King Eider

Somateria spectabilis

Class: Aves
Order: Anseriformes

Conservation Status

NatureServe:	*Agency:*	
G Rank: G5	USFWS:	IUCN: Least Concern
S Rank: S3B,S3N	BLM:	ADF&G: Species of Greatest Conservation Need

Final Rank

Conservation category: **VII. Yellow**

VII = low status and high biological vulnerability and action need

Category	Range	Score
Status:	-20 to 20	-3
Biological:	-50 to 50	-10
Action:	-40 to 40	4

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

The Pacific population of king eiders underwent serious declines (>50%) from the 1970s to the 1990s (Suydam et al. 2000; Bowman et al. 2015). Recent surveys based on migration counts and aerial surveys indicate a stable to increasing trend (Quakenbush et al. 2009; Larned et al. 2012; Powell et al. 2018; Wilson et al. 2018b).

Distribution Trend (-10 to 10) -5

Unknown, but likely stable.

Status Total: -3

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) -6

The long-term (1986-2017) mean population index for king eiders breeding on the Arctic Coastal Plain is 16,349 (95% CI: 14,707-17,990; Wilson et al. 2018b). The entire western population, which includes individuals that breed in the western Canadian Arctic, flies by Point Barrow during migration. Migration counts are highly variable between years, but estimates range from 322,381 to 796,419 (Quakenbush et al. 2009; Powell et al. 2018). However, the number of individuals that breed in Alaska is much smaller (Powell and Suydam 2012; Wilson et al. 2018b).

Range Size (-10 to 10) -8

In Alaska, breeds on the Arctic Coastal Plain from Cape Lisburne east to Canada. Molts and overwinters in shallow waters of the Bering Sea (e.g. Bristol Bay, Kuskokwim Bay, St. Lawrence Island) and the Gulf of Alaska (e.g. Kodiak Island) (Phillips et al. 2006; Oppel et al. 2008; Schamber et al. 2010a; Bentzen and Powell 2015). Bays in the Chukchi, Beaufort, and Bering Seas (e.g. Ledyard Bay, Harrison Bay, Bristol Bay) are used during migration (Phillips et al. 2007; Oppel et al. 2009; Schamber et al. 2010a; Bentzen and Powell 2015). Breeding range is likely most restricted and is estimated at ~160,000 sq. km.

Population Concentration (-10 to 10) 10

King eiders are solitary nesters on the Arctic Coastal Plain and are relatively widely distributed in the winter (Phillips et al. 2006; Bentzen et al. 2009; Bentzen and Powell 2015). However, the entire western breeding population flies by Point Barrow during spring migration (Quakenbush et al. 2009). In some years, most of the 500,000+ birds pass in just a few days (Quakenbush et al. 2009; R. Bentzen, WCS, pers. comm.). This makes them very vulnerable in both space and time and we therefore rank this question as A- Single site.

Other sites in Alaska are important to king eiders. Dickson (2012) outlines 7 critical areas for the Pacific population of King Eiders, based on work in Alaska and western northern Canada. Three of these critical areas are in Alaska: 1- eastern Chukchi Sea (incl. Ledyard Bay); 2- Bristol Bay; and 3- western Beaufort Sea. Dickson (2012) lists 5 additional areas as "potentially" critical, including waters off of St. Lawrence Island. Satelitte telemetry studies found that between found that between ~20 to 38% of tagged individuals overwinter in southwest Alaska (Bristol Bay or the Alaska Peninsula; Phillips et al. 2006; Schamber et al. 2010a). As well, 93% of tagged individuals used Ledyard Bay during staging (Oppel et al. 2008).

Reproductive Potential

Age of First Reproduction (-5 to 5) -3

Breeding occurs at age 3 (Oppel and Powell 2010; Powell and Suydam 2012).

Number of Young (-5 to 5) 1

Clutch size for two sites in Alaska ranged from 2 to 8, with an average between 4.2 and 4.4 (Phillips and Powell 2009; Bentzen and Powell 2012). Although females can breed annually when conditions are favorable (Powell and Suydam 2012), breeding incidence is probably about 0.78 (Bentzen and Powell 2012). Both nest (0.21-0.57; Bentzen et al. 2008; Bentzen and Powell 2012) and duckling (~0.1; Bentzen and Powell 2012) survival rates are very low. While our ranking system can accommodate taxa that do not breed every year, this question evaluates clutch size irrespective of nest or juvenile survival rates. Assuming a breeding rate of 0.78 would still give an annual clutch size of 3.12 (4.2 * 0.78), and we therefore maintain a rank of C- 3-9 offspring/female/year.

Ecological Specialization

Dietary (-5 to 5) 1

Eats mainly aquatic invertebrates including mollusks, crustaceans, and insects (Oppel et al. 2010; Powell and Suydam 2012). Also feeds on plants (graminoids, marsh plants) and algae (Powell and Suydam).

Habitat (-5 to 5) -5

In Alaska, the entire population breeds on the Arctic Coastal Plain, on wetland tundra near lakes or on islands, and in areas with relatively high willow cover (Bentzen et al. 2009; Liebezeit et al. 2011). During non-breeding, they use relatively shallow, low salinity waters that are close to shore and free of ice (Phillips et al. 2006; Dickson and Smith 2013).

Biological Total: -10

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). Subsistence harvest and sport hunting are permitted, but subject to closed seasons and bag limits (ADFG 2018e; AMBCC 2018).

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

Recent work has greatly improved our understanding of distribution and habitat use, but these areas of research are not yet fully understood. From 2001 to 2011, researchers at the University of Alaska Fairbanks and the North Slope Borough studied movements and habitat use during various seasons e.g. wintering, migrating, breeding (http://projects.iab.uaf.edu/kingeider/KIEI_Home.htm). This research program and other studies have begun to identify critical areas in Alaska and Russia for king eider ecology (e.g. Phillips et al. 2006; Oppel et al. 2008; Schamber et al. 2010a). Habitat associations have been studied (Phillips et al. 2006; Bentzen et al. 2009).

Knowledge of Population Trends (-10 to 10) 2

The Waterfowl Breeding Population Survey (formerly the North Slope Eider Survey) is an annual survey of breeding birds on Alaska's Arctic Coastal Plain, which has provided abundance indices of king eiders since 1986 (Wilson et al. 2018b). Count surveys at Point Barrow have been conducted intermittently during spring migration since 1976 and also provide a relative population trend for the entire western population (i.e. incl. Canada; Quakenbush et al. 2009). Detection probability and high interannual variation remain important problems (Powell et al. 2018).

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

Although recent studies have provided valuable information on survival rates and demographics, little is known about the factors that limit king eiders in Alaska and reasons behind historical declines are unknown. Modeling efforts by Bentzen and Powell (2012) using published demographic estimates found high adult survival rates. However, survival is low for early life stages including nest (Bentzen et al. 2008; Bentzen and Powell 2008), duckling (Mehl and Alisauskas 2007; Phillips and Powell 2009; Bentzen and Powell 2012), and yearling survival (Phillips and Powell 2009; Oppel and Powell 2010). The factors responsible for these low survival rates in Alaska are not fully known (Bentzen et al. 2008; Phillips and Powell 2009; Bentzen and Powell 2012). Predation by foxes and avian predators, as well as human disturbance, may be contributing factors (Bentzen et al. 2008). Studies in the Canadian Arctic have found that predation is the main cause of hatchling mortality (Kellett et al. 2003; Mehl and Alisauskas 2007). Little is known about the factors that contribute to eider mortality on their wintering and molting grounds, or during migration.

In Alaska, subsistence harvest estimates range from ~4,800 to nearly 30,000 birds/year (Naves 2015; Rothe et al. 2015). However, this number includes eiders that breed in the western Canadian Arctic, which has a much larger population size. Given high rates of adult survival, Bentzen and Powell (2012) discounted subsistence harvest as a factor affecting population dynamics, but additional research is needed. Oil spills are estimated to have resulted in the death of as many as 100,000 birds (Flint et al. 199; Bentzen and Powell 2012). The potential for future oil spills in Alaska's Arctic could have major repercussions on the king eider population (Phillips et al. 2006; Bentzen and Powell 2012).

Action Total: 4

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

Harvest:	Substantial, regulations
Seasonal Occurrence:	Year-round
Taxonomic Significance:	Monotypic species
% Global Range in Alaska:	>10%
% Global Population in Alaska:	<25%
Peripheral:	No

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Alaska Center for Conservation Science
Alaska Natural Heritage Program
University of Alaska Anchorage
Anchorage, AK