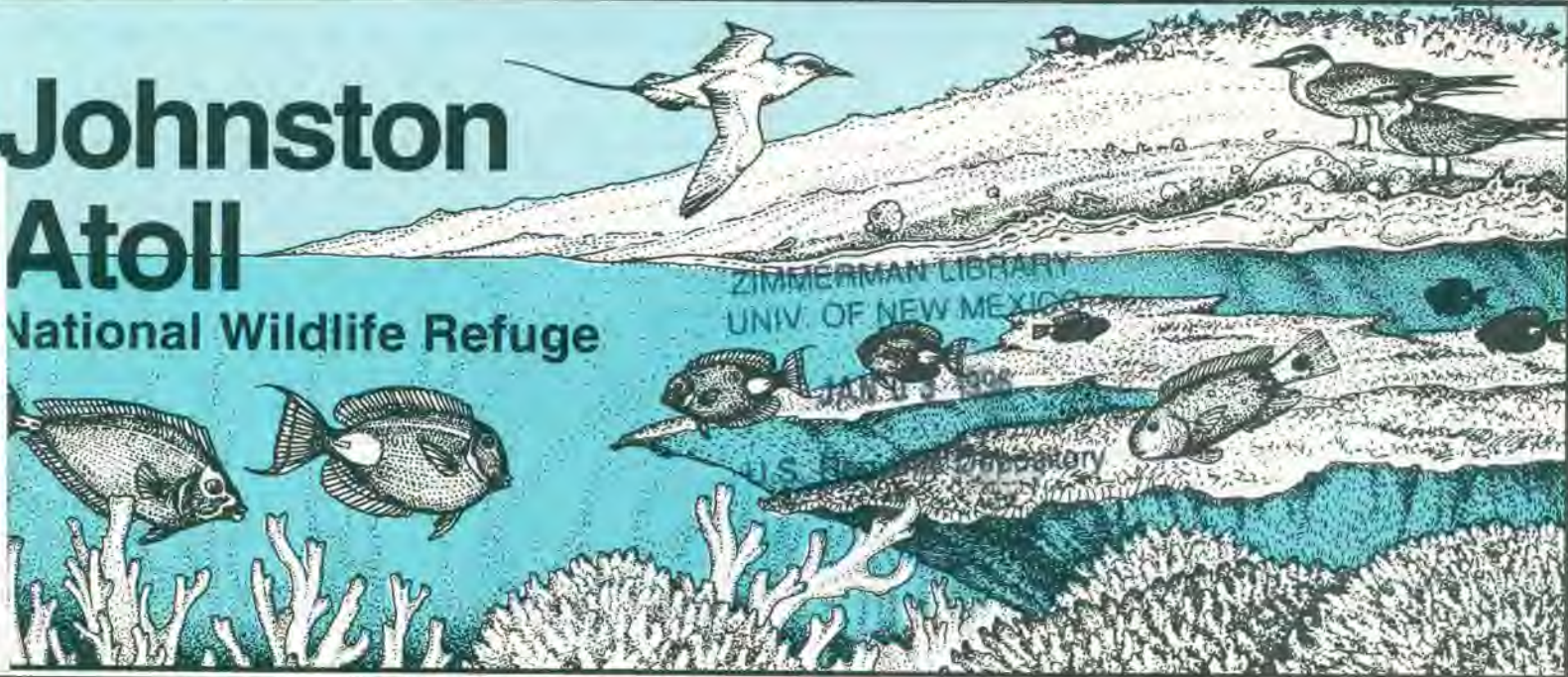


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# Johnston Atoll

## National Wildlife Refuge



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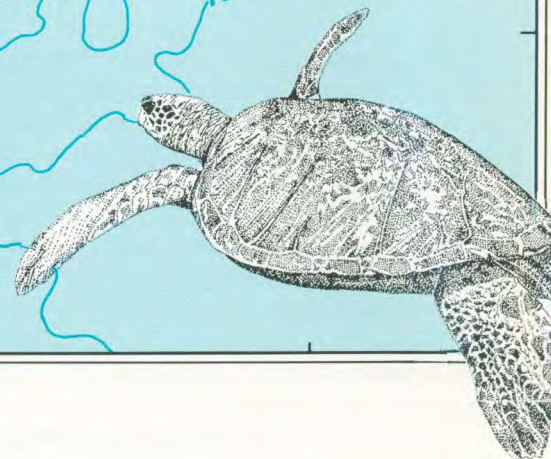
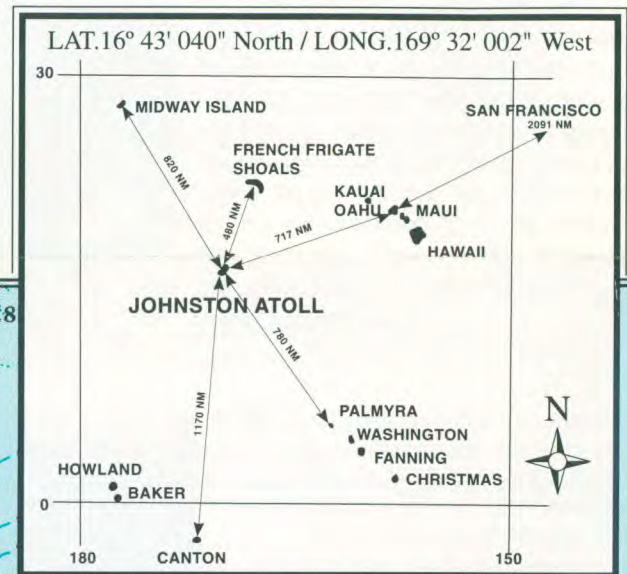
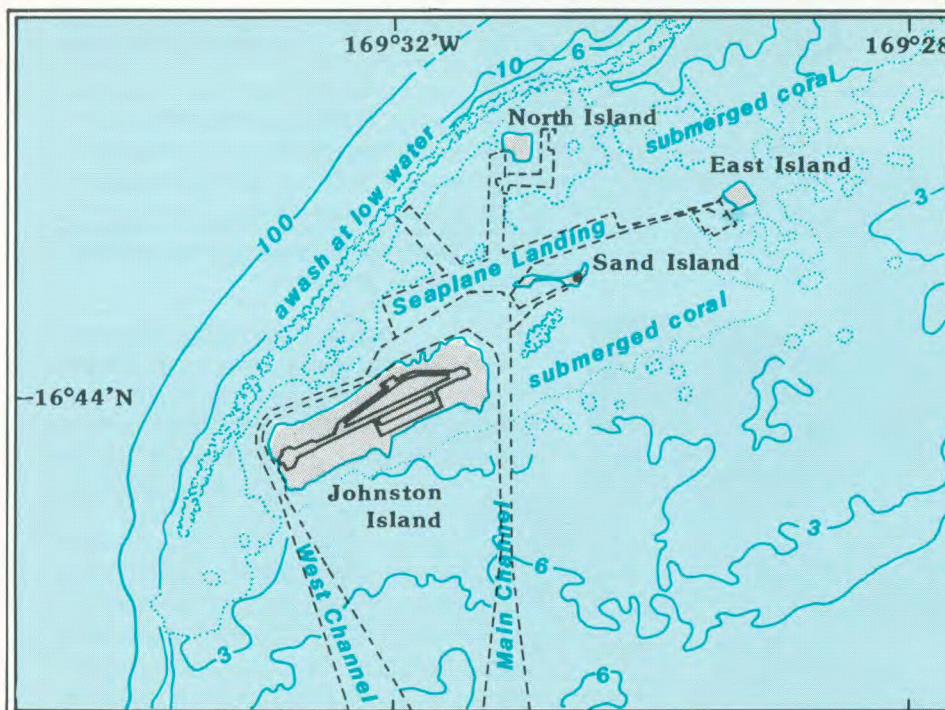
# Johnston Atoll National Wildlife Refuge

Near the center of the North Pacific between the Hawaiian Islands and the Marshall Islands lies one of the most isolated atolls in the world: Johnston Atoll. The formation of Johnston Atoll began about 70 million years ago when volcanic eruptions forced lava to the surface of the ocean. It cooled to form a small island, and coral began to grow around the edge of the island and over the sunlit shallows.

Over millions of years, the island slowly sank back into the sea. As the land mass disappeared under the water, the coral around the outer edge of the island continued to grow, eventually forming a coral ring around the island. When the island sank, only the continually growing expanse of coral-covered flats, small coral islands in the blue central lagoon, and a ring of coral reef remained.

Today, Johnston Atoll is a broad, shallow platform about 50 square miles in size, with a marginal coral reef emergent only on the north and west sides. Four small islands — Johnston, Sand, North, and East — emerge from the lagoon.

In comparison to the shallow reefs, which are lush and varied, the deep surrounding ocean supports much less marine life. In the warm, westward flowing stream of the North Equatorial Current, few nutrients rise to the surface, and the microscopic plant life that supports all other marine creatures is sparse. As it flows around the atoll, the current is diverted, and turbulence brings the nutrients of deeper water to the surface. The richer marine life this supports creates a feeding ground for the thousands of seabirds that roost and breed on the islands.



## History

Johnston Atoll was discovered accidentally on September 2, 1796, by Captain Joseph Pierpoint when his ship, the American Brig SALLY, ran aground. Lt. William Smith of HMS CORN-WALLIS named the larger island for his ship's captain, Charles J. Johnston, after sighting it briefly on December 14, 1807.

Johnston Atoll was one of 30 central Pacific islands claimed by the United States under the Guano Act of 1856. It granted Americans the privilege of removing guano (the accumulation of seabird excrement) for use as a rich fertilizer.

In 1923, the Biological Survey of the U.S. Department of Agriculture and the Bishop Museum visited Johnston during a scientific expedition. Their findings resulted in President Calvin Coolidge's Executive Order 4467, which designated the islands as a bird refuge. In 1934 by Executive Order 6935, President Franklin D. Roosevelt placed the atoll under the U.S. Navy, while retaining the earlier provisions for the refuge.

In 1936, the Navy began the first of many changes to the atoll. By 1964 dredge and fill operations had brought the size of Johnston Island to 625 acres from its original 46 acres, increased Sand Island from 10 to 22 acres, and added two man-made islands, North (Akau) and East (Hikina) of 25 and 18 acres, respectively.

Today, Johnston Atoll remains an unincorporated territory of the United States with operational control held by the Defense Nuclear Agency. The atoll is maintained as a storage and destruction site for chemical weapons being destroyed under international treaty. In July 1990, the Johnston Atoll Chemical Agent Disposal System (JACADS) was completed. It is a test plant engaged in the incineration of chemical weapons stored at Johnston. It is closely monitored and complies with all federal environmental laws and regulations. To ensure JACADS does not harm the atoll's sensitive environment, the Department of Defense funds numerous environmental studies and a marine research laboratory. The U.S. Fish and Wildlife Service maintains biologists on the atoll to advise the military and monitor the wildlife and human activities.



No person shall, on the basis of race, color, sex, age, national origin, religion, physical or mental restrictions, be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in any program or activity of the Department of the Interior.



**U.S. Department of the Interior**  
**Fish and Wildlife Service**

RF 12510 April 1995

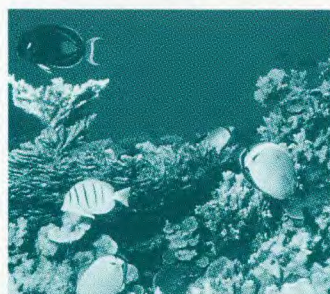
## Atoll Ecology

As the only shallow water and dry land area in millions of square miles of ocean, Johnston is an oasis for reef and bird life. Corals and coralline algae are responsible for the existence of the atoll. Though corals are true animals, colonies of microscopic symbiotic algae are contained in their tissues. The algae contribute their photosynthetic production to the coral, receiving in return secure space in the sun and the coral's wastes as nutrients. Johnston is home to 32 species of coral, with the most impressive being the table *Acropora* forming massive colonies up to 10 feet in diameter.



About 300 species of fish have been recorded from the reefs and inshore waters of Johnston Atoll. The majority of the fishes are edible, though some may very rarely retain a poison within their flesh known as *ciguatoxin*. The poison is produced by a microscopic alga that is eaten by fishes browsing along the bottom. It causes the fishes no harm, but the poison can concentrate in the flesh of many reef fishes, especially the carnivores such as eels, jacks, and sharks. Unsuspecting humans and even seals can then be poisoned when they eat their catch.

Due to the atoll's isolation, small size, and lack of habitat diversity, the number of species of coral, fish, and reef life are not as great as in Hawaii. However, western and southern Pacific species of coral, fish, and other fauna, including mollusks, crabs, and urchins, exist here but not in Hawaii. Johnston marine life has been little studied and may yet contain species unknown to science.



## Endangered Species

Two unique forms of marine life found at Johnston Atoll are protected under Federal laws for threatened and endangered species. These species are the green sea turtle, *Chelonia mydas*, and the Hawaiian monk seal, *Monachus schauinslandi*.

Sea turtles are reptiles that spend their entire lives at sea except for brief visits ashore to deposit their eggs in pits dug in sandy areas above the high tide mark. The new hatchlings can fit in the palm of a hand, but the adults can grow to 300-400 pounds and may take 30-40 years to reach breeding maturity. Turtles are highly vulnerable to human predation and disturbance. Many turtles at Johnston have been tagged by researchers seeking to understand migration routes and estimate growth, reproduction, and mortality. Tag recoveries of nesting females on a beach at French Frigate Shoals indicate the Johnston population probably nests there, and no nesting activity has been recorded at Johnston.



The monk seal, found primarily in the Northwest Hawaiian Islands, occasionally occurs at Johnston. The species has declined sharply in historical times as a result of human harvesting and disturbance of breeding colonies. They feed on fish and crustaceans from the reef and lagoon and, although able to spend long periods at sea, often haul out on sandy beaches to bask in the sun.

# Migratory Birds

Of all the wildlife at Johnston, the birds are the most conspicuous, if only because humans spend most of their time out of the water. Most of the birds that occur at Johnston are seabirds. Seabirds obtain their food from the sea and generally possess webbed feet and beaks adapted for feeding on fish and squid. They also have characteristic internal salt glands that make it possible for them to drink sea water. Long narrow wings efficient for soaring are found in many species.

Seabirds are among the longest lived birds in the world, and life spans in excess of 30 years are not uncommon for some species. Compared to other birds, they produce fewer young over their lifetime, and the young take longer to mature — up to 7 years for some species. Many seabirds mate for life, and both males and females incubate, brood, and feed their young.

Seabirds evolved on islands where natural predators were absent, therefore, they lack a well developed fear of people or predators. Their long lives and the ease with which the chicks and adults can be captured for banding and marking make them ideal subjects for long term studies. Seabird population numbers and movements can quickly reflect changes in the ocean environment.

Other migratory birds occurring at Johnston Atoll include species that breed in Alaska, Canada, the mainland United States, and Asia, and migrate to the South and Central Pacific for the winter. These include many shorebirds and occasional waterfowl, hawks, owls, and egrets. Some species like the bristle-thighed curlews and Pacific golden plovers may make a 6,000-mile round trip voyage between their South Pacific wintering areas and arctic breeding areas. The following species descriptions detail information on the birds that regularly occur at Johnston.

## Shearwaters and Petrels

### Bulwer's Petrel

The Bulwer's petrel is the smallest of the group. They are sooty-brown birds with lighter bars on the upper wing, a short wedge-shaped tail, and black legs and feet. Sixty to 70 pairs of this small seabird nest in the rocky crevices of the causeway on Sand Island. The oldest known Bulwer's petrel, banded 22 years ago, was discovered there in 1993.



### Christmas Shearwater

Christmas shearwaters have a short, rounded tail and dark plumage, legs, and feet. Competition with the larger wedge-tails is probably responsible for limiting their abundance to fewer than 100 birds at Johnston.



### Wedge-tailed Shearwaters

The wedge-tailed shearwater is the largest of the local shearwaters and has a distinctly wedge-shaped tail and flesh-colored legs and feet. A single egg is laid in a chamber at the end of a burrow that may be 6 feet long. Burrows are dug with the bill and feet and reexcavated and renovated before each breeding season. Three to four thousand of these birds use the natural portion of Sand Island as a nesting site, for the dense roots of the *Lepturus* grass support the burrow walls. Their unique moaning calls at night can give the colonies an eerie character.

## Tropicbirds, Frigatebirds, and Boobies

These are medium-sized to very large birds, distantly related to the pelicans of temperate waters. All have webbing over all four toes and an inflatable gular (throat) pouch. All move poorly on the ground with short, weak legs. Although adults of each species are distinctly different, the chicks are generally similar, born naked (some tropicbirds are downy), and blind. Longevity for tropicbirds and boobies ranges from 16 to 20 years, and frigatebirds may live more than 30 years.

### Red-tailed Tropicbird

Red-tailed tropicbirds are white with two long, thin red tailfeathers. The bill is bright red, and the eyes are lined with black. Immature birds have black barring over the back and upper wing surfaces. They are tolerant of human activity but susceptible to eat, dog, and rat predation. Several thousand red-tailed tropicbirds use Johnston Island, with current increased populations probably resulting from the increased amount of vegetation.



### White-tailed Tropicbird

White-tailed tropicbirds are white birds with two long, thin white tailfeathers. The wing edges and eyes are lined with black, and the bill is yellow. Viewed from below, the birds appear to be pure white. This species prefers to nest on cliffs, but nests recently have been found on the ground under shrubs on Johnston Island.



### Great Frigatebird

The great frigatebird is the largest seabird on Johnston Atoll. It has a forked tail, hooked bill, and a 7-foot wingspan. The adult males possess bright red throat pouches that they inflate during the breeding season. Among the most efficient of soarers, it glides on the wind or thermal updrafts, often harassing other seabirds and stealing their catch. Their aggressive habits extend to the nesting grounds, where they take unattended eggs and chicks of even their own species.

### Red-footed Booby

The red-footed booby has a white body and wings except for dark tips. The legs and feet are an unmistakable bright red, and the beak is light blue. There is also a common, light brown adult color phase. The chicks of mated adults of the two color phases may develop into adults of odd colorations ranging from mottled to sharply bicolored appearances.



### Brown Booby

The brown booby has a deep chocolate brown back and upper wing surface, and a sharply delineated white chest and underwing. Prey is taken by diving into the water followed by underwater pursuit. It builds a cuplike nest of dried vegetation and lays two eggs instead of one like other seabirds. However, usually only one chick is reared successfully.



### Masked Booby

The masked booby is the largest of the booby species and, like the brown booby, lays two eggs (but raises only one chick) in a small, insignificant scrape on bare earth. It is all white with a black trailing edge on the wings and has a yellow bill and a small, black face mask. Its bright golden eyes are a very distinctive feature when observed close-up.

## Terns and Noddies

Terns are small to medium-sized birds with narrow, graceful wings and thin, sharp bills. They feed by plunging or snatching prey from the surface of the water. Like many seabirds, their primary feeding strategy is to locate schools of small fish that have been driven to the surface by the feeding activities of larger fish, such as tuna. Most terns nest colonially and usually show strong individual pair bonding. The colonies tend to return to the same site to nest each year. Tern chicks are born with down and open eyes.

### Gray-backed Tern

Gray-backed terns are smaller than sooty terns but similar in general appearance. The upper surfaces are gray, and the white blaze over the face and eyes extends well behind the eyes. Nesting in this species begins early in the year since harassment by sooty terns can severely reduce breeding success. Six to seven hundred pairs breed on North Island each year during the summer.



### Sooty Tern

The sooty tern sports long, narrow wings, is black on top and white on the neck and stomach. The forked tail, harsh screeching calls, and extensive breeding colonies distinguish them as Johnston's most abundant bird with an estimated 150,000 breeding pairs on the small outer islands. It has a brash, somewhat aggressive personality when in breeding colonies and will readily walk or fly up to intruders. Breeding activity can be unpredictable, and can occur throughout the year.

### White Tern

The white tern is unmistakable with its pure white plumage and black bill. Its habit of fluttering curiously over visitors assures that its presence will be noticed. A single egg is laid directly on a tree branch, a ledge, or on any suitable surface. The growth of trees on Johnston ensures that the population of this attractive bird will continue to increase.



### Brown Noddy

Brown noddies are gray-brown birds with an indistinct gray-white forehead and crown. The legs, feet, and bill are black. Their common name comes from the stereotyped head nodding courtship displays between adults. Several thousand nest on Sand, North, and East Islands, making this the second most numerous species using Johnston Atoll.

### Black Noddy

The black noddy (also known as the white-capped or Hawaiian noddy) is smaller and darker than the brown noddy. The white on the forehead and crown is more distinct and extends further back. Black noddies are common on Johnston with many pairs nesting in trees on the main part of Johnston Island.



### Blue-gray Noddy

Bluish-gray on their backs with a soft white underside the Blue-gray noddie's coloration and size give them a delicate, porcelain-like appearance. Uncommon at Johnston, several appear each year nesting on the ground under bushes, usually on Sand and North Islands. The first nest recorded at Johnston Atoll was in 1993.

## Shorebirds

Migratory shorebirds are commonly seen on Johnston during the winter months. Shorebirds typically feed near the water's edge, but can also be found in mixed flocks working grassy or gravelly areas. In some cases, shorebirds prey upon the eggs of seabird colonies

**Bristle-thighed Curlew** The bristle-thighed curlew is a large, brown shorebird with a long decurved bill. It has an unbarred rusty tail, a brown back, and a light stripe over the eye. Its voice is a sharp "curlew" repeated several times. It breeds on the tundra in Alaska and arrives on the atoll in August or September.



### Pacific Golden Plover

The Pacific golden plover is distinguished by gold spotting on the wings and back and a white stripe over the eye and down the neck. The long legs are a light gray-brown. Golden plovers wintering at Johnston will make their migration flights directly to the arctic and will remain in the air for up to 7

days. Prior to the spring migration flight, the plumage of the male will change dramatically. It develops a prominent black face, throat, and belly. The speckled golden color of both the males and females also becomes more brilliant.



### Wandering Tattler

The wandering tattler is a solitary bird usually seen along the shoreline. It is slate-gray on its back, light underneath (with black barring during the breeding season), and has yellow legs. The wintering population is quite small and does not include more than a dozen birds.



### Ruddy Turnstone

Ruddy turnstones are small, distinctly marked shorebirds with a bar and blotch pattern of black on white and short reddish legs. Their migratory pattern is believed to consist of a direct flight from the arctic to the atoll in the fall, and a coastal return via the western Pacific, Japan, and Siberia in the spring.

## Waterfowl

Every winter, a small number of different species of ducks (and on occasion, geese) will find Johnston on their migratory journeys. Johnston is a welcome rest for some, but many of the arrivals are too weak to depart. Their survival is unlikely since the atoll has no waterfowl habitat.

## Bird List

**Abundance:** a - Abundant (numerous common species)  
 c - Common (certain to be seen in suitable habitat)  
 u - Uncommon (present, but not certain to be seen)  
 r - Rare (seen only a few times a year or not at all)  
 x - Accidental (not normally expected)

**Nesting Habit:** 1 - Burrow      4 - Shrub or tree  
 2 - Rock crevice      5 - Branch or ledge  
 3 - Ground      6 - Under vegetation

Resident Nesting Seabirds	Abundance	Nesting Habit	Adult Wing Span (inches)
Bulwer's petrel	u	2, 6	23
Wedge-tailed shearwater	c	1	38
Christmas shearwater	u	2, 6	32
White-tailed tropicbird	u	6	38
Red-tailed tropicbird	a	2, 3	44
Brown booby	a	3	54
Red-footed booby	c	4	40
Masked booby	u	3	60
Great frigatebird	c	4	90
Gray-backed tern	c	3	29
Sooty tern	a	3	34
Brown noddy	a	3, 4	33
Black noddy	c	4	29
White tern	c	5	28
<b>Non-nesting, Nonresident Seabirds</b>			
Black-footed albatross	r		89
Laysan albatross	r		82
Townsend's shearwater	r		13
Phoenix petrel	x		14
Sooty storm petrel	x		22
Red-billed tropicbird	r		24
Lesser frigatebird	x		90
Laughing gull	x		41
Franklin's gull	x		35
Herring gull	x		52
Glaucous winged gull	x		53
Elegant tern	x		37
Blue-gray noddy	r		24

### Migratory Shorebirds

Migratory Shorebirds	Abundance
Black-bellied plover	x
Pacific golden plover	c
Semipalmated plover	x
Lesser yellowlegs	x
Willet	x
Wandering tattler	u
Spotted sandpiper	x
Bristle-thighed curlew	u
Ruddy turnstone	c
Sanderling	u
Western sandpiper	x
Pectoral sandpiper	x
Sharp-tailed sandpiper	x
Buff-breasted sandpiper	x
Ruff	x
Short-billed dowitcher	x
Wilson's phalarope	x

### Accidentals, Stragglers, or Waterfowl

Peregrine falcon	x
Short-eared owl	x
Cattle egret	r
Northern pintail	r
American wigeon	r
Northern shoveler	x
Skylark	x
Japanese white-eye	x
Northern harrier	x
Mallard	x
European tufted duck	x
Black brant	x
White-fronted goose	x

## Wildlife Regulations

The Commanding Officer at Johnston Atoll has prescribed regulations concerning wildlife that reflect and support Federal laws and National Wildlife Refuge regulations. It is prohibited for any person to harass, willfully disturb, hunt, trap, capture, or kill any bird or to take the eggs of any bird or any species designated as threatened or endangered (sea turtles and Hawaiian monk seals). Entry to North, East, and Sand Islands is controlled due to the seabird nesting colonies. Other regulations govern fishing activities and export of marine life from Johnston Atoll. Detailed regulations are listed in FCI Instruction 5000.4, Conservation of National Resources and Protection of Fish and Wildlife on Johnston Atoll.