurasian Great Cormorant" and is found in central and southern Europe and patchily through much of central Asia to Russian Far East, India and China. It winters in Africa and southeastern Asia. It is about 10% smaller than the nominate race in linear dimensions and 40% less mass with more extensive white plumes on the head and neck, which can appear solid white at distance. It is otherwise similar with the exception of a greener gloss to adult's plumage and the bare skin at the base of the lower mandible is more extensive, reaching as far as the gape or even further.
- *P. c. hanedae.* It is endemic to Japan. It is similar to Race *sinensis* but less greenish.
- *P. c. maroccanus.* The "Morroccan Great Cormorant" is found in northwestern Africa from Morocco southward to Mauritania. In appearance, it appears as an intermediate between *sinensis* and *lucidus*, with the throat and upper breast white during all seasons. In addition, it may be less glossy than the nominate, and the white of the lower head extending farther back. The facial skin can be variable but usually similar to the nominate.
- *P. c. lucidus.* The "White-breasted Great Cormorant" is found in coastal western and southern Africa and inland in east Africa. It is smaller and greener than Race *sinensis*. Populations in eastern Africa (especially the east Congo and west Uganda) show an extreme variation from all black to white-breasted. The facial skin at the base of the mandible and on the gular pouch during courtship is dark gray to dusky olive, rather than yellowish. Immatures are often contrastingly white on the under parts except for the dark outer thighs.

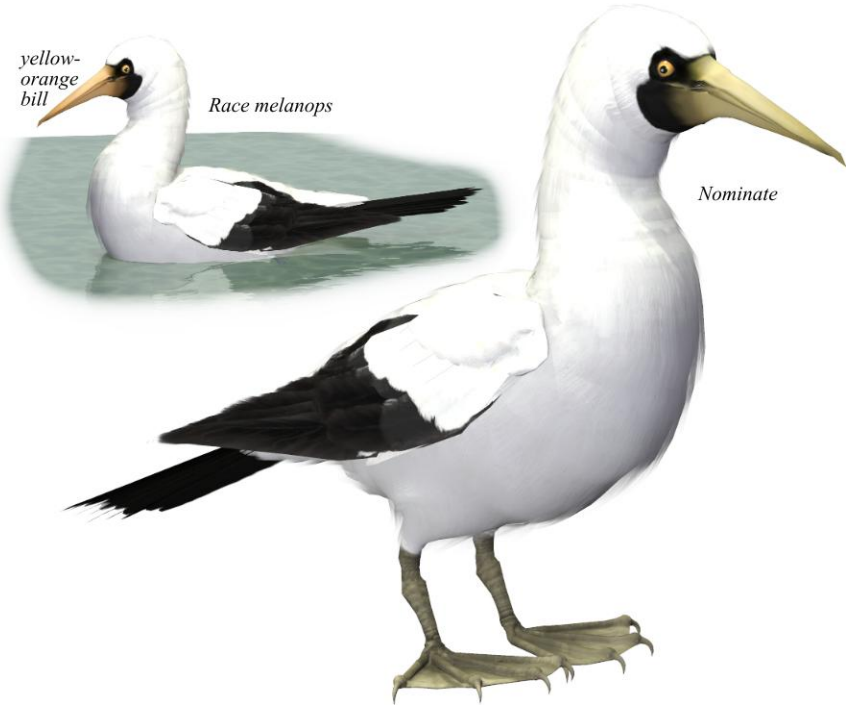
Common Name: Masked Booby
Scientific Name: *Sula dactylatra*

Size: 29.1-33.9 inches (74-86 cm)

Habitat: Tropical Oceans; from the Caribbean, across the Pacific Ocean, to Hawaii, Australia, and Indonesia-- a rare visitor to the United States.

For roosting and breeding , it exclusively favors smaller oceanic islands (especially flat, unforested terrain) within 30° of the Equator. Breeding colonies are found on coral sand beach (Latham, west Indian Ocean); on pampa-like vegetation consisting of *Eragrostis variabilis, Boerhavia diffusa, Lepidium owaihiense, Tribulus cistoides, Ipomea indica, Solanum nelsoni,* and *Verbesina encelioides* (Kure, Hawaiian Islands.). It typically avoids nesting directly on vegetation or on steep slopes or cliffs, but favors locations near cliff edges or on high spots that facilitate taking flight.

Status: Not threatened. **Global Population:** 211,000,000 mature adults with a declining population. At least some mortality from tangling in fishing gear, but this problem is not known to be significant. It probably has frequent interactions with purse-seining tuna fisheries, as the fisheries often use Masked Boobies and other seabirds to locate tuna schools, but no scientific data exists.



Diet: Fish and squid.

It forages in blue-water pelagic zones. It plunge-dives from various heights up to 30 m (100 feet) into schools of fish.

Nesting: Sexes are similar in appearance but females are slightly larger. The adult plumage is bright white, except for the black to blackish-brown primaries, secondaries, humerals, and tail. The white on the wings is restricted to the marginal, lesser and median coverts, and some of the outer primary-coverts (the rest are blackish-brown to black). The under wing has white coverts, remiges blackish distally and broadly tinged pale gray on bases. The bill ranges from a greenish-yellow to bright yellow and is thick-based, tapering down without much curvature. The dark slate to black skin around the eye, extending narrowly to the upper bill and on the lores to the upper throat. It is less dark on the chin and lores.

The juvenile plumage is a dark chocolate to black except for the white upper back which forms a broad conspicuous collar and white breast. The tips of the scapulars

have a whitish dull brown color, with less distinct pale tips to the lesser coverts and on back to the upper tail-coverts. It rear flanks and rear thighs are a blotchy dark brown, otherwise it has all-white under parts and under wing-coverts white with a dark carpal patch and narrow dark line towards base of wing. As the birds age, the upper parts (including the marginal and lesser wing-coverts) acquire dark brown and white feathers in that form a checkerboard-like pattern.

Nests are a slight depression on ground, surrounded by circle of pebbles or other debris, often near a breezy cliff edge or other take-off feature. One to two light blue eggs are laid. Although the Masked Booby regularly lays two eggs, it never raises two young. The first egg is laid four to nine days before the second, and the older chick always ejects the second from the nest. The parents do not protect or feed the ejected chick, and it is quickly scavenged by a host of associated crabs, landbirds, and frigatebirds.

Cool Facts: The Masked Booby, also known as the White or Blue-faced Booby.

The population of boobies breeding along the Pacific Coast of northern South America, including the Galapagos, was recently recognized as a separate species, the Nazca Booby (*Sula granti*). Until 2000, it had been considered a Masked Booby subspecies. The Nazca Booby has an orange, not yellow, bill and is smaller with a significantly shorter, shallower bill. Whereas the Masked Booby usually nests on low, flat areas, the Nazca Booby uses cliffs and steep slopes.

Four subspecies are recognized:

- *S. d. personata.* This subspecies breeds in the southeastern Indian Ocean (Cocos Keeling Islands, Christmas Island and northwestern Australia), and on numerous islands in the west and central Pacific Ocean from Philippines eastward through Micronesia and Polynesia, north to the Hawaiian Islands and south to the Coral Sea, off northeastern Australia. It is also found in the eastern Pacific on islands off western Mexico (Alijos Rocks, Clarión Island, San Benedicto, Clipperton Island) and off north-central Chile (San Félix, San Ambrosio). It has a yellow bill and its iris tends to be orange-yellow or amber. Its legs and feet are olive drab to bluish-gray.
- *S. d. tasmani.* This subspecies breeds in the northern Tasman Sea (Lord Howe Island, Norfolk Island and Kermadec Islands). Its iris is brown (all other subspecies have yellow iris). Its bill is straw-yellow to olivaceous greenish-yellow and its legs are a dark khaki-gray. It is grayer on the tarsi.
- *S. d. dactylatra*. The nominate subspecies breeds on islands in the Caribbean and off the northern coast of South America (South to eastern Brazil), on Ascension Island (Southern Atlantic Ocean), and possibly also still in the Bahamas. Its defining characteristics are its straw-colored bill, orange to olive legs and feet.
- *S. d. melanops.* This subspecies breeds on islands of southern Red Sea and western Indian Ocean. Its bill is orange-yellow to yellow-green. Its legs and feet are lead gray to khaki-olive. Its tarsi is often grayer, and the central tail feathers are with little or no silvery gray.

Common Name: Nazca Booby
Scientific Name: *Sula granti*

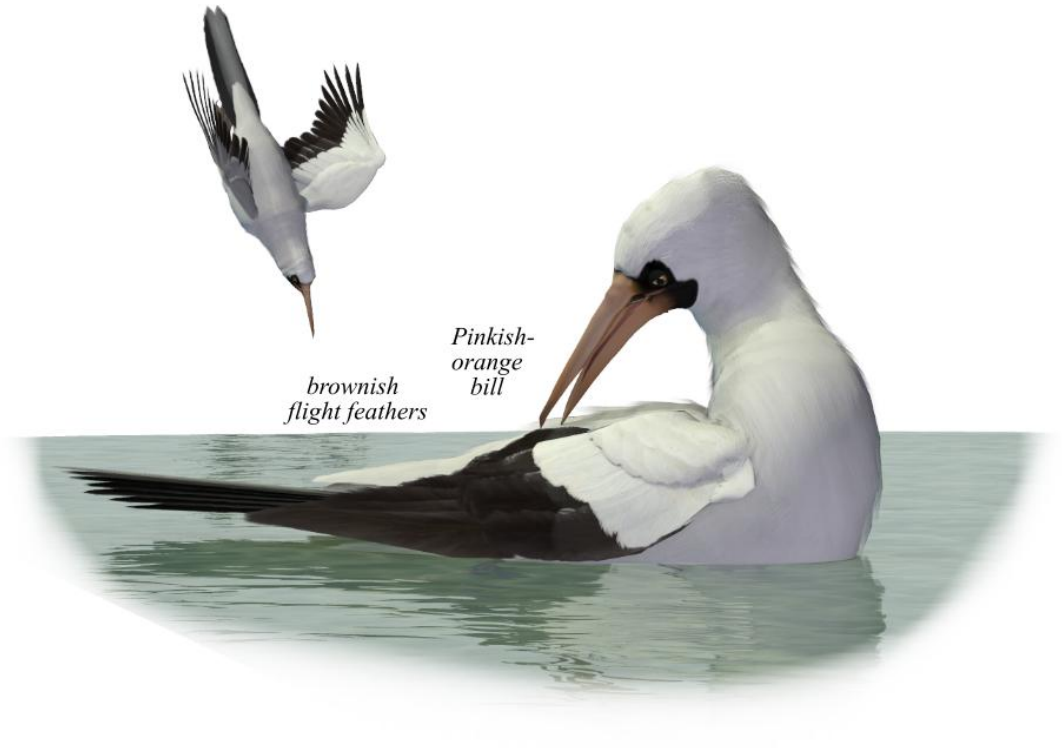
Size: 29.5-33.5 inches (75-85 cm)

Habitat: Eastern Tropical Pacific. The main breeding colonies are located on the Galapagos Islands and on Malpelo Island (off of western Colombia). There are smaller colonies on San Benedicto Island (western Mexico), Clipperton Island (Eastern Pacific), Cocos Island (south of Costa Rica), La Plata island (Ecuador), and Lobos de Afuera (off of northwestern Peru).

It is strictly marine and fairly pelagic. When foraging, it prefers deeper waters than other boobies. In the Galapagos, it feeds further from its colony than the Blue-footed Booby does, although its diet appears to be very similar. It nest and roosts on rocky islands offshore.

Status: Least Concern. **Global Population:** 3,000,000 - 4,000,000 mature individuals with an increasing population trend.

Diet: Nazca Boobies on the Malpelo Island consume mainly one species of fish, *Oxyporhamphus micropterus*. The second most significant family in their diet is flying fish, followed by jacks, pompanos and tuna. This contrasts with the diet of boobies on the Galapagos Islands where anchovies and sardines make up a significant part of the birds' nutrition.



Prey is caught by plunge-diving from moderate to great heights. Older birds perform a reduced proportion of v-shaped dives, indicating reduced foraging efficiency and senescence. Furthermore, these birds make a larger number of foraging dives per hour than younger birds.

This booby is normally solitary, or found in small groups. It is a frequent victim of food piracy by frigatebirds. The Nazca Booby is one of the most pelagic species of boobies during the breeding season, making foraging trips more than 329 km away from the coast, the longest trip recorded for any booby species.

Nesting: Sexes appear the same in plumage; females tend to be larger than males. The Nazca Booby closely resembles the Masked Booby (*Sula dactylatra*) but the adult Nazca has a coral-pink bill with yellower tip (not a yellow bill, as in the Masked Booby). Other differences include the color of its feet which are khaki to dark grayish-olive. Its iris, which is a golden-yellow to orange, and the central rectrices which often are largely silvery gray to white (rather than all dark). There also are subtle morphological differences between the two species. Nazca Booby is smaller than Masked Booby, with a shorter, shallower bill, and shorter tarsus, but with longer wings and tail.

It is more difficult to distinguish immatures of the two species, especially juveniles, which have grayish bills in both species. Most juvenile Masked Boobies have a white collar across the neck, while conversely, the nape of Nazca Booby usually is brown.

Cool Facts: The Nazca Booby is closely related to the Masked Booby (*Sula dactylatra*), and indeed formerly was considered only a subspecies of the latter. However, recent molecular studies have established it as a separate species, and the two species also breed sympatrically with no hybridization. The main difference from the Masked Booby, besides its breeding range, is in bill color, with the Nazca Booby having a deep red or orange bill and the Masked Booby a yellow bill. The Nazca Booby breeds primarily on the Galapagos and Malpelo Archipelagos but can be rarely found offshore from mainland South America, with small breeding populations in the Ecuadorian and Peruvian coasts as well as in the Pacific Coast of Central America. Its status in the region is uncertain due to confusion with very similar Masked Booby which is a regular visitor of the offshore waters of South America’s Pacific Coast.

Common Name: Red-footed Booby
Scientific Name: *Sula sula*

Size: 27.2-31.1 inches (69–79 cm)

Habitat: Pantropical distribution in the Caribbean Sea, Atlantic, Pacific, and Indian Oceans, and seas north of Australia.

It prefers mainly coral atolls or volcanic islands.

Status: Least Concern. **Global Population:** 3,000,000 - 4,000,000 mature individuals with an increasing population trend. It is one of most abundant and widespread of all sulids, but population widely scattered on myriad of small islands through tropical seas and few colonies are protected. As result of its tree-nesting habit, has suffered greatly from habitat destruction, especially in western Indian Ocean, where at least 12 colonies lost in the last 100 years. This has also occurred in the South Atlantic, where just 100 pairs remain. It does not pick up plastics at sea as the albatross does.

In Hawaiian Islands., most colonies are protected by U.S. Fish and Wildlife Service. The birds are doing well there and, in some cases, increasing in numbers. In the Caribbean and throughout rest of its range, protection varies by country; poaching and destruction of habitat occurs, even in some designated sanctuaries.

Diet: Mostly flying fish and squid.

It feeds mostly by diving vertically into the water, generally from 4-8 m and dives as deep as 5 m. It may catch flying fish in air. Prey are never carried in beak while flying. They are always swallowed first. It feeds singly or in flocks, numbering a few to several hundred. It is often in mixed-species flocks with shearwaters, petrels, Brown Boobies, Sooty Terns and Brown Noddies.

Nesting: Sexes appear the same in plumage; females tend to be larger than males. It is a slim-bodied and long-winged booby with the longest tail within its genus. The adults feet and legs are orange-red to red. Its bill is mostly bluish gray, and base of lower mandible is pinkish. The bare facial skin around the eye and nostrils is brightly colored: a combination of pink to red, and light blue. The male gets a lime green or bluish green patch under and in front of eye prior to breeding, which fades quickly once incubation begins. The soft-part colors fade universally as nesting season progresses.

This booby is highly polymorphic, with confusing array of color morphs, ranging from individuals all white (often more or less tinged apricot-yellow) except for blackish primaries, secondaries, and coverts (white morph), to individuals that are entirely dark brown (dark morph). Some white-morph birds have blackish tail, while others have white tails but entirely dark upper wing and 'saddles.' Color morphs do not segregate reproductively or geographically.

Fledglings and juveniles of all morphs somewhat similar; all brown plumage, except light tan or white belly with slightly darker chest stripe. They have a black bill and facial skin while the feet are gray. Immatures have a mottled gray-brown head, a white back, wings and under parts spotted with varying degrees of gray-brown except in dark morph. The degree of spotting decreases as birds reach their adult plumage. The soft parts are a muted color of adult colors.

It nests primarily in shrubs or trees such as the beach magnolia (*Scaevola serice*a) or beach heliotrope (*Tournefortia argentea*), but will use almost any plant, and sometimes deserted man-made structures. It prefers to nest at heights greater than 1 m (3 feet). On large islands, nesting can occur up to 5–8 km inland. It generally does not nest in the shade.

The pair builds a stick nest, with larger twigs on bottom and smaller twigs toward top. One of pair must stay with nest to prevent other birds (Red-footed Boobies or frigatebirds) from stealing nest material. Usually only one egg is laid and incubated for 44-46 days. Female spends several days at nest prior to laying and takes first shift. Male and female share duty thereafter. During first 1–2 wk of life, chick spends most time sleeping under parent, waking each few hours to move or beg. Chick begins preening when 2–3 weeks old. At least one adult is at nest continuously until chick is 6–8 weeks old. Chicks fledge after 90 to112 days.

Cool Facts: This pantropical booby is the smallest of the six booby species found worldwide. Only this booby, and Abbott's Booby, are the only arboreal nesters in the booby family.

Three subspecies generally recognized:

- *S. s. sula.* The nominate subspecies is known as the Atlantic Red-footed Booby and is found on islands in the Caribbean and off eastern Brazil (Fernando de Noronha, Trindade), and Ascension Island (south Atlantic).

- *S. s. rubripes.* The Indopacific Red-footed Booby is found on islands in the Indian Ocean and the tropical western and central Pacific Ocean eastward to the Hawaiian Islands, Line Islands, Marquesas and Pitcairn Islands.
- *S. s. websteri.* The Eastern Pacific Red-footed Booby is found in the tropical eastern Pacific Ocean from the Revillagigedo Islands (off southwestern Mexico) south to the Galapagos islands.

Common Name: Guadalupe Murrelet
Scientific Name: *Synthliboramphus hypoleucus*

Size: 9-9.8 inches (23-25 cm)

Habitat: Pacific Ocean; at sea and on offshore rocks and islands of northwestern Baja California (San Benito Islands and Guadalupe Island); some sightings on San Martín Island (also in Baja California), and San Clemente Island and Santa Barbara Island (Channel Islands), off southern California. It winters offshore presumably within the breeding range along the Pacific coast of Baja California, rarely further north.

It is found offshore and along sea coasts, occupying warmer waters than all alcids except Craven's and Scripp's Murrelet (*S. craveri* and *S. scrippsi)*. It breeds on steep sea cliffs, slopes and canyons on islands. It winters primarily well offshore, though distribution at this season not well known due to difficulties of separation from Scripp's Murrelet, albeit with definite evidence of some degree of overlap.

Status: Endangered. **Global Population:** 5,000 mature individuals with a declining population trend. Cat predation is thought to have caused the extirpation, or at the very least, significantly reduced the population on the main island of Guadalupe, which is considered the most important historical site for the species. Other likely former breeding colonies (Cedros, Natividad, Asunción and San Roque) thought to have been extirpated by invasive animals.

Breeding is unconfirmed on San Martín Island, Baja California, and San Clemente and Santa Barbara Islands, California. Guadalupe Island has been declared a

Biosphere Reserve and the other Mexican islands with current or former breeding colonies are either in existing biosphere reserves (Natividad, Asunción and San Roque) or in a proposed new biosphere reserve. Other than introduced mammalian predators, other threats are drowning in drift gill-nets, nest-site disturbance, bright lights used by the squid fishery that cause disturbance and mortality and possibly organochlorine pollution, and changes in sea temperature associated with global climate change.

Diet: Around Santa Barbara Island during nesting period, it eats entirely larval fish (especially northern anchovies, Pacific sauries and rockfish). Elsewhere, it feeds on unidentified crustaceans and sand lance.

Breeding: A small auk with a short, slender black bill. Sexes are alike in appearance. The female is usually significantly larger than male in its culmen, wing chord and weight (averages 15 g heavier), but not bill depth or tarsus length. Its black upper parts have a faint grayish cast, including top of head, neck, back, wings and tail. There are prominent white crescents above and below the eye, meeting the white of the throat. It has mostly snowy white under parts, with its flanks varying from white to a mottled gray and white. Its legs and feet are a bluish-gray, with black webs and claws. In winter, it is often a paler grayish-black above due to feather wear. The juvenile is similar to the adult, but with scattered dark barring along the flanks.

It appears on the sea near colonies mid-to-late December, and breeding can continue until July. It is nocturnal when at the colony. Egg laying is asynchronous and variable between years, but the season is generally very similar to, perhaps marginally later than Scripp's Murrlet. Chicks of this species recorded as early as late February and eggs as late as early May. It is probably monogamous. It breeds mostly in small colonies and at low densities, possibly determined by patchy distribution of suitable nesting habitat: rock crevices, caves, burrows and shrubs. Nests often placed under foliage of maguey (*Agave shawi*), on sandy slopes facing sea, while a few few nests are in earthen caves or burrows of other species (such as rabbits). A clutch of two eggs is laid.

Cool Facts: Three very similar species of small, gray and white alcids (*Synthliboramphus*) occur in southern California and in northwestern Mexico. Guadalupe Murrelet has the most distinctive appearance of these three; it also is the rarest, most geographically restricted, and least known member of the group.

Common Name: Scripps's Murrelet
Scientific Name: *Synthliboramphus scrippsi*

Size: 9-9.8 inches (23-25 cm)

Habitat: Pacific Ocean; it breeds the southern California Channel Islands and on islands off west coast of Baja California at least as far south as Islas San Benito. Santa Barbara Island supports the great majority of nesting birds in southern California. Nesting at large islands (San Miguel, Santa Cruz, San Clemente) is largely or entirely on offshore rocks, owing to presence of predators (native island fox and spotted skunk) on these islands. Some birds breed at San Clemente Island and there is a single record (1967) of a pair nesting at Bird Rock off Santa Catalina Island. When not at breeding colonies, individuals occur along the Pacific Coast from at least the southern tip of Baja California to southern British Columbia.

Its preferred nesting habitat is steep sea slopes, canyons, and cliffs with a sparse cover of herbaceous and shrubby plants. On Channel Island this includes annual grasses, iceplant, and the shrubs such as silverlace, cholla, wild buckwheat, and Australian saltbush.

Status: Vulnerable. **Global Population:** 1,440,000 mature individuals with a declining population trend. The largest nesting colony of Scripps's Murrelet in the United States is on Santa Barbara Island in the California Channel Islands. Important colonies off the coast of Baja California are on Islas Los Coronados, Islas San Benito, and Isla Guadalupe. The species has been extirpated on some of the Baja California islands by introduced cats and other predators, and it is threatened on other islands. Although the colony at Santa Barbara Island has maintained numbers in the low thousands since the mid-1970s, it is very localized and subject to several threats, including oil spills and other pollution as well as avian and mammalian predation.

Diet: Around Santa Barbara Island during nesting period, it eats entirely larval fish (especially northern anchovies (*Engraulis mordax*) but also Pacific sauries and rockfish (*Sebastes sp.*)). Elsewhere, it feeds on unidentified crustaceans and sand lance (*Ammodytes sp*).

A wing-propelled diver that captures larval fishes and other small prey items in its bill. Observers have noted zigzag patterns in underwater “flight” of foraging birds. The species is almost always seen on the water in pairs, even in non-breeding season and throughout nesting season, when one member of mated pair is generally on nest. This may reflect cooperative foraging by either mated pairs or “pairs” of unrelated birds.

Breeding: Sexes are alike in appearance. The female is usually significantly larger than male in its culmen, wing chord and weight (averages 15 g heavier), but not bill depth or tarsus length. A small, cleanly marked murrelet with slender bill. Its dorsal color (including the top of the head and neck, back, wings, and tail) is solid black with bluish-gray cast. With worn plumage, it appears gray-black, sometimes with dull brown cast, but generally still showing some bluish-gray. Some individuals have dark feathers forming a partial collar at sides of neck, but this is short and broad (longer and narrower in Craveri's Murrelet). The under wing coverts usually pure white, sometimes with a few scattered gray feathers. The base of the inner vanes (and shafts) of primaries are white. The flanks (below the folded wing) are largely white or mottled gray and white. Its underparts, including the throat and under tail-coverts are snowy white. It bill is shorter and deeper than in Craveri's Murrelet.

It appears on the sea near colonies mid-to-late December, and breeding can continue until July. It is nocturnal when at the colony. Egg laying is asynchronous and variable between years, but the season is generally very similar to, perhaps marginally later than, *S. scrippsi.* Chicks of this species recorded as early as late February and eggs as late as early May. It is probably monogamous. It breeds mostly in small colonies and at low densities, possibly determined by patchy distribution of suitable nesting habitat: rock crevices, caves, burrows and shrubs. Nests often placed under foliage of maguey (*Agave shawi*), on sandy slopes facing sea, while a few few nests are in earthen caves or burrows of other species (such as rabbits). A clutch of two eggs is laid.

Cool Facts: Scripps's (formerly Xantus's) Murrelet, along with the closely related Craveri's Murrelet (*Synthliboramphus craveri*), is one of the southernmost species in the Alcidae, a family that is predominantly northern in distribution. This small black and white seabird has a relatively limited breeding distribution on offshore islands from southern California to central Baja California, Mexico. Postbreeding dispersal is largely to the north, as far as is known; large numbers of birds spend the late summer and fall over the outer continental shelf off central California, and small numbers occasionally occur in similar habitats north to Washington and southern British Columbia.

Common Name: Black Noddy
Scientific Name: *Anous minutus*

Size: 15 inches (38 cm)

Habitat: Oceania; throughout the Hawaiian Archipelago, including all islands of NWHI and the coastal cliffs and offshore islets of MHI. Outside of Hawai‘i, noio (black noddy) breed on islands throughout the world’s tropical oceans. Noio (black noddy) typically remain near (within 80 kilometers [50 miles]) their breeding colonies year-round.

Status: Least concern. **Global Population:** 2,000,000-3,000,000 mature individuals. In Hawai‘i, population estimated at 12,000 breeding pairs with the largest populations occurring on Midway Atoll (6,000 pairs) and Nihoa (5,000 pairs). All sites in NWHI are free of rats and cats, however the MHI support large populations of non-native mammalian predators and like all seabirds, adults and nests are susceptible to predation by rats *(Rattus spp.*), and feral cats (*Felis silvestris*). Also ‘Iwa or great frigatebirds (*Fregata minor*), Laysan Finches (*Telespiza cantans*), and shorebirds will depredate eggs and chicks. Kayak and zodiac tours of sea caves used for nest sites can result in adults flushing from nests, resulting in predation by native birds. And because noi’o (black noddy) rely on predatory fish to drive prey to the surface, overfishing may eventually affect Hawaiian populations.

Diet: Primarily takes juvenile goatfish, lizardfish, herring, flying fish, and gobies. Often forages in large, mixed species flocks associated with schools of large predatory fishes which drive prey species to the surface. Noi’o generally forage in near shore waters and feeds mainly by dipping the surface from the wing or by making shallow dives.

Nesting: Individuals have slender wings, a wedge-shaped tail, and black bill which is slightly decurved. Adult males and females are sooty black with a white cap and have reddish brown legs and feet. The bill is slightly decurved.

These birds make nests in caves, or rocky ledges of sea cliffs in late spring. Usually, Noi'o nest together as a colony. The females lay only one egg each year. They can often be seen hunting fish near their nesting sites. Established pairs return to the same nest site year after year. Breeding is highly variable and egg laying occurs year-round. Both parents incubate the single egg, as well as brooding and feeding the chick. Birds first breed at two to three years of age, and the oldest known individual was 25 years old.

Cool Facts: Noi'o are unusual because they are endemic coastal birds that reside in Hawai'i year round, while most of Hawaiian sea birds spend winters in Hawai'i, and leave in summer to breed in the arctic. Their cousins, Noi'o Koha, or Brown Noddys, nest on the ground, and because of this have not survived on the main islands, where they have been wiped out by predators.

Flight is swift with rapid wing beats and usually direct and low over the ocean; this species almost never soars high.

Seven Black Noddy subspecies are generally recognized, and two are resident in Hawai'i (Races *melanogenys* and *marcusi)*.

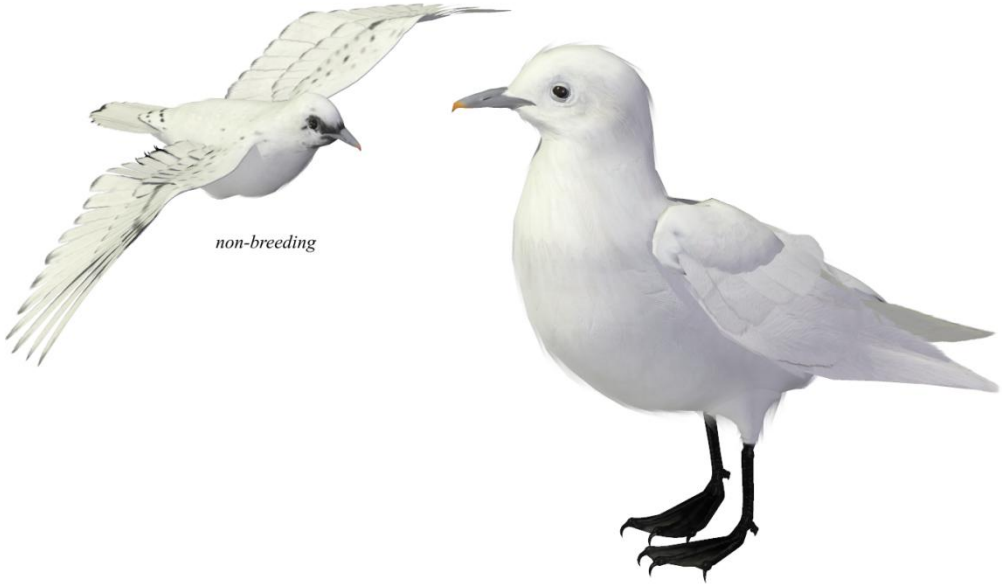
- *A. m. americanus*. First reported by Mathews in 1912. It is found in the Caribbean islands. It is similar to the nominate but has a stouter bill and browner tail.
- *A. m.* melanogenys. First reported by Gray in 1846. It is found in the Hawaiian Islands. It had the has shortest wing and tail.
- *A. m. diamesus*. First reported by Heller and Snodgrass in 1901. It is found in the eastern-central Pacific at Clipperton Island, Cocos Island and Malpelo Island. It has the longest wings and tail of the subspecies.
- *A. m. worcester.* First reported by McGregor in 1911. It is found on Cavilli Island and the Tubbataha Reef (Sulu Sea), also the Java Sea, and (perhaps) the Ashmore Reef (off northwestern Australia. It disperses to the eastern Indian Ocean.
- *A. m. minutus.* First reported by Boie in 1844. The nominate subspecies is found on the coasts of northeastern Australia and eastern New Guinea, the Bismarck Archipelago, the Solomon Islands and locally through Melanesia (excluding Vanuatu) and Polynesia to the Tuamotu Islands.
- *A. m. marcusi.* First reported by Bryan in 1903. It is found on Marcus Island (Minami Tori-shima) and Wake Island southward through Micronesia to the Caroline Islands.
- *A. m. atlanticus.* First reported by Mathews in 1912. It is found on several Atlantic islands: St Paul, Fernando de Noronha and Martim Vaz (off eastern Brazil), Ascension and St Helena (formerly also Inaccessible) north and eastward to islands in Gulf of Guinea (western Africa). This race has a longer, stouter bill and longer wings than *minutus*. The tail is noticeably blackish, and white on head is more restricted to crown. It differs from race *diamesus* in having lighter shoulders, under body, and the sides of head and neck.

Common Name: Ivory Gull
Scientific Name: *Pagophila eburnea*

Size: 16-16.9 inches (40-43 cm); wingspan 108-120 cm

Habitat: North America and East-Asia Arctic Regions; it breeds north-eastern Canada, northern Greenland, Svalbard, and several archipelagos in northwestern reaches of the Russian Federation. In winter it has a near circumpolar distribution, and is found in the Arctic, Pacific and Atlantic oceans. On occasion, at any time of year, it can be found far from drifting pack ice. In North America, this gull is confined to the central and eastern Canadian Arctic during the breeding season. It does it occur as a winter vagrant south of the Bering Sea and Maritime Provinces in rare instances.

It breeds mainly on inaccessible cliffs, on broken icefields, inland cliffs, and on low rocks or flat shoreline. In rare cases, gravel-covered sea ice close to coast has used as breeding platform. Outside of breeding season, they are associated with pack ice-- favoring areas with 70–90% ice cover near the ice edge.



Status: Near Threatened to Endangered. **Global Population:** 12,000–18,000 mature individuals with a dramatically declining population trend. Remote and inaccessible locations of Ivory Gull breeding colonies generally limit direct risks from human disturbance, however climate change impacts to the ice shelves appears to directly be impacting the survival of this species. Changes in conditions on its staging or wintering grounds, such as more severe winters and changes in distribution and thickness of sea-ice for affecting the populations. Other potential causes of the decline have been identified in Canada include oiling at sea. For both climate change and

contaminant factors, cessation or mitigation of potential negative effects on Ivory Gulls is unlikely in the short-term.

Ivory Gulls are protected under various legislation in Canada, the United States, Greenland, and Svalbard. Species is on the Norwegian Red List as “declining, monitoring”, and is registered as a Category 3 (Rare) species in the Red Data Book of Russia However, economic instability and changing legal structure threatens conservation strategies for all Arctic wildlife protected in Russia's incomplete system of nature reserves. In Canada, Ivory Gulls were uplisted to “Endangered” in May 2006, based on recently documented population declines. As a declining, circumpolar species with panmictic populations shared by several countries, the Ivory Gull deserves special recognition and sustained monitoring throughout the circumpolar arctic.

Diet: Opportunistic feeders. Major prey includes sympagic (ice-associated) fish and invertebrates washed onto floes or caught nearby in surface waters. Infrequent sightings originally prompted observers to conclude that Ivory Gulls were largely dependent on scavenging feces and carcasses, however more close study has proven this claim exaggerated.

It is very responsive to “red” splashes with it unhesitatingly investigating and pecking at red objects (including clothing) left on ice or snow. It appears to rely mostly upon vision for acquiring food. It uses hovering, contact-dipping, surface-plunging, wading in shallow water, and surface-seizing for foraging. When diving, it hovers while looking down into the water, then plunges like a tern. Birds may submerge completely except for wings which are held upward over back. Occasionaly, the dives are deep enough so that only wing tips project above the water surface. At Spitsbergen, takes marine crustaceans by surface-dipping in flight.

Nesting: Sexes are alike and there is no pronounced seasonal variation. It is a very distinctive gull with the plumage being entirely white in adults. It is the only gull with those markings (except for fully albinistic individuals of other small or medium-sized gulls). Its heavy bill is slate-blue graduating to grayish-green with a yellow or red tip. Its legs are black. It has an upright head and a very rounded crown with a stocky body and short legs. Its wingtips projecting beyond tail give perched individuals the silhouette of a white pigeon or dove. It has a dark iris.

First winter gulls have blackish face mask, usually with a narrow black subterminal tail band, and varying amounts of black spots on upper parts and tips of flight-feathers, which gives an ermine-like appearance.

In Svalbard and Franz Josef Land, gulls may arrive at breeding sites as early as February and March, before the polar daylight returns. More typically though, gulls return throughout April and May. It has been known not to breed when food conditions are unfavorable. Breeding usually compressed into

about 60-day period; initiation depends upon influence of annual climate conditions.

It usually selects nesting sites that are remote and predator-free such as rocky cliffs. In Spitsbergen, nesting ledges and clefts situated 10–43 km inland on 20–30 m high stone tower cliffs on hilltops (to 730 m elevation) above glaciers, gravel slopes, and erosional pans, on small dolerite cliffs near the top of scree slopes at 500 m elevation, on dry stony ridges within a few meters of the ice cap, gently-sloping boulder-strewn mounds, and gravel banks in small streams. Both adults assist in nest construction. The nest is a scrape type construction which is supplemented by dry grasses, splinters of driftwood, feathers and down, mosses, algae and seaweed. It lays a single clutch. Incubation begins after a second egg is laid with both sexes incubating. Eggs are never uncovered for more than a few seconds. The free bird may try to push off its incubating mate, but more commonly waits quietly at side of the nest for periods a few minutes to an hour. Incubation takes 24-26 days and fledging requiring 30-35 additional days.

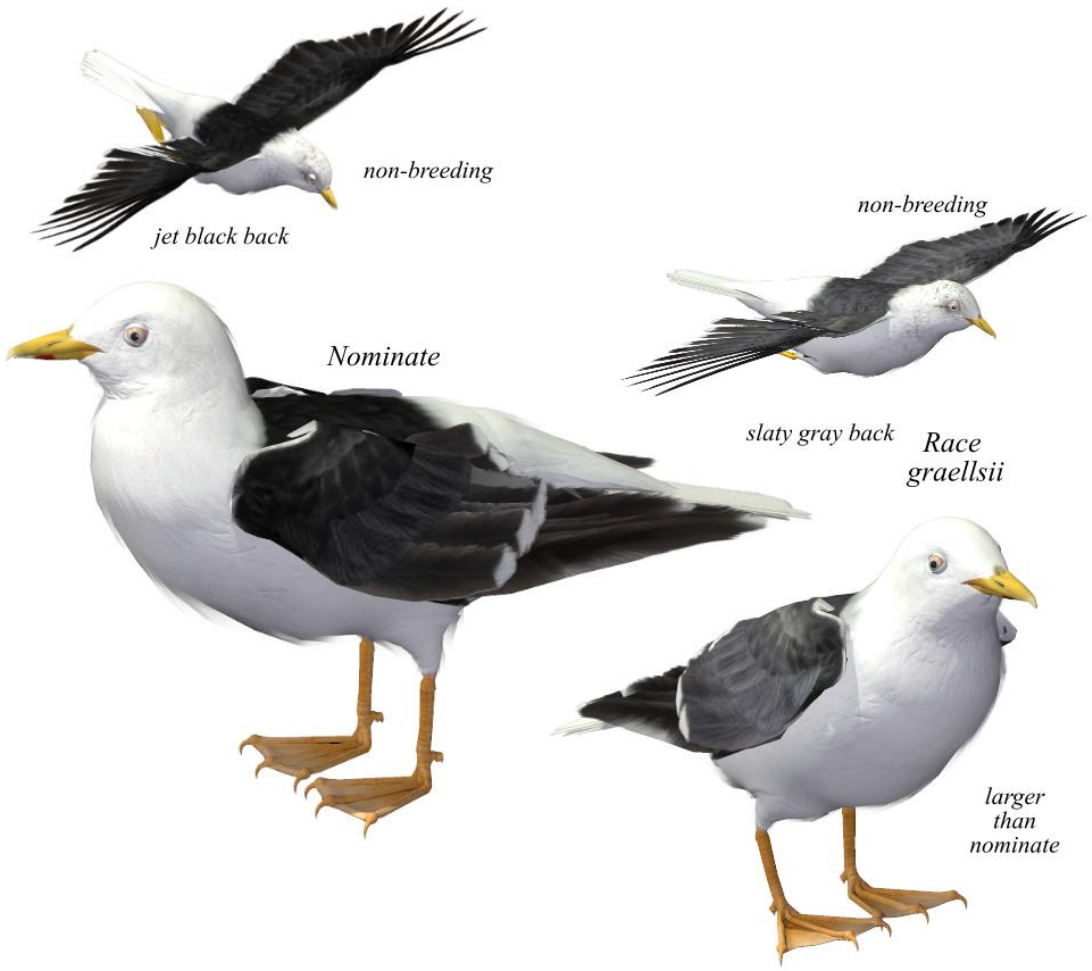
Cool Facts: Ivory Gulls were known to Arctic mariners as early as 1609, although the species was not classified formally until 1774 by C. J. Phipps, who described it from a specimen taken in Spitsbergen following an attempted voyage to the North Pole. In spite of a relatively early discovery, its mysterious lifestyle led to ample speculation about its habits. Some of the earliest assertions, such as a supposed aversion to sitting on the sea surface and reliance upon polar bear and seal offal, were certainly overstated. Even today, knowledge of the life history of Ivory Gulls has been slow to accrue and there have been no truly long-term studies of its demography. The Ivory Gull's year-round association with sea ice and its position at the top of the Arctic food web make it especially susceptible to man-made changes and to environmental pollution swept north by prevailing winds and ocean currents. Recent surveys in Canada revealed an 80 to 85 percent population decline in the species' breeding population there since the 1980s, raising concern for the survival of the species and rumors of its imminent demise. Researchers have been scrambling to understand the ecology and status of this enigmatic and exceptionally difficult to study bird and answer the question that everyone has been asking: What is really happening to the Ivory Gull? Although it seems unlikely that any one factor is driving the bird's apparent decline, scientists are slowly assembling the pieces, and human activities are certainly implicated.

Common Name: Lesser Black-backed Gull
Scientific Name: *Larus fuscus*

Size: 20.1-24 inches (51-61 cm); wingspan 124–158 cm

Habitat: Eurasia; the breeding areas are mostly found in northern Europe and Russia. It winters through southern Eurasian and Africa. It has increased dramatically in North America, most common along the east coast. Formerly just a winter visitor, many birds are now spotted year-round. Some winters they occur in large numbers. Even on the west coast, this species has become an annual winter visitor in California with birds reported around most of the state each winter. They've even been seen in numbers at the Salton Sea.

It frequents a wide diversity of coastal and inland waters, including the open sea. It obtains most of its food at open sea. It congregates to feed or roost at estuaries, harbors, lakes, reservoirs and sandy beaches. Many scavenge at rubbish dumps and in fields. It breeds mainly on sandy, rocky or grassy sea coasts, rocky islands, in saltmarshes, on islands in lakes and rivers, on roofs of buildings, on moors and on sea cliffs. It tends to avoid cliffs occupied by the European herring gull (*L. argentatus*).



Status: Least Concern. **Global Population:** 800,000-920,000,000 mature individuals with a stable to increasing population trend. Overall the species has increased greatly since the 1940s, but there have been local declines, due to culling

for example. Race *fuscus* in particular has shown a declining trend, which seems largely due to poor reproductive output; in Finland the population decreased from about 15,000 pairs in the mid-970s to 3,700 pairs by 2013. Some *fuscus* colonies have been seriously affected by Herring Gull predation. Blood and egg analyses have also shown that Race *fuscus* carry higher DDE residues than other sympatric large gulls and suggest that this, together with nutrient stress, may be implicated in their decline. High PCB residues accumulated by adults from pesticide-treated grasshoppers in their winter quarters may also have been involved in the observed liver damage and resulting high death rates in chicks in Finland, but the situation is unclear.

Diet: Opportunistic feeders. It frequent items include small fish, aquatic invertebrates, birds' eggs and chicks, trawler discards, rodents and berries. Baltic herring (*Clupea harengus*) are important where available.

Breeders tend to forage at sea to a greater extent than other gull species. Foraging methods include contact-dipping and surface-plunging. The nominate race tends to avoid sites frequented by other gull species, and forages in deeper water, mainly by plunge-diving. Birds feeding in the intertidal zone are more likely to peck at visible food items than to rummage in seaweed or under stones.

Nesting: Sexes appear the same in plumage but males are slightly larger than females. This is an easily confusable species with the Great black-backed gull. The lesser is a much smaller bird, with slimmer build, yellow rather than pinkish legs, and smaller white "mirrors" at the wing tips. The adults have black or dark gray wings (depending on race) and back. The bill is yellow with a red spot. The head is grayer in winter, unlike the Great black-backed gulls. Annual molt for adults begins between May and August and is not complete on some birds until November.

Breeders arrive at their colonies from March onwards. Egg laying principally from May to mid-June. Colonies usually small in Russia but quite large in Britain and elsewhere in northwestern Europe. Colony sites are usually found on grassy shores, dunes, clifftops, ledges of cliffs or buildings and rooftops. Natural colony sites are usually well vegetated with shrubs, with nest-sites often being among denser vegetation than used by herring gulls in mixed colonies. The nest is assembled with dry stalks, grass, lichens and feathers. The female lays 2–3 eggs; laying less or no eggs in years when food is scarce. Eggs are incubation 24–28 days and fledge after 30–40 days. The first breeding generally occurs at four year of age in an average lifespan of 25 years.

Cool Facts: The only known nests of Lesser Black-backed Gull in North America have occurred on Appledore Island, Maine, where one Lesser paired with a Herring Gull and produced hybrid young from 2007–2011, a pattern that has become more common since 2015. But as of 2019, there have been no reports of pure pairs of Lesser Black-backed Gulls nesting in North America.

There are five subspecies. The races differ mainly in size, proportions and degree of darkness of the mantle and upper wings in adults.

- *L. f. fuscus.* First reported by Linnaeus in 1758. The nominate subspecies is found in the Baltic Sea and Finland eastward to the White Sea. It winters mostly

in Africa and southwestern Asia. The nominate race is almost jet black above. It is the smallest and longest-winged subspecies.

- *L. f. intermedius.* First reported by Schiøler in 1922. This race is found in the Netherlands, Germany, Denmark, coastal Norway and southwestern Sweden, with isolated population in northeastern Spain (Ebro Delta). It winters mostly in western Europe and western Africa. The mantle is sooty black.
- *L. f. graellsii.* First reported by Brehm in 1857. This race is found in Iceland, the Faeroes, British Isles, the Netherlands, France and Iberia. It winters from southwestern Europe to western Africa, and has increased dramatically on Atlantic coasts of America. It is dark slate-gray on the back and upper wings.
- *L. f. heuglini.* First reported by Bree in 1876. The “Heuglin's Gull” is found in northern Siberia from the southern Kola Peninsula eastward to the Taymyr Peninsula. It winters from the Middle East south to eastern Africa and eastward to India, eastern China and southern Korea. It is dark slate-gray on the back and upper wings.
- *L. f. barabensis.* First reported by Johansen in 1960. The “Steppe Gull” is found in the central Asian steppes. It winters mostly in southwestern Asia.

Common Name: Ring-billed Gull
Scientific Name: *Larus delawarensis*

Size: 16.9-21.3 inches (43-54 cm)

Habitat: North America. Present breeding range from 39° to 61°N and 53° to 124°W; from coastal Newfoundland and southern Labrador, Great Slave Lake (Northwestern Territory, Canada), and south-central British Columbia (sparingly) south to southeastern Québec, western New York, southern Michigan, northern South Dakota, southern Wyoming and northeastern California and northwestern Nevada. Eastern and western populations divide at ca. 96°W; individuals rarely breed outside their natal geographic region. Almost exclusively a fresh-water breeder, except in Maritime Canada, n. Ontario (James Bay), and Washington State.

Status: Least Concern. **Global Population:** 3,000,000 - 4,000,000 mature individuals with an increasing population trend. This species was nearly wiped out by human persecution and development between 1850 and 1920, but has since rebounded to become a common and familiar bird. An estimated 3 to 4 million individuals inhabited North America in 1990, whereas Breeding Bird Survey data in 2009 suggested that this number had increased 250%. In some localities this gull is considered a pest and various measures are used to control its numbers, most with limited success. Disturbance to breeding birds by humans caused 31% reduction of nests (7,962 to 5,534) by abandonment.

Diet: Opportunistic feeders that mostly eat insects, earthworms, fish, rodents, and grain.

Nesting: Sexes appear the same in plumage; females tend to be slightly smaller than males. Present primarily from September to February, the head and nape are white with sparse and pale neutral-gray to light neutral-gray mottling. The upper back

and scapulars are a pale neutral gray and the lower scapulars have broad white tips. Both the rump and the tail are white, the latter usually without subterminal markings (occasional birds, perhaps more often in fourth and fifth basic plumage show dark markings to some rectrices). The wings are a pale neutral gray while the secondaries and inner primaries (p1-p4) are gray with white tips. The outer primaries (p5-p10) have increasing blackish neutral gray subterminal bands with a pale neutral gray area extending across webs of p5-p7. The white subterminal spots (mirrors) to p9-p10, larger on p10. The underparts are white.

Gulls have a strong fidelity to the colony site and even a specific area within the colony. The selection of a nesting site may be based on success of previous year's nesting or stability of habitat. The nest serves as a primary focus of orientation of pairs in colony.

Nests are placed on the ground in low, open areas with sparse vegetation, next to or under low plants that afford visual protection from aerial predators. Occasionally, they are placed under trees or underbrush. This gull generally avoids dense herbaceous or shrub cover. Substrates include sandbars, earth, beaches with rocks, driftwood, concrete, slag, and bare rock areas. Pair cooperates in nest construction and maintenance. Dead plant material is collected near nest site or brought to site by both parents and it includes twigs and sticks, grasses, leaves, lichens, and mosses.

2-3 eggs are laid and are incubated by both parents for 23–28 days. The newly hatched chicks move little within the nest until the down is dry and their eyes are open. Within the first day, the head and body movements are coordinated but postures are without signal functions. They utter both low and high intensity “Distress Calls” by the first day after hatching. Chicks differentiate calls of the parents from other adults 4–5 days after hatching and preferentially approach parents' “Mew Call”. At fledging, family groups disintegrate. When chicks reach about 90% of the adult size, they are mostly independent of parental care.

Cool Facts: Gulls are protected under the Migratory Bird Convention Act, 1994, but large populations of gulls in urban and suburban areas can negatively affect airline flight safety, human health, and agricultural and horticultural production. Encroachments on Common Tern (*Sterna hirundo*) and Piping Plover (*Charadrius melodus*) nesting habitat are dealt with on a case by case basis.

Common Name: Gull-billed Tern
Scientific Name: *Gelochelidon nilotica*

Size: 13-15 inches (33-38 cm); wingspan 85-115 cm

Habitat: Worldwide; breeding in scattered localities in Europe, Asia, northwest Africa, Australia, and the Americas. Although outside the United States, this species is less restricted to marine waters than most terns. Within the United States, it nests only in coastal colonies along the Atlantic and Gulf coasts; in southern California it is restricted to a single coastal site and one in the interior of the state. North American birds winter along the Gulf Coast, Pacific coast of Mexico, and into Central and South America.

It breeds on barrier beaches and dunes, salt-marshes, salt-works, man-made islands, and rivers and freshwater lagoons. It is found far more along coastal plains than in continental interiors, but also breeds on hyper-saline lakes (Race *aranea* is strictly coastal).

Status: Least Concern to Vulnerable. **Global Population:** 163,000,000-272,000,000 mature individuals with a declining population trend. As with most terns,

its numbers were seriously depleted in the late 19th century by the millinery trade, with a slow recovery in the 20th century. Breeding population inventories have been erratic, so determining population trends is difficult.

In California, initial population estimated at 500 pairs in 1927, but has declined significantly since. It was designated a State “Species of Special Concern” in California in 1978. Monitoring efforts during 1992–2008 suggested very small but relatively stable population size of 131 pairs, although large annual fluctuations do occur.

It has recently been assessed as increasing in Europe. This shows a recovery from the considerable decline noted during the second half of the 20th century in some countries. In France, from 500–800 pairs in 1950 to 269–370 pairs at end of 20th century; Turkish population has declined since a high of 2000-7000 pairs, mainly as a result of wetland drainage and degradation, and is estimated at 537–1,033 pairs in 2015). The Danish population has declined to virtual extinction in recent decades, and the German breeding range has contracted southward, with the species breeding at just one colony since the mid-1990s. The main causes of decline in Europe are deterioration and loss of habitat.

Diet: Opportunistic; a broad diet and does not depend on fish, instead feeding commonly on insects, small crabs, and other prey snatched from the ground, air, or even bushes. It is also known to eat small chicks of shorebirds and Least Terns (*Sternula antillarum*), and it will pirate fish from other small terns when sharing colonies with them.

Often feeds in large numbers on emerging insects over lakes, fields and grassland, and in Azerbaijan even over semi-desert; migrants typically feed over salt-ponds, coastal lagoons and mudflats, as well as marshes and wet fields. Winters on estuaries, lakes and salt-plains. It rarely is seen plunge diving. Adult birds are not known to swim or rest on water. Young chicks (4–5 days old), however, are adept swimmers.

Nesting: Sexes appear the same in plumage; It is a stocky looking tern, with short, heavy black bill. Its wide-based wings pale gray above with the upper parts (including the rump) being pale gray. The primaries are slightly darker but the wing tips are whitish to pale gray. The body is very white with a short, slightly forked tail. Adults in breeding plumage have a black cap, black feet and legs. Non-breeding plumaged and immature birds lack black cap, but have dark smudge behind eye, with some dark streaking on the hind crown. The juvenile has scapulars and upper wing-coverts variably splotched with brown. The head is white with fine dark speckling. Immature and winter birds look whiter-headed than other North American terns.

Seldom abundant, this tern usually nests among Common Terns (*Sterna hirundo*), Black Skimmers (*Rynchops niger*), and in California, Caspian (Hydroprogne caspia) and Forster's terns (*S. forsteri*). Colonies are 20-50 nests.

This tern is monogamous with long-term pair bonds. Males appears to push females about in the immediate vicinity of of their territory. The female, in a hunched position, often gives “Whine” and “Head Jerk”, a slight upward movement of head directed toward male's bill, as part of courtship.

The nest is a “Scrap” styled nest constructed with nearby materials (e.g. Coastal-sand and shells; Marshes-grasses and dried sedges). Usually 3 eggs are laid and males complete the incubation after the first egg is laid. Females will join in incubation after all eggs are laid. The incubation period lasts 22-23 days. Young fed by both parents but most often by the female. The male sometimes delivers food to the female, who then, transfers it to the young. The first flight occurs after about 28-35 days.

Cool Facts: It is often called the “Marsh Tern” between it is often seen nesting and feeding in or alongside them.

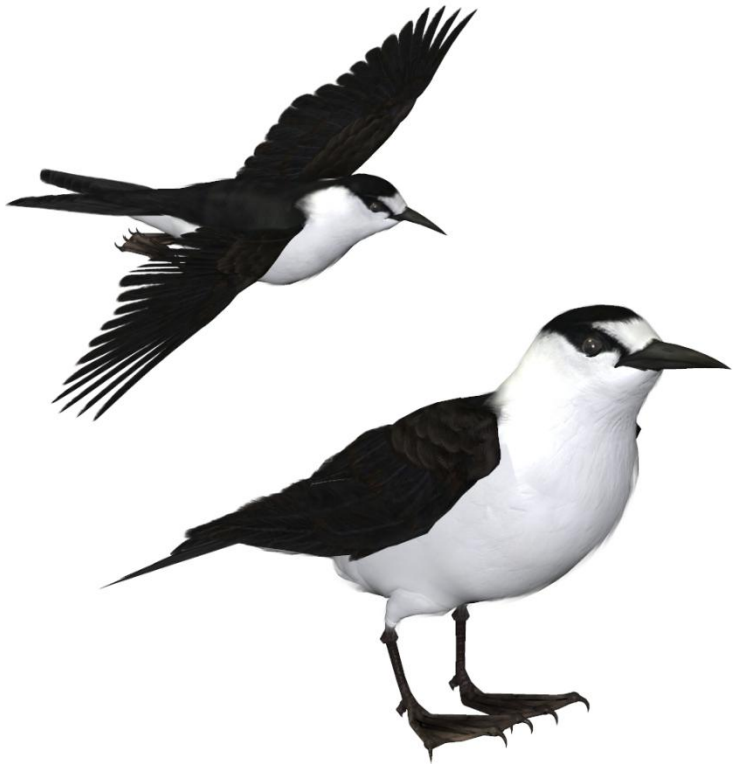
Six subspecies are recognized, diagnosed by shade of gray mantle, rump color, primary color, bill depth, crown pattern, and leg length. Body size vary widely.

- *G. n. aranea.* First reported by Wilson in 1814. This race breeds in the eastern United States from southern New York south and west through Texas to northeastern Mexico. It is also resident on The Bahamas, Virgin Islands, Cuba, and Puerto Rico, and on the northern Yucatan Peninsula. It winters coastally from the Gulf of Mexico south through Middle America to nothern coastal South America. Its mantle is a medium gray, the rump is pale blue-gray and the tail is pale blue-gray with paler outer rectrices. The outer web of the primaries is gray with the bill being conical, its legs short and a white space between gape and crown being wide (>3 mm).
- *G. n. vanrossemi.* First reported by Bancroft in 1929. It breeds from southern California southward on the Baja California peninsula and in western Mexico southward to Colima (Salton Sea, California). It also may breed in the Americas from northwestern Colombia southward to northern Peru. It winters from western. Mexico (rarely to southern California) south through Middle America to, perhaps, northwestern South America. It is like Race *aranea*, but the bill is more tubular—depth at base or nares broadly overlaps that of *aranea,* but depth at gonys 10.7–11.5 mm and its legs are longer (>32 mm).
- *G. n. gronvoldi.* First reported by Mathews in 1912. It is a resident in eastern South America from French Guiana south to northeastern Argentina; also in northwestern South America in Ecuador and northern Peru. It, too, is similar to Race *aranea*, but its mantle is a pale gray and the rump and outer web of primaries are white. The bill may average deeper, but is still conical in shape.
- *G. n. nilotica.* First reported by Gmelin in 1789. The nominate race breeds from southern Europe southward to Mauritania in northwestern Africa and eastward across the Mediterranean and Middle East and India to northwestern China. It winters in tropical Africa and around the north Indian Ocean. It is like Race *aranea*, but the gonydeal angle sharp and the bird averages larger overall.
- *G. n. affinis.* First reported by Horsfield in 1821. This subspecies breeds from southeastern Siberia south to eastern China. It winters in southeast Asia and northern Australia (Java). It is similar to the nominate race, but its rump is white, the tail whitish gray with darker outer rectrices, and the white space between gape and crown being narrow. Its wing length and bill size average considerably smaller than other subspecies.
- *G. n. macrotarsa.* First reported by Gould in 1837. This subspecies is endemic to western and southern Australia (Tasmania). It is similar to Race *affinis*, but its mantle is a pale gray, the white space between the gape and crown is wide (>3 mm), and culmen decurved rather than straight. It averages considerably larger in all measurements. Also, in its breeding plumage, the head and neck are white, the black cap extends from forehead to nape, the upper parts are a pale silvery gray, with only a slight contrast against the white rump and tail.

Common Name: Sooty Tern
Scientific Name: *Onychoprion fuscatus*

Size: 14-17.5 inches (36-45 cm)

Habitat: Pacific & Indian Oceans. This bird is migratory and dispersive, wintering more widely through the tropical oceans. It has very marine habits compared to most terns. This species is a rare vagrant to Western Europe and is also not normally found on the Pacific coasts of the Americas due to its pelagic habits, however in Baja California several nesting locations have been found. It breeds normally on islands throughout the equatorial zone.



Status: Least Concern.
Global Population: 21,000,000 - 22,000,000 mature individuals. The overall population trend is uncertain, as some populations are decreasing, while others are increasing or are unknown.

Diet: These birds often fly in large flocks, catching small fish on the surface in marine environments

Nesting: Sexes appear the same in plumage. Adults in breeding plumage have their upper parts (including top of the head, nape, and upper surface of wings and tail) blackish, contrasting with a white patch on forehead, white under parts (tinged grayish), and white-edged outer rectrices of tail.The under wing coverts are white, contrasting with dark under surface of the remiges. The white patch on the forehead extends on to the back to just above (not past) eye. The tail deeply forked, with the outermost pair of rectrices elongated. The bill and legs are black and the iris is dark brown. Adults in non-breeding plumage are similar, but there are blackish feathers of lores, crown, and nape with white margins (or these areas dark brownish). The outermost pair of rectrices are worn and shortened. Juveniles have plumage entirely sooty brown to blackish, with whitish and tan (occasionally chestnut) spots on some feathers of the back, scapulars, and upper wing, and with lower belly, under tail coverts, and the under wing coverts are smoky gray to whitish.

It breeds in colonies on rocky or coral islands creating a nest in a ground scrape or hole. It lays one to three eggs.

Cool Facts: It is known as the "Wideawake Tern" or just "Wideawake". These names refers to the non-stop calls produced by a colony of these birds, as does the Hawaiian name ‘ewa ‘ewa which roughly means "unpleasant noise".

Sooty Terns rarely come to land except to breed, and can stay out to sea either by soaring or floating on the water for between 3 to 10 years. It flies with steady, buoyant wing beats or soars.

There are seven subspecies:

- *O. f. fuscatus.* First reported by Linnaeus in 1766. The nominate breeds throughout species' range in Caribbean and Atlantic. Its under parts are mostly white (including the under wing and under tail coverts), with a slight gray tinge on flanks and belly.
- *O. f. crissalis.* First reported by Lawrence in 1871. It breeds in the Eastern Pacific Ocean from Isabel Island in Islas Revillagigedo and Clipperton Island south to Galápagos Islands. It ranges to the Pacific coast of Middle America from Baja California to Panama, and probably farther south. It is similar to the nominate, but its breast and posterior under parts more decidedly grayish.
- *O. f. luctuosus.* First reported by Philippi and Landbeck in 1866. It breeds on San Felix Island off the coast of Chile. It ranges to the Juan Fernandez Islands and the coast of Chile. It is similar to race *crissalis* but larger, grayer on the under parts, and more dusky on rectrices.
- *O. f. oahuensis.* First reported by Bloxham in 1826. Breeds tropical northern Pacific Ocean from Bonin Islands, Minami Tori Shima (Marcus Island), and the Hawaiian Archipelago south to Christmas Island. It is similar to race *crissalis*, but the bill is slightly heavier at base.
- *O. f. serratus.* First reported by Wagler in 1830. It breeds in western and northern Australia, New Guinea, and New Caledonia east across the South Pacific Ocean to Easter Island. It has a pale gray tinge to the under parts, but becomes paler with wear.
- *O. f. kermadeci.* First reported by Mathews in 1916. It breeds on the Kermadec Islands (Kermadec, Lord Howe, and Norfolk Island). It is very similar to race *serratus*.
- *O. f. nubilosus.* First reported by Sparrman in 1788. It breeds across the Indian Ocean, southern Red Sea, and Persian Gulf east to Greater Sunda Islands and the Western Pacific from the China Sea and the Philippines north to the Ryukyu Islands. It is very similar to race *serratus*, which is often lumped under this subspecies, but is slightly paler on the under parts.

Common Name: Pomarine Jaeger
Scientific Name: *Stercorarius pomarinus*

Size: 18.1-20.1 inches (46-51 cm)

Habitat: Circumpolar; it has an erratic breeding distribution because it coincides with peaks in lemming populations. It is absent from eastern Greenland, where lemmings do not occur, and northern Europe, west of the White Sea. Birds do wander widely in the Arctic during summer, but the presence in an area does not necessarily indicate breeding. When not breeding, they are highly pelagic. It winters mostly in productive regions of tropical and subtropical oceans.

It is largely confined to low-lying wet coastal Arctic tundra, usually marshy areas with numerous small lakes and cyclic peaks in abundance of brown lemmings.

Status: Least Concern. **Global Population:** 400,000 mature individuals with a stable population trend. The productivity of this species is thought to fluctuate in accordance with changes in the population of lemmings, a key prey item during the breeding season. As a result of this, it is expected that future changes to lemming

populations driven by climate change may have impacts on the breeding success of the Pomarine Jaeger, with some declines already identified. The future impact on populations is unknown, but it has the potential to have a significant negative effect on productivity, that if continued over several years could begin to drive a decline in population level.

Diet: Breeders rely primarily on moderate to high densities of brown lemmings. Breeders search for lemmings from perches, on the wing, and on foot.

Nesting: It is the largest of the three jaegers (but still substantially smaller than large skuas). There is great variation in size as a result of individual variation and sexual dimorphism (females average about 10–15% larger in mass). Otherwise sexes do not differ in appearance. Adults in Definitive Alternate plumage have distinctive profiles: the two central retrices which extend well beyond the rest of the tail, are broad, blunt feathers with a half twist, so they are conspicuous in side view. This plumage has two morphs with few intermediates. The “Light” morph has dark brown upper parts (except the head), a blackish cap, white under parts and collar, with yellowish wash on the sides of the neck, usually a bold brown band across the breast, and brown flanks and under tail-coverts. The “Dark” morph (5–20% are dark morph in all populations) is similar except the under parts, sides of the neck, and collar are entirely dark brown. Both morphs and all plumages have whitish shafts of 3–8 outermost primaries and a whitish patch on the underside of the primaries. Its molt leads to a heavy barring appearance of the under parts from late autumn. Soon after they leave the Arctic in mid-to-late summer, most adults lose their characteristic tail streamers. In this Definitive Basic plumage, adults are barred with brown or whitish to varying degrees above and below, especially on upper tail- and under tail-coverts. The rectrices project only slightly beyond the rest of the tail and lack twists.

In the juvenile plumage, showing during the first southward migration, the young are heavily barred with brown or whitish, especially on the upper tail- and under tail-coverts and under wing-coverts. The pale bars on the upper parts often have a cinnamon (orangish-brown) hue. The central rectrices hardly project beyond the rest of the rectrices. Later immature plumages are highly variable, and changes in appearance with age are poorly documented. Light morphs are brown above barred with whitish, whitish below barred, streaked, or spotted with brown. Dark morphs are often almost entirely dark brown, including their under wing coverts, and can closely resemble adults in dark morph.

The nest is a “scrape” style, usually placed on a slight rise. Sometimes, the nest includes some plant material from the immediate vicinity in the bottom or around the edges, but no distant materials are ever carried to the nest.

In years with numerous lemmings, egg-laying begins in June, earlier in years with earlier snow melt and less adverse weather. Egg laying appears to be roughly synchronized, with half of all eggs usually laid within 1 week and the remainder in the following 10–16 days. The last eggs are laid in final week of June or first week of July. The first young hatch in early July and begin to fly in early August.

Cool Facts: Although Pomarine Jaegers do not prey much on other birds, they appear to have a major impact on their populations. Shorebirds and passerines become scarce near Barrow in years with high densities of lemmings, probably because the numerous jaegers and lemmings disrupt successful nesting.

Special Thanks to my beta testers…

Alisa and FlintHawk

Species Accuracy and Reference Materials

Many birds of the same species do vary considerably in color. This package tries to emulate the colors and markings in the most commonly found variants.

The author-artist has tried to make these species as accurate to their real life counterparts as possible. With the use of one generic model to create dozens of unique bird species, some give and take is bound to occur. The texture maps were created in Painter with as much accuracy as possible. Photographic references from photographs from various Internet searches and several field guides were used.

Sources for this Volume and Field Guide

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