

# ARCTIC TERN

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## TAXONOMY

**Scientific name:** *Sterna paradisaea* Pontoppidan, 1763

**Common name:** Arctic Tern

**Family:** Laridae

**Taxonomic comments:**

Monotypic; no subspecies recognized. Protein electrophoresis and phenetic evidence suggests this species is most closely related to the Common (*Sterna hirundo*) and Antarctic Tern (*S. vittata*); a few reports of hybridization with Common, Roseate (*S. dougallii*) and Forster's Terns (*S. forsteri*) exist (Hatch 2002).



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## DESCRIPTION

**Basic description:** A medium-sized tern.

**General description:**

A slender, medium-sized tern with a streamlined body, long pointed wings, long deeply-forked tail, and spear-like bill. Gray overall, with paler underparts, white cheeks, solid black cap, bright red bill and legs. Outer wing feathers with dark line on outer edge; outer edge of tail feathers dark gray; rump white. Plumage in North American winter similar to nonbreeding juvenile plumage: bill is dark red or black, black cap is restricted to back of head, and forehead becomes white (Hatch 2002).

**Length (cm):** 28-39

**Weight (g):** 90-120

**Diagnostic characteristics:**

Similar in appearance to Aleutian Tern (*S. aleutica*) which often mix on coastal breeding grounds. Arctic Tern has black forehead and red bill; Aleutian has white forehead, black bill and darker wings.

**Reproduction:**

In arctic regions, first seen near colony sites when open water is nearby; may lay within 10 days of arrival. Clutch size 1-3 eggs, mid-May in temperate seas to mid-July in high arctic. Egg-laying within colony is well synchronized; most females lay within 10 days of the colony's first egg. No second broods reported, but may re-lay up to 18 days after loss of eggs. Incubation by both sexes usually 21-23 days (Hatch 2002). Young are tended by both parents, may leave nest soon after hatching but remain nearby; fly at 20-23 days (still fed by parents). Nests usually in small scattered colonies (several to a few hundreds

of pairs); will nest in large dense colonies (thousands of pairs) only at southern edge of range. At sites accessible to mammalian predators such as foxes, distance between neighboring nests increases (typically >10 m) and pairs may nest solitarily (Hatch 2002).

**Ecology:**

Undertakes the farthest annual migration of any bird, traveling over 40,000 km from arctic breeding grounds to wintering grounds off Antarctica (Hatch 2002). Remains well out to sea during most of the migration; often flies in large flocks and associates with other terns and small gulls in areas where migration routes overlap (Johnson and Herter 1989).

Forages singly, in monospecific flocks, or in mixed-species flocks. Frequently feeds offshore over predatory fishes that drive prey to the surface (Hatch 2002). Nests with Aleutian Terns in some coastal colonies in southern Alaska (Hatch 2002). Minimizes foraging competition with Aleutian Tern by feeding in different areas: Arctic Terns disperse widely from shore to continental shelf break, while Aleutian Terns concentrate in bays and fjords (Sanger 1987). Preyed upon (especially eggs and young) by large falcons, owls, corvids, gulls, foxes, mustelids, and rats (Hatch 2002).

**Migration:**

Migrates mainly well offshore. Longest regular migration of any bird (over 40,000 km; Hatch 2002). Arrives on breeding grounds April-June (mid-May in Gulf of Alaska and Norton Sound; Baird 1983, Kessel 1989; late May-early June in Beaufort Sea area; Johnson and Herter 1989). Departs by August-September (Bent 1921); August at Seward Peninsula, rare after early September (Kessel 1989); postbreeding flocks common early August-late September at northcentral Alaska Peninsula; most gone by early October (Gill et al. 1981).

**Food:**

*General:* Forages by plunge-diving and surface dipping. Eats small fishes, crustaceans, aquatic insects, and other invertebrates (Hatch 2002).

*Alaska:* At Sitkalidak Strait, Gulf of Alaska, chick diets consisted of 34% capelin, 18% sand lance, 12% smelts, 10% sculpins, 22% other fishes, and 6% invertebrates (n = 51; Baird 1983). At Cooper Island, northern Alaska, adults fed on arthropods (probably insects) from tundra ponds during incubation when shorefast ice made nearby marine prey unavailable. When ice broke up, diets shifted to ice-associated marine fishes and invertebrates. Postbreeding birds gather in large flocks at euphausiid swarms (Boekelheide 1980).

**Habitat:**

*Breeding:* Nests on ground in wide variety of open, usually treeless terrain types, often with no vegetation or with low or scattered plant cover. Generally nests close to water, frequently on small rocky, gravelly, grassy or peaty islands; also barrier beaches and sand or gravel pits, gravel bars in rivers, or glacial moraines, as well as marshes, bogs, and grassy meadows (Hatch et al. 1978, Mickelson et al. 1980, Baird 1983, Rosenberg 1986,

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Kessel 1989, Petersen et al. 1991, Hatch 2002). May nest alone or in mixed colonies with Aleutian Tern; known to shift colony sites from year to year (Baird 1983).

*Non-breeding:* Mostly pelagic, rarely in coastal bays and estuaries. Generally migrates offshore, although Alaska population may travel along coastlines during fall migration and overland during spring migration (Hatch pers. comm.).

*Foraging:* Open water where prey is available in surface waters; generally within 20 km of colony. Foragers visit rocky shores, shallow bays, tidal flats, shoals, ice edges and faces of tidewater glaciers, tide rips, ocean fronts and upwellings. Inland, principally forages at streams, rivers, and lakes (Hatch 2002).

## **STATUS**

**Global rank:** G5 (27Nov1996)

**Global rank reasons:**

Secure – common, widespread, and abundant.

**State rank:** S4B (24Apr2006)

**State rank reasons:**

Widespread distribution. Population probably greater than several hundred thousand. Statewide trend variable; 90% population decline on Kodiak Island and in Prince William Sound; stable to increasing on Arctic Coastal Plain. Changes in prey base may be affecting Gulf of Alaska breeders; other potential threats include disturbance on breeding grounds and predation by introduced mammals.

## **DISTRIBUTION AND ABUNDANCE**

**Range:**

**Global range:**

*Breeding:* Northern Alaska east to northern Ellesmere Island, south to Aleutians, northwestern British Columbia, northwestern Saskatchewan, northern Ontario, New Brunswick, and along Atlantic coast, locally to Maine and Massachusetts; a disjunct colony in Puget Sound, Washington, and solitary nesters in northcentral Montana. Outside North America: Greenland on all coasts; in the Palearctic north to Iceland, Svalbard and Franz Josef Land, south to the Netherlands and sparsely in Belgium, Ireland and northwestern France; in northern Russia and widely along Russian far eastern arctic coasts (Wrangel Island, Chukotska and Kamchatka Peninsulas south to Sakhalin Island; Hatch 2002).

*Non-breeding:* Reported widely on migration. Primarily in Southern Hemisphere (Antarctic and Sub Antarctic). Small numbers reported throughout the year from Namibia to Mozambique, southern Australia and New Zealand (Hatch 2002).

**State range:**

*Breeding:* Most commonly found in coastal regions throughout the state, also occurs in the interior; not present in southeastern Alaska south of Tracy Arm (Gabrielson and Lincoln 1959). Largest concentrations occur in the northern Gulf of Alaska (Gould et al. 1982, Lensink 1984). Also nests along Bering Sea coast, on St. Lawrence Island (absent from St. Matthew and Pribilof Islands), western Aleutian Islands, and across the entire North Slope (Johnson and Herter 1989, Hatch 2002). Inland nesting widespread, but poorly documented. Breeding records from Mt. McKinley area, Mountain Village on lower Yukon River, Innoko-Iditarod region, Lake Minchumina, Minto Lakes marshes, mouth of Chandalar River, Yukon Flats, along the Porcupine River, Brooks Range, Kuskokwim River near Bethel, Johnson River, Copper River drainage, Talkeetna Mountains, Yakutat Bay, and on the Situk River (Gabrielson and Lincoln 1959).

**Abundance:**

**Global abundance:**

Global breeding population estimated between 1 to 2 million pairs; includes primarily coastal estimates of about 12,800 pairs on the Atlantic U.S. coast; 80,000 pairs in Greenland; 200,000–500,000 pairs in Iceland; 72,000 pairs in Scotland; 70,000 pairs elsewhere in Atlantic Europe; 50,000 pairs in Baltic European countries; several hundred thousand in Russia; and several hundred thousand in Alaska (Lensink 1984, Hatch 2002). Few estimates exist for interior-nesting birds.

**State abundance:**

Alaska population may be several hundred thousand, with most birds nesting inland (Lensink 1984). However, inland nesting is widespread and poorly documented. Combined total population indices for areas surveyed between 1989 and 2004 suggest a minimum population estimate of at least 120,500 birds (USFWS 2005).

The Beringian Seabird Colony catalog reports 234 Alaskan coastal colonies with a breeding population of approximately 12,500 birds (USFWS 2006a). This includes 25 small breeding colonies in the Beaufort Sea, 21 in the Chukchi and Bering Seas, 13 on the Aleutian Islands/Alaska Peninsula, and about 100 in the Gulf of Alaska (where colonies are much larger; Hatch 2002).

On the Arctic Coastal Plain, annual eider surveys conducted in 2002 resulted in a population estimate of 14,014 Arctic Terns (SE 1,717; Larned et al. 2003). Population estimates for the area between the Colville and Kuk Rivers ranged from 15,000 to 26,000 individuals for 1992–2002 (Mallek 2003). In western Alaska, surveys conducted along the coastal zone of the Yukon-Kuskokwim Delta reported a mean of 17,140 individuals, 1992–2002 (Platte and Stehn 2002); 7,231 individuals in Koyukuk and Kanuti National Wildlife Refuges (NWR), 1996–1997 (Platte 1999a); 8,549 individuals in Selawik NWR, 1996–1997 (Platte 1999b); and 3,016 individuals in Innoko NWR, 1994 (Hatch 2002). In the Tanana/Kuskokwim lowlands, a population of 2,092 individuals was estimated during aerial waterfowl surveys, 2001–2002 (USFWS 2002). Numbers and distribution throughout much of interior Alaska not recorded (Hatch 2002).

In southcoastal Alaska, a population of 5,512 individuals was estimated during summer boat surveys in Lower Cook Inlet, 1993 (Agler et al. 1995a). The most recent survey data for Kodiak Island reported 5,163 birds on the south and east parts of the island in 2001, and 526 birds on the north and west side of the island in 2002 (Stephensen et al. 2002, Stephensen et al. 2003). In 2001, 1,554 individuals were counted in Yakutat and Disenchantment Bays and 1,117 individuals in Russell and Nunatak Fiords (Stephensen and Andres 2001). In 1994, a population of 2,676 birds was estimated from small boat surveys conducted throughout Southeast Alaska (survey area included water within 5.6 km of shore and land within 100 m of shore extending from Haines and Glacier Bay south to Dixon Entrance; Agler et al. 1995b).

**Trends:**

**Global trend:**

Breeding populations in New England declined in late nineteenth century, subsequent recovery peaked 1930–1950 and was followed by a smaller decline and population fluctuations since the 1990s (Hatch 2002). In northern Canada, no data for general trends, but dramatic declines reported for the 1980s to 1997 at the Belcher Islands, Hudson Bay (Gilchrist and Robertson 1999). Overall trends in Alaska variable (see State trend). In western Greenland, large declines reported (Evans 1984a, Hatch 2002). In southern part of northwestern Europe, breeding range has possibly contracted recently (Evans 1984b). Local populations may sometimes increase, in spite of low productivity and interactions with gulls, due to immigration from other (disturbed) colonies (Howes and Montevecchi 1993).

**State trend:**

Overall trend variable. Stable to potentially increasing on the Arctic Coastal Plain (Hatch 2002, USFWS 2005); possibly increasing on Yukon-Kuskokwim Delta where nest estimates increased from 5,805 nests in 1992 to 10,378 in 2005, and peaked at 14,266 in 2002 (Fischer et al. 2005, USFWS 2005). Conversely, in the Gulf of Alaska, coastal colony counts on Kodiak Island and surveys at sea in Prince William Sound indicate large recent declines of more than 90%, including the complete disappearance of 14 historical colonies on Kodiak Island (Agler et al. 1999, Lance et al. 2001, Stephensen et al. 2001, Stephensen et al. 2002, Stephensen et al. 2003). More work is needed to interpret such findings, and to establish when adults abstain from breeding and how far nesting locations may shift (Hatch 2002, Stephensen et al. 2003).

## **EXISTING PROTECTION**

**Global protection:**

Listed as a species of Special Concern in Massachusetts and Maine, Threatened in New Hampshire. Federally listed as a species of Conservation Concern in Alaska (Hatch 2002).

**State protection:**

Much of this species' nesting habitat lies within protected areas in Alaska, including many National Wildlife Refuges and National Parks and Preserves (Igl 1996). Federally listed as a species of Conservation Concern in Alaska (Hatch 2002).

## CHALLENGES

**Global challenges:**

Vulnerable to food shortages, predation (including egg predation by humans), pollution, and habitat degradation and loss (Howes and Montevecchi 1993). Disturbance at colony sites could cause desertion or declines (Howes and Montevecchi 1993), but terns have also shown potential for habituation to human activity under certain conditions. Growing gull populations have displaced terns from breeding habitat in some parts of Atlantic Canada and increased predation on young and eggs (Lock 1992). Climatic warming could decrease abundance or change distribution of ice-associated prey species such as the Arctic cod.

**State challenges:**

*Changes in prey availability:* Terns are especially sensitive to reduction in food availability, sometimes causing complete breeding failure and possibly decreases in adult survival (USFWS 2006b). Over the past 20 years, a climatic regime shift in the Gulf of Alaska (GOA) marine ecosystem caused changes in productivity and the composition and distribution of marine fish communities (Anderson and Piatt 1999). Declines in tern and other piscivorous marine bird populations coincided with changes in the GOA ecosystem, and have been linked to changes in forage fish availability during this time (Agler et al. 1999); also see Climate change, below.

*Predation:* Vulnerable to predation, which limits colony site availability and strongly affects nest spacing (Hatch 2002). Adults may abandon nests if disturbed by predators, and seldom re-nest. Arctic Terns tend to nest on flat sites where mammalian predators have easy access; the widespread introduction of foxes to Alaskan islands likely had a local impact on tern populations (Sowl 1979). In the Aleutian Islands, *Sterna* spp. do not occur in any numbers on islands having foxes (Bailey and Kaiser 1993); terns colonized islands after disappearance (or removal) of introduced foxes but original distribution is unknown (Hatch 2002). Introduction of rats to island nest colonies is also a potential threat. Increasing gull populations in parts of Atlantic Canada caused displacement of nesters and increased chick and egg mortality (Lock 1992); artificial concentrations of predaceous gull populations near tern colonies could be a potential threat in Alaska. In addition to gulls, Black-billed Magpies (*Pica hudsonia*), Northwestern Crows (*Corvus caurinus*), Common Ravens (*C. corax*), and Parasitic Jaegers (*Stercorarius parasiticus*) eat both chicks and eggs and may be of concern at some colonies (Snyder 1987, Duffy 1995, Hatch 2002).

*Subsistence harvest:* Shooting, eggging, and trapping occur in numerous areas across the tern's breeding range. In Alaska, subsistence harvest was estimated at approximately 80 adults and 2,500 eggs per year between the early 1990s and 2000. These are minimal

estimates and the full extent of the harvest and impacts to the population are unknown (USFWS 2006b).

*Disturbance at nest and roost sites:* Sensitive to disturbance at nesting colonies. Complete colony abandonment has been observed following a single visit by humans (Haney et al. 1991); however, this species is also known to habituate readily to predictable human activity and colonies are known from sites such as airports, city parks and within meters of highways (Hatch 2002). Most colonies are isolated and rarely visited, so human disturbance is likely only a local problem near settlements, and where commercial fishing or tourist boats pass near colonies on shore.

*Climate change:* Arctic Terns rely on ice-associated prey species (e.g., Arctic cod) whose distribution and abundance could be affected by rising ocean temperatures and declining sea ice. On Cooper Island, Alaska, terns modified their breeding chronology so that chick rearing coincided with periods when prey species were most available (i.e. during shorefast ice breakup and drifting pack ice periods); terns even risked predation by Arctic foxes (which accessed the island by shorefast ice) to lay eggs during these times, demonstrating the importance of nearby ice and associated prey (Boekelheide 1980).

## **RESEARCH AND INVENTORY NEEDS**

### **Global research needs:**

Very little is known about nonbreeders in the Antarctic, where most of the mortality occurs. Study wintering ecology in the southern hemisphere and threats to breeding populations in the northern hemisphere.

### **State research needs:**

Investigate suspected declines in southcoastal areas and determine the mechanism for such declines. In particular, the role of changing prey base on reproductive success needs study. Research needed on interactions and genetic exchange with Russian populations. Determine the extent of predation by gulls and their effect on tern populations.

### **Global inventory needs:**

Range, particularly nonbreeding, is not well defined; better information needed on global distribution, numbers and trends.

### **State inventory needs:**

An accurate statewide population census is needed, and consistent monitoring is required to estimate trends. Inland nesting is poorly documented, needs inventory. Determine level of subsistence harvest and evaluate human disturbance from different sources (hunters, commercial fishing boat wakes, and tourism) at index colonies.

## CONSERVATION AND MANAGEMENT NEEDS

### **Global conservation and management needs:**

On the Atlantic Coast, where Arctic Terns are outnumbered by growing Common Tern (*S. hirundo*) populations, consistent methods for determining numbers in mixed colonies are needed (Hatch 2002).

### **State conservation and management needs:**

Disturbance may be detrimental to nesting success. Evaluate human disturbance at key colonies and develop methods to minimize disturbance whenever possible. While colony disturbance may be a concern, under some circumstances terns may become habituated to repeated exposure to human activity; this close co-existence could in fact be a management goal with benefits to human viewers as well as terns (Hatch pers. comm.).

Protection against island rat introductions and increased gull predation is important; uncovered trash dumps draw gulls into areas and should be controlled near colonies. Oil contamination may be prevented by monitoring ship compliance with regulations for discharge of oil and other pollutants.

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**Reviewer(s):** Dr. Jeremy Hatch, University of Massachusetts Boston, Boston, MA.

Life history and global level information were obtained from the on-line database, NatureServe Explorer ([www.natureserve.org/explorer](http://www.natureserve.org/explorer)). In many cases, life history and global information were updated for this species account by Alaska Natural Heritage Program zoologist, Tracey Gotthardt. All global level modifications will be sent to NatureServe to update the on-line version.

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**Global Element Ecology & Life History Author(s):** Hammerson, G.

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