Forster's Tern

Sterna forsteri

REGULATORY STATUS

USFWS: Migratory Bird
USFS R2: No special status
USFS R4: No special status
Wyoming BLM: No special status
State of Wyoming: Protected Bird

CONSERVATION RANKS

USFWS: No special status
WGFD: NSS3 (Bb), Tier II
WYNDD: G5, S1
Wyoming Contribution: LOW
IUCN: Least Concern
PIF Continental Concern Score: Not ranked

STATUS AND RANK COMMENTS

Forster's Tern (*Sterna forsteri*) has no additional regulatory status or conservation rank considerations beyond those listed above.

NATURAL HISTORY

Taxonomy:

Although two North American subspecies have been suggested, there are currently no formally recognized subspecies of Forster's Tern [1, 2].

Description:

Identification of Forster's Tern is possible in the field. It is a medium-sized tern; adults weigh between 130–190 g, range in length from 33–36 cm, and have a wingspan of approximately 79 cm [1, 3]. The sexes are similar in size and appearance [1]. Breeding adults have a solid black cap that extends to the bottom edge of the eye, pale gray back and wings, white to light gray primaries, white underbody, long deeply notched tail, dark brown eyes, orange bill with a black tip, and orange legs and feet [1, 3]. Non-breeding adults have a black bill, dark gray primaries, and the black cap is reduced to black eye patches [1, 3]. Two other species of tern are known to breed in Wyoming: Black Tern (*Chlidonias niger)* and Caspian Tern (*Hydroprogne caspia*) [4, 5]. Forster's Tern resembles Caspian Tern in the breeding season, but Caspian Tern has a thicker red bill with a gray tip and black legs and feet [3].

Distribution & Range:

Forster's Tern is restricted to North America for both the breeding and non-breeding seasons [1]. The breeding distribution of Forster's Tern is widely scattered across Canada and the United States, but the Prairie Potholes Region and the northern Great Basin represent the two largest core areas [1]. Wyoming borders the northeastern edge of the Great Basin, and contains several small peripheral breeding areas [1]. Forster's Tern migrates through the state in the spring and fall

and is a summer resident [4, 5]. Although this species has been observed locally at waterbodies across the state, confirmed breeding has been documented in just 5 of the 28 latitude/longitude degree blocks [5].

Habitat:
Forster's Tern prefers fresh, brackish and saltwater marsh and wetland habitats [1]. Although it is most commonly found in large, open-water marshes with islands of standing emergent or floating vegetation, it will also use peripheral marsh habitat at the edges of lakes, streams, islands, estuaries and coastal beaches [1]. In Wyoming, Forster's Tern breeds primarily in large marshes and lakes, but may use any body of water below elevations of 2,286 m during migration [4]. Forster's Tern nests on a variety of substrates including marshy, sandy and cobblestone shorelines, floating and emergent vegetation, vegetated windrows, and muskrat lodges [1]. The nests themselves can range from an unlined ground scrape to a mound of local marsh plants [1].

Phenology:
In Wyoming, spring arrival of migrating and breeding Forster's Terns typically begins in late April and peaks from mid to late May [4]. Very little is known about the specific nesting and breeding phenology of this species in Wyoming, but nest initiation has been observed as early as late May [4]. Clutch size can range from 1–4 eggs, although clutches of 2 or 3 eggs are most common [1]. Forster's Tern is considered a single-brood species, but will often renest following the loss of the first clutch [1]. Fall migration from Wyoming starts in July and peaks in late August and early September [4].

Diet:
Forster's Tern is primarily piscivorous, consuming a variety of small fish species 1–10 cm in length, as well as some arthropods [1].

CONSERVATION CONCERNS

Abundance:
Continental: WIDESPREAD
Wyoming: VERY RARE
There are no robust estimates of abundance available for Forster's Tern in Wyoming. The statewide abundance rank of VERY RARE is based on the rather small area of the state known to be occupied in any given season, and the small coverage of suitable habitat within that area. However, within suitable habitat in the occupied area, Forster's Tern appears to be common and is usually encountered during surveys that could be expected to indicate its presence [5]. Colonial nesting waterbird surveys conducted from 2002–2006 by the Wyoming Game and Fish Department (WGFD) recorded a range of 33 to 116 individuals annually across all surveyed sites [6-10]. From 1968–2015, annual Wyoming Breeding Bird Survey (BBS) detections of Forster's Tern ranged from 0 to 6, with none recorded in most years [11]. Only 2 Forster's Terns were detected during surveys for the Integrated Monitoring in Bird Conservation Regions (IMBCR) program between 2009–2015 [12]. While surveys conducted as part of the BBS and IMBCR programs may occasional detect this species, neither is specifically designed to capture tern observations.

Population Trends:
Historic: UNKNOWN
Recent: UNKNOWN

Robust population trends are not available for Forster's Tern in Wyoming because the species is infrequently detected during monitoring efforts. North American BBS survey-wide trend data have deficiencies, and should be viewed with caution, but suggest that Forster's Tern numbers declined annually by 1.72% from 1966–2013 and increased annually by 1.82% from 2003–2013 [13]. Neither trend estimate was statistically significant.

Intrinsic Vulnerability:

MODERATE VULNERABILITY

Forster's Tern has moderate intrinsic vulnerability in Wyoming due to a narrow range of habitat use, low density of occurrence, colonial nesting behaviors, and inherent risk of bioaccumulation. Forster's Tern abundance and breeding distribution is limited by a preference for large, productive wetlands and marshes. These habitat types are naturally uncommon in Wyoming, which is one of the most arid states in the country [14, 15]. Natural or anthropogenic disturbance to breeding colonies can potentially affect large numbers of nesting individuals and negatively impact local populations of Forster's Tern. As a primarily piscivorous species, Forster's Tern is inherently at risk for physiological and reproductive stress caused by bioaccumulation of environmental contaminants from feeding in polluted aquatic habitats [1, 16-20]. Existing research has examined mercury toxicity in marine habitats or interior saline waterbodies such as the Great Salt Lake, Utah. The extent to which Forster's Tern is exposed to environmental contaminants in freshwater habitats in Wyoming is unknown.

Extrinsic Stressors:

SLIGHTLY STRESSED

Forster's Tern is slightly stressed by extrinsic stressors in Wyoming, where already limited natural wetland habitat is potentially vulnerable to climate change and drought, invasive plant species, and development for infrastructure, energy, and agriculture [14, 15]. Natural wetlands in Wyoming are declining in size and number, with less than 2% of the total state area classified as wetland habitat [14, 15]. Forster's Tern colonies located in close proximity to California Gull (*Larus californicus*) colonies in California were susceptible to high rates of chick mortality from gull predation [21]. The breeding distribution of Forster's Tern in Wyoming overlaps with several gull species, including California Gull [4, 5]; however, predation risk to Forster's Tern chicks at these locations is expected to be nominal.

KEY ACTIVITIES IN WYOMING

Forster's Tern is classified as a Species of Greatest Conservation Need (SGCN) by the WGFD, and as a Level I Priority Bird Species requiring conservation action in the Wyoming Bird Conservation Plan [22]. Current statewide bird monitoring programs are designed for monitoring breeding songbird populations and are unlikely to provide useful information on Forster's Tern. These monitoring programs include the BBS program conducted on 108 established routes since 1968 [13], and the multi-agency IMBCR program initiated in 2009 [12]. Since 1984, WGFD has conducted annual or periodic monitoring at the most important and productive sites for colonial waterbird SGCN to determine species presence and distribution, and to estimate number of nesting pairs. The most recent effort was the culmination of a multi-year cooperative agreement between the WGFD and the United States Fish and Wildlife Service to conduct an intensive survey of all historic, known, potential, and new colonial waterbird breeding sites statewide as part of a western range-wide effort to track population size, trends, and locations of breeding colonial waterbirds in the western United States [23, 24]. In 2014, an online Atlas of western colonial waterbird nesting sites was produced with data collected and submitted by participating

states [25]. Every three to five years, WGFD personnel visit known colonial waterbird nesting sites outside of Yellowstone National Park to evaluate water level conditions, determine species present at each site, and estimate the number of nesting pairs of colonial waterbirds. There are currently no research projects designed specifically for Forster's Tern in Wyoming.

ECOLOGICAL INFORMATION NEEDS

In Wyoming, Forster's Tern would benefit from research to determine its detailed distribution, the location and habitat characteristics of all current breeding locations, and the annual abundance of migrating and breeding adults. Beyond approximate arrival and departure dates, very little is known about migratory pathways, or the phenology of local breeders in Wyoming. Nothing is known about nest success, predation risk, fledgling survival, or risk of exposure to aquatic contaminants at the nine known breeding locations in the state. Wyoming's wetland and marsh habitats are scarce and inherently vulnerable, and current and future anthropogenic and natural stressors should be identified to ensure the persistence of breeding habitat for Forster's Tern.

MANAGEMENT IN WYOMING

This section authored solely by WGFD; Andrea C. Orabona. The colonial nature of Forster's Terns and other waterbirds makes these species particularly vulnerable across their range to loss or degradation of nesting sites, stochastic weather events such as drought and flooding, changing land use practices, pollution, and climate change. In Wyoming, Forster's Tern is classified as a Species of Greatest Conservation Need due to limited suitable aquatic or wetland breeding habitat, sensitivity to human disturbance during the breeding season, and susceptibility of nests to fluctuating water levels [14]. Two separate but compatible survey programs are in place to monitor populations of many avian species that breed in Wyoming; the BBS [13] and IMBCR [12] programs. While these monitoring programs provide robust estimates of occupancy, density, or population trend for many species in Wyoming, colonial waterbirds are one of the species groups that warrant a targeted, species-specific survey method approach to obtain these data. WGFD conducted inventories of nesting colonial waterbirds, including Forster's Tern, from 1984–1986 [26, 27]. In 1990, WGFD summarized all information presently known on colonial nesting waterbirds in Wyoming [28]. Since 1984, WGFD has conducted annual or periodic monitoring at the most important and productive sites for colonial waterbird Species of Greatest Conservation Need. Results have shown Forster's Tern nesting at nine sites in Wyoming; Ocean Lake near Riverton, Cokeville Meadows National Wildlife Refuge near Cokeville, and five sites within the Laramie Plains Basin near Laramie [5]. Due to their sensitivity to human disturbance during the nesting season, the survey technique used for colonial waterbirds is minimally invasive and provides only an estimate of the number of breeding pairs and coarse habitat associations of each waterbird species present in the colony. Actual nests, eggs, or young are not located or counted to prevent colony disruption and reduce predation risk. From 2009–2012, WGFD and the USFWS cooperated to conduct a rigorous survey of all historic, known, potential, and new colonial waterbird breeding sites statewide as part of a western range-wide effort to track population size, trends, and locations of breeding colonial waterbirds in the western United States [23, 24]. A total of 90 sites were evaluated in Wyoming; 86 potential colonial waterbird nesting sites and 4 known nesting sites. A lack of adequate emergent vegetation to provide secure nesting areas for colonial waterbirds was noted at most potential sites visited. An online Atlas of western colonial waterbird nesting sites was produced with data collected and submitted

by participating states [25]. Best management practices to benefit Forster's Tern include maintaining large, high quality wetland complexes; keeping water levels stable during the nesting season; installing artificial nest platforms where needed; protecting any colony site used by Forster's Tern; keeping human disturbance to a minimum during the breeding season, and monitoring colony sites every three years to determine Forster's Tern presence and estimate number of nesting pairs [14, 22].

CONTRIBUTORS

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Figure 1: A flying Forster's Tern in breeding plumage in Walden, Colorado. (Photo courtesy of Bill Schmoker)

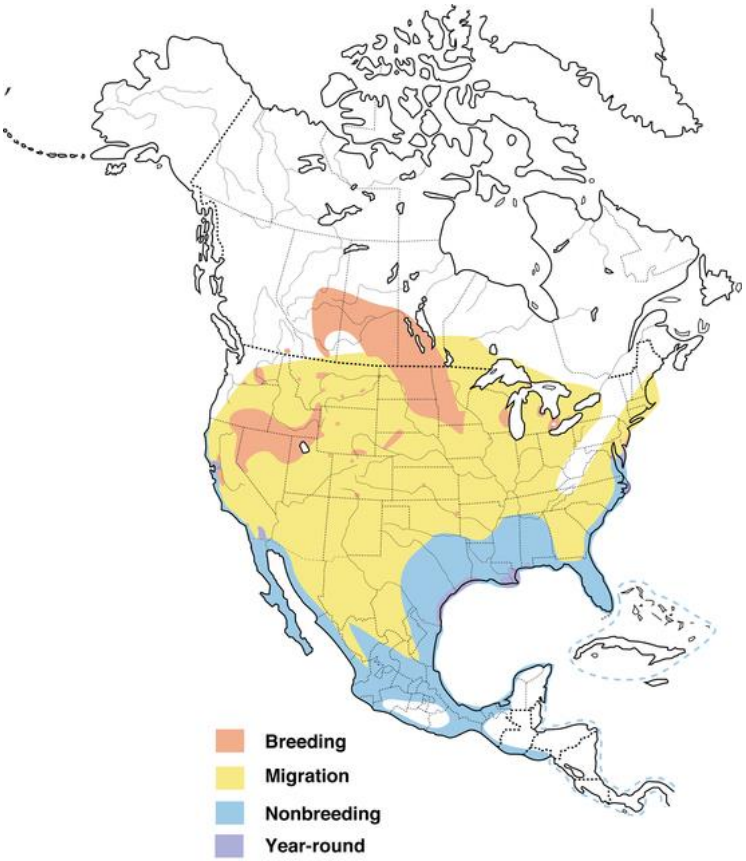

Figure 2: North American range of *Sterna forsteri*. (Map courtesy of Birds of North America, http://bna.birds.cornell.edu/bna, maintained by the Cornell Lab of Ornithology)

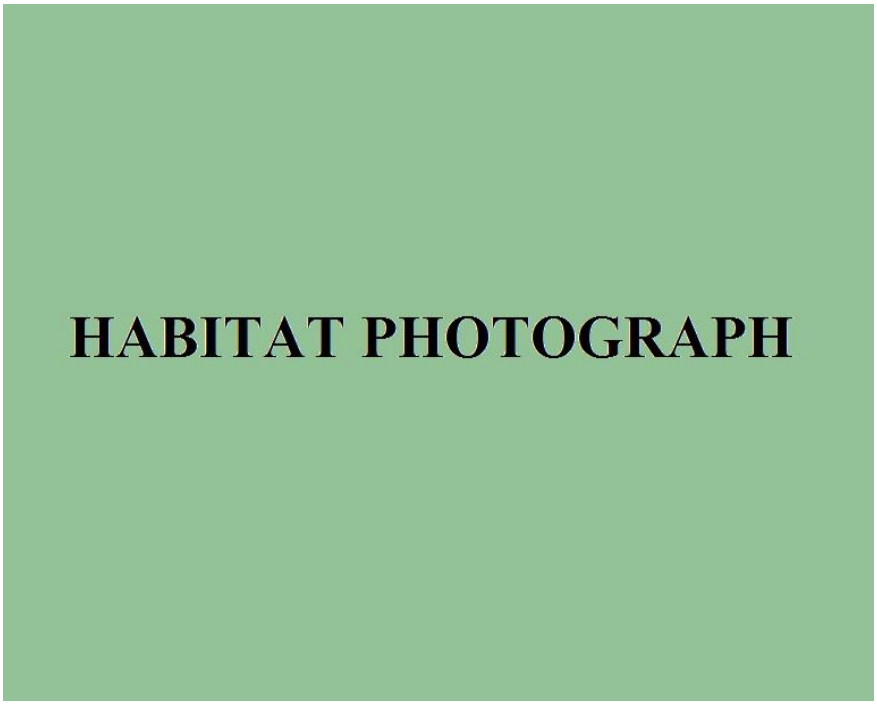

Figure 3: Photo not available.

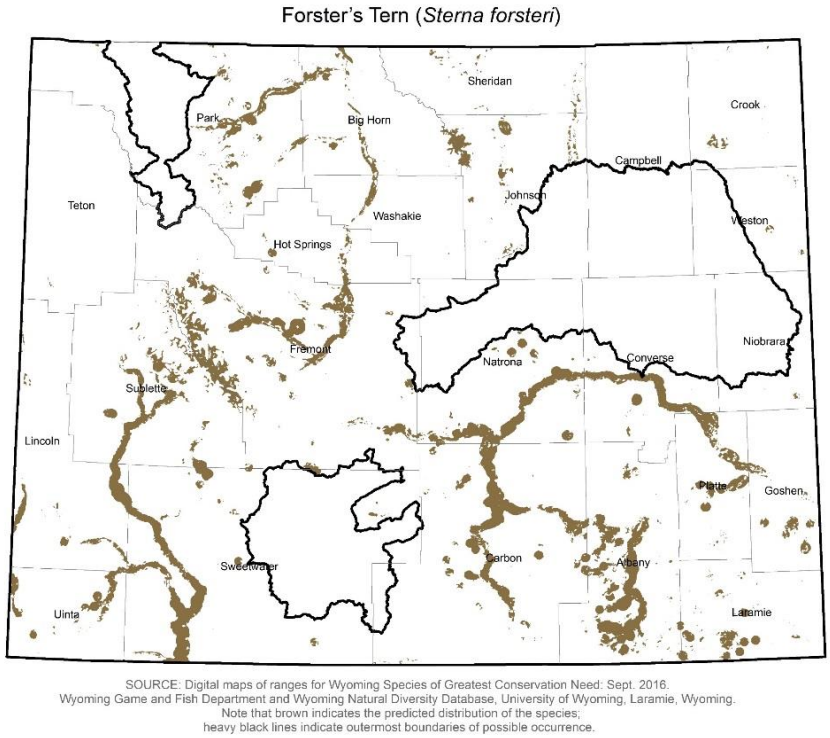

Figure 4: Range and predicted distribution of *Sterna forsteri* in Wyoming.