Trumpeter Swan

Cygnus buccinator

Class: Aves
Order: Anseriformes

Conservation Status

NatureServe:	*Agency:*	
G Rank: G4	USFWS:	IUCN: Least Concern
S Rank: S4B,S3N	ADF&G: Species of Greatest Conservation Need	

Final Rank

Conservation category: **IX. Blue**

IX = low status and low biological vulnerability and action need

Category	Range	Score
Status:	-20 to 20	-8
Biological:	-50 to 50	-24
Action:	-40 to 40	0

Higher numerical scores denote greater concern

Status - variables measure the trend in a taxon's population status or distribution. Higher status scores denote taxa with known declining trends. Status scores range from -20 (increasing) to 20 (decreasing). **Score**

Population Trend (-10 to 10) 2

Trumpeter swans were nearly driven to extinction in the early 1900s due to overhunting. They have recovered since then, and in Alaska have exhibited an average annual increase of +5.3% per year from 1968 to 2015 (i.e. since USFWS surveys began; Groves 2017). This growth rate has slowed in recent decades and the population appears to have stabilized since 2005 (Groves 2017; D. Groves, pers. comm.).

Distribution Trend (-10 to 10) -10

Over the past 50 years, trumpeter swans have expanded their distribution, both within the core and the peripheries of their Alaskan range (Conant et al. 2002). The population now occupies much of the suitable habitat within Alaska's boreal forest and appears to be reaching carrying capacity in some parts of the state (Groves 2017). Further significant expansion within their core breeding range is unlikely; however, the population has continued to expand into peripheral boreal-tundra ecotone habitat (Bryant et al. 2005; Harwood 2017).

Status Total: -8

Biological - variables measure aspects of a taxon's distribution, abundance and life history. Higher biological scores suggest greater vulnerability to extirpation. Biological scores range from -50 (least vulnerable) to 50 (most vulnerable). **Score**

Population Size (-10 to 10) -10

Population size is likely >25,000. Population size of breeding and non-breeding adults in Alaska was estimated at 22,015 (SE = 1,113) in 2015 (Groves 2017). This estimate is a minimum number and does not include areas where trumpeter and tundra swans overlap.

Range Size (-10 to 10) -2

Breeds in interior, southcoastal, and southeast Alaska, from south of the Brooks Range to the Gulf of Alaska, and from the Canadian border west to the Yukon-Kuskokwim Delta (Mitchell and Eichholz 2010). Although uncommon in southeast, breeding has been confirmed along the Chilkat and Taku rivers near Haines and Juneau, respectively (Johnson et al. 2008b). Overwinters in southeast Alaska (Mitchell and Eichholz 2010) and possibly as far north as Cordova (Isleib 1981, qtd. in PFC 2006b). Wintering range is most restricted and is estimated to be

<100,000 sq. km.

Population Concentration (-10 to 10) -10

Solitary nesters (Hansen et al. 1971). Form flocks during winter and migration, but areas of high concentrations have not been identified in Alaska. Given population size, likely more than >250 sites.

Reproductive Potential

Age of First Reproduction (-5 to 5) 1

Most females do not reproduce until 4 to 7 years of age (Mitchell and Eichholz 2010).

Number of Young (-5 to 5) 1

Clutch size in the Copper River Valley and the Kenai Peninsula ranged from 1 to 9 eggs, with averages between 4.4 and 5.7 (Hansen et al. 1971). Estimates for brood sizes tend to be lower, ranging from 2.8 to 3.6 (Conant et al. 2002; Groves and Hodges 2013). Elsewhere in North America, clutch sizes vary regionally and averages range from 3.5 to 5.8 eggs (Olson et al. 2015).

Ecological Specialization

Dietary (-5 to 5) -5

Adults are primarily herbivourous, feeding on aquatic and emergent vegetation such as Carex and Equisetum (Hansen et al. 1971). Occasionally consumes fish and fish eggs. Cygnets eat aquatic invertebrates and vegetation (Mitchell and Eichholz 2010).

Habitat (-5 to 5) 1

Trumpeter swans typically nest in boreal forest habitats in large wetlands by freshwater such as lakes, ponds, and rivers (Johnson et al. 2008b; Schmidt et al. 2009a; Mitchell and Eichholz 2010). Hansen et al. (1971) observed a high percentage (51%) of nests in beaver ponds and in waterbodies dominated by Carex or Equisetum. They suggested that stable water levels and a high density of aquatic vegetation were important characteristics for nest sites (Hansen et al. 1971). Trumpeter swans have been observed nesting from sea level to elevations >1,000m (Hansen et al. 1971; D. Groves, pers. comm.,), but may avoid higher elevations because of the short ice-free season (Hansen et al. 1971; Schmidt et al. 2009a). They tend to avoid forested wetlands and areas near actively used roads (Schmidt et al. 2009a).

Biological Total: -24

Action - variables measure current state of knowledge or extent of conservation efforts directed toward a given taxon. Higher action scores denote greater information needs due of lack of knowledge or conservation action. Action scores range from -40 (lower needs) to 40 (greater needs). **Score**

Management Plans and Regulations (-10 to 10) -10

Protected under the Migratory Bird Treaty Act (MBTA 1918). Although subsistence harvest was historically allowed, it is currently illegal to hunt trumpeter swans in Alaska (AMBCC 2017; ADFG 2017a). A management plan is in place for the Pacific population and was last updated in 2006 (PFC 2006b).

Knowledge of Distribution and Habitat (-10 to 10) 2

The distribution of trumpeter swans in Alaska has been changing for the past several decades (Conant et al. 2002; Bryant et al. 2005). As such, the extent of their distribution is not fully understood. Only a few studies have considered habitat use of nesting swans in Alaska (Hansen et al. 1971; Schmidt et al. 2009a). Little is known about distribution and habitat use during migration and in the winter (PFC 2006b).

Knowledge of Population Trends (-10 to 10) -2

The Alaska Trumpeter Swan Survey, which is part of a broader North American survey, began in 1968 and has taken place once every five years since 1975 (Groves 2017). These surveys cover most of the swans' Alaskan breeding range, though they do not include areas where trumpeter swans and tundra swans (Cygnus columbianus) overlap (Conant et al. 2002; Groves 2017). Localized monitoring is also conducted on federally protected lands (PFC 2006b).

Knowledge of Factors Limiting Populations (-10 to 10) 10

Few studies have considered the population dynamics of trumpeter swans in Alaska and the factors that current limiting this population are largely unknown. Prior to the 20th century, market hunting had a devastating impact on the population. The population has recovered since then and has continued to increase and expand its distribution since surveys began in 1968 (Groves 2017). Growth appears to be slowing and trumpeter swans may have reached their carrying capacity in some parts of the state (Conant et al. 2002; Groves 2017). However, their breeding distirbution continues to expand in peripheral habitat (Bryant et al. 2005; Schmidt et al. 2011). These expansions have increased the amount of overlap between trumpeter and tundra swans, which may increase competition between the two species (Conant et al. 2002; Schmidt et al. 2011). Continued range expansions may be mediated by climate change leading to improved reproductive conditions at the northern edge of their range (Schmidt et al. 2009b; Schmidt et al. 2011). Some data are available on survival and productivity (e.g. Hansen et al. 1971; Groves and Hodges 2013), but there is little information on associated limiting factors. Hansen et al. (1971) documented moderately high levels of nest and cygnet survival. Predation accounted for the majority of nest failures, followed by infertile eggs and nest abandonment (Hansen et al. 1971).

Habitat loss due to urban or agricultural development has likely occurred in some parts of southcoastal Alaska (e.g. Cook Inlet), as well as on wintering grounds in British Columbia, Washington, and Oregon (Conant et al. 2002; PFC 2006b). Future development of roads and pipelines in interior Alaska could also lead to the loss of suitable breeding habitat (Schmidt et al. 2009a). Indeed, Schmidt et al. (2009a) found that trumpeter swans avoided nesting near active roads and other transportation infrastructure. Lead poisoning has been identified as an important source of mortality, especially in Washington and British Columbia (PFC 2006b). Other sources of mortality identified in the Trumpeter Swan Management Plan include: diseases such as Aspergillosis, illegal hunting, and collisions with power lines (PFC 2006b). The amount of illegal or accidental harvest (e.g. in areas where they overlap with tundra swans) is unknown (PFC 2006b).

Action Total: 0

Supplemental Information - variables do not receive numerical scores. Instead, they that are used to sort taxa to answer specific biological or management questions.

Harvest:	None or Prohibited
Seasonal Occurrence:	Year-round
Taxonomic Significance:	Monotypic species
% Global Range in Alaska:	>10%
% Global Population in Alaska:	25-74%
Peripheral:	No

References

Alaska Migratory Bird Co-Management Council (AMBCC). 2018. 2018 Alaska subsistence bird harvest regulations. Office of the Alaska Migratory Bird Co-Management Council, U.S. Fish & Wildlife Service, Anchorage, AK, USA.

Bryant, J. M., B. D. Scotton, and M. R. Hans. 2005. Sympatric nesting range of Trumpeter and Tundra Swans on the Koyukuk National Wildlife Refuge in Northwest Interior Alaska. Progress Report FY-05-02, U.S. Fish and Wildlife Service, Koyukuk/Nowitna Natio

Conant, B., J. I. Hodges, D. J. Groves, and J. G. King. 2002. Census of trumpeter swans on Alaskan nesting habitats, 1968-2000. Waterbirds 25:3-7.

Groves, D. J. 2017. The 2015 North American Trumpeter Swan Survey: A cooperative North American survey. U.S. Fish and Wildlife Service, Division of Migratory Bird Management, Juneau, AK.

Groves, D. J., and J. I. Hodges. 2013. A survey of trumpeter swans on Alaskan summering habitats, 2010. U.S. Fish and Wildlife Service, Migratory Bird Management, Juneau, AK, USA.

Hansen, H. A., P. E. K. Shepherd, J. G. King, and W. A. Troyer. 1971. The trumpeter swan in Alaska. Wildlife Monographs 26:3–83.

Harwood, C. M. 2017. Trumpeter Swan Survey, Kanuti National Wildlife Refuge, August 2016. Kanuti NWR Progress Report FY17, U.S. Fish and Wildlife Service, Koyukuk/Nowitna National Wildlife Refuge Complex, Galena, AK, USA.

Johnson, J. A., B. A. Andres, and J. A. Bissonette. 2008b. Birds of the major mainland rivers of Southeast Alaska. General Technical Report PNW-GTR-739. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, OR, USA.

Migratory Bird Treaty Act (MBTA). 1918. U.S. Code Title 16 §§ 703-712 Migratory Bird Treaty Act.

Mitchell, C. D., and M. W. Eichholz. 2010. Trumpeter Swan (Cygnus buccinator), version 2.0. In Rodewald, P. G., ed. The Birds of North America, Cornell Lab of Ornithology, Ithaca, NY, USA. DOI: 10.2173/bna.105

Olson, D., B. Long, and C. D. Mitchell. 2015. Geographic variation in trumpeter swan Cygnus buccinator clutch size and egg weights. Wildfowl 65:133–142.

Pacific Flyway Council (PFC). 2006b. Pacific Flyway management plan for the Pacific coast population of trumpeter swans. Pacific Flyway Study Committee, Portland, OR, USA.

Schmidt, J. H., M. S. Lindberg, D. S. Johnson, and J. A. Schmutz. 2009a. Environmental and human influences on trumpeter swan habitat occupancy in Alaska. The Condor 111(2):266-275. DOI: 10.1525/cond.2009.080102.

Schmidt, J. H., M. S. Lindberg, D. S. Johnson, B. Conant, and J. King. 2009b. Evidence of Alaskan trumpeter swan population growth using Bayesian hierarchical models. Journal of Wildlife Management 73(5):720-727.

Schmidt, J. H., M. S. Lindberg, D. S. Johnson, and D. L. Verbyla. 2011. Season length influences breeding range dynamics of trumpeter swans Cygnus buccinator. Wildlife Biology 17(4):364-372. DOI: 10.2981/11-003

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