

**Kanuti NWR Progress Report FY18
Aerial Survey of Breeding Scaup and Scoters
on Kanuti National Wildlife Refuge, June 2017**

Purpose: Aerial line-transect survey for breeding scaup (Lesser and/or Greater) and scoters
Location: Kanuti Flats, Kanuti National Wildlife Refuge (NWR)
Dates: 11 June 2017
Participants: Chris Daniels, Chris Harwood
Author: Christopher M. Harwood
Report Date: 12 February 2018

Summary:

On 11 June 2017, Pilot/Biologist Chris Daniels and Wildlife Biologist Chris Harwood conducted an aerial line transect survey for primarily scaup and scoters on Kanuti NWR. This is the fourth year of this survey. The crew flew 20 transects (including 10 new transects), totaling about 360 km in length, in 4.25 hours. Observations of the focal species totaled 118, composed mostly (98) of scaup. Estimates (plus standard error) for the 1,130-km² survey area were 1,499 ± 214 scaup and 562 ± 224 Surf Scoters. We observed no White-winged Scoters in 2017.

Background:

In 2014, Pilot/Wildlife Biologist Nikki Guldager of Yukon Flats NWR secured regional funding to expand the geographic range of her Refuge's survey for breeding scaup and scoters within the Northwest Boreal Landscape Conservation Cooperative region. In addition to historical lines flown over Yukon Flats NWR, Guldager and crew surveyed along transects deployed over an area south of Tanana Village, Minto Flats State Game Refuge, and Tetlin, Kanuti, Koyukuk and Nowitna Refuges (Guldager et al. 2016). In 2015, Kanuti NWR assumed operation of the Kanuti-specific survey with Refuge Manager/Pilot Mike Spindler and Deputy Refuge Manager Tina Moran as crew. The same crew replicated the survey again in 2016.

Study Area and Methods:

The survey's study area of 1,130 km² was defined in 2017 by 20 aerial line transects traversing east-west across the Kanuti Flats (Figure 1). The total length of the original 10 lines (#1–10) is 168.8 km (range: 7.0–25.5 km), while that of ten new intervening lines (#11–20) is 190.9 km (range: 10.1–27.4 km) for a total of 359.7 km. Adjacent original and alternate lines are approximately 3 km apart. Survey and statistical methods generally follow Guldager et al. (2016). While our crew did use a voice recorder to document all observations (transect number, waypoint number, species, number/sex of individuals observed), the recordings were not automatically ascribed a GPS location via laptop computer interface. The crew largely confined their observations to the taxa historically recorded on this survey: scaup (presumably a mix of Greater and Lesser), scoters (Surf and White-winged), and loons (Common, Pacific, and Red-throated). We did not record swans (presumably mostly Trumpeter) in 2017 because we had completed a census of swans on the Refuge in 2016. Data on voice recordings were transcribed manually into paper datasheets and electronic spreadsheets. "Indicated totals" varied between

scaup and scoters. For scaup, “indicated total” equals double the number of observed pairs, plus single and flocked scaup. For scoters, “indicated total” equals double the number of observed pairs, single drakes, and flocked drakes. Single females were not counted for either taxon. Wildlife Biologist Bryce Lake of Yukon Flats performed the SAS analyses to generate estimated totals and standard errors for each taxon.

Results:

General

Daniels and Harwood were stationed at Kanuti Cabin so the practice (8 June) and actual survey (11 June) emanated from the cabin. The crew used a CubCrafters Top Cub on floats for all flights.

On 8 June the crew performed a practice survey for 1.5 hours. Estimated cost for the practice flight was \$188 (1.5 hr at \$125/hr). Estimated fuel cost for this flight (1.5 hr at 8 gal/hr at \$10/gal [Bettles pricing]) was \$120.

During the formal survey on 11 June, the crew surveyed lines 1–10 (from south to north) from 8:41–10:41, refueled in Bettles, and then surveyed lines 11–20 (north to south) from 11:44–14:00 before returning to Kanuti Cabin. Total flight time on 11 June was 5.2 hr. Estimated cost for flight hours was \$650 (5.2 hr at \$125/hr). Estimated fuel cost for the survey (5.2 hr at 8 gal/hr at \$10/gal) was \$416. The estimated operational cost of the practice and survey flights, but not including salaries, was \$1,374.

Observations

The crew made 118 observations of the focal taxa, including 98 of scaup and 20 of Surf Scoter (Table 1; Fig. 1). The indicated totals from these observations were 192 scaup and 72 Surf Scoters (Table 2). Densities derived from these indicated totals suggested $1,499 \pm 214$ scaup and 562 ± 224 Surf Scoters in the study area. There were also 11 observations of Common Loons, 3 of Pacific Loons, 1 of Red-throated Loon, and 2 of unidentified loons. These observations suggested 117 ± 38 Common and 31 ± 19 Pacific Loons (Table 2) in the study area. There were an additional 11 observations of scaup and 2 of Surf Scoters that were recorded off-transect (and thus not used in the estimates).

Discussion Points

1. One of our goals in 2017 was to increase the precision of the estimates by increasing the number of transects, especially given the relatively modest increase in survey cost to do so. This would likely increase the number of observations, and consequently reduce the variance of the estimate. By doubling the number of transects, we indeed increased considerably from prior years the indicated totals of scaup (range: up 64–310%) and Surf Scoters (up 500–1100%). When comparing to 2016, the greater effort this year resulted in decreasing the standard error of each of the focal species’ estimate by some 50% (i.e., 30% to 14% for scaup, 74% to 40% for Surf Scoter). While this increase in precision is certainly laudable, the accuracy of the estimates is unknown and estimates have varied widely among years (915; 782; 1,946; 1,499; Table 2). This variation may in part be due to three completely different survey crews and different

aircraft. We should expect a more consistent crew and survey platform in future years. It also may be worth talking to Migratory Bird Management biologists to see if there are practical (i.e., inexpensive) ways to assess sources of bias and improve the estimate's accuracy.

2. This was the first survey of these species for this year's observers. To mitigate their inexperience, they conducted one practice survey prior to the official survey. They also reduced the number of species recorded from prior years by dropping swans, especially given the intensive census done of the taxon in fall 2016. One additional option to increase focus would be to eliminate recording of loon observations. While the number of loon observations has not been particularly high to date, including them in the suite of focal taxa does to some extent distract, especially for the back-seat observer who not only has to capture additional waypoints on the GPS, but also spend more time speaking into the voice recorder. Limiting the scope of the survey to just scaup and scoters may be warranted, at least initially for this crew, to reduce distractions and increase accuracy in focal detections. After gaining comfort and confidence in a reduced suite of focal species, the crew in time could begin to add back in dropped species.

Literature Cited:

- Harwood, C. M. 2017a. Aerial surveys of molting geese on Kanuti National Wildlife Refuge, July 2016. Unpublished USFWS report, Kanuti National Wildlife Refuge, Fairbanks, Alaska.
- Harwood, C. M. 2017b. Trumpeter Swan census, Kanuti National Wildlife Refuge, August 2016. Unpublished USFWS report, Kanuti National Wildlife Refuge, Fairbanks, Alaska.
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- Platte, R., and R. Stehn. 2011. Aerial survey of waterbirds on Kanuti National Wildlife Refuge and adjacent wetlands. Unpublished USFWS report, Migratory Bird Management, Anchorage, AK.
- Guldager, N., M.R. Bertram, and B. Lake. 2016. 2014 and 2015 aerial scoter and scaup surveys: Yukon Flats National Wildlife Refuge (NWR) annual monitoring report, and expanded survey of Tetlin, Kanuti, Koyukuk and Nowitna NWRs, Minto Flats State Game Refuge, and lake areas south of Tanana Village. Unpublished Yukon Flats National Wildlife Refuge report, U.S. Fish and Wildlife Service, Fairbanks, Alaska.

Table 1. Observations of scaup and Surf Scoters (SUSC) during aerial line transect surveys, Kanuti NWR, Alaska, 11 June 2017.

	Transect	1	2	3	4	5	6	7	8	9	10
SCAUP	pair	5	1	1	7	4	1	1	3	1	0
	single	2	1	2	3	2	1	3	1	2	0
	flocked drakes	5	0	2	7	0	0	5	4	0	0
	indicated total ¹	17	3	6	24	10	3	10	11	4	0
SUSC	pair	0	0	1	1	0	3	0	0	2	0
	single	0	1	0	0	0	0	0	0	0	0
	flocked drakes	4	0	0	0	0	0	4	0	0	0
	indicated total ¹	8	2	2	2	0	6	8	0	4	0

	Transect	11	12	13	14	15	16	17	18	19	20
SCAUP	pair	8	5	0	4	6	3	4	2	3	1
	single	2	4	0	1	0	3	0	3	2	2
	flocked drakes	0	3	0	0	0	5	2	2	0	3
	indicated total ¹	18	17	0	9	12	14	10	9	8	7
SUSC	pair	0	0	0	0	0	7	0	0	0	0
	single	0	1	0	0	1	3	0	0	1	0
	flocked drakes	0	0	0	0	2	5	0	0	0	0
	indicated total ¹	0	2	0	0	6	30	0	0	2	0

¹ Indicated total varies between scaup and scoters. For scaup, indicated total equals double the number of pairs, plus single and flocked scaup. For scoters, indicated total equals double the number of pairs, single drakes, and flocked drakes. Single females were not counted for either taxon.

Table 2. Annual estimates of scaup, scoters, and loons in Kanuti NWR study area based on observations from aerial line transects, Kanuti NWR, Alaska, 2014–2017.

Species ¹		SCAUP	SUSC	WWSC	COLO	PALO	LOON
2014	Indicated Total ²	55	6	14	2	4	NR ³
	Density (birds/km ²) ⁴	0.81	0.09	0.21	0.03	0.06	
	Estimated Total ⁵	915	100	233	33	67	
2015	Indicated Total ²	47	12	8	3	6	NR ³
	Density (birds/km ²) ⁴	0.7	0.18	0.12	0.04	0.09	
	Estimated Total ⁵	782	200	133	50	100	
2016	Indicated Total ²	117	10	2	4	0	NR ³
	Density (birds/km ²) ⁴	1.73	0.15	0.03	0.06	0	
	Estimated Total ⁵	1,946	166	33	67	0	
	Standard Error	588	123	36	41	0	
2017⁶	Indicated Total ²	192	72	0	15	4	4
	Density (birds/km ²) ⁴	1.33	0.50	0	0.10	0.03	0.03
	Estimated Total ⁵	1,499	562	0	117	31	31
	Standard Error	214	224	0	38	19	19

¹ SCAUP = Lesser or Greater Scaup, SUSC = Surf Scoter, WWSC = White-winged Scoter, COLO = Common Loon, PALO = Pacific Loon, LOON = Unidentified loon or Red-throated Loon (i.e., one Red-throated Loon was recorded on the survey)

² Indicated total varies between scaup and scoters. For scaup, indicated total equals double the number of pairs, plus single and flocked scaup. For scoters, indicated total equals double the number of pairs, single drakes, and flocked drakes. Single females were not counted.

³ NR = not recorded. Any loons observed in 2014–2016 were identified to species.

⁴ Density is number of indicated total divided by 67.5 km² (= 168.8 km long for all transects times 0.4 km wide for each transect strip)

⁵ Estimated total equals the density multiplied by the total survey area (1,130 km²).

⁶ Results based on surveying 20 lines in 2017; only 10 lines surveyed 2014–2016

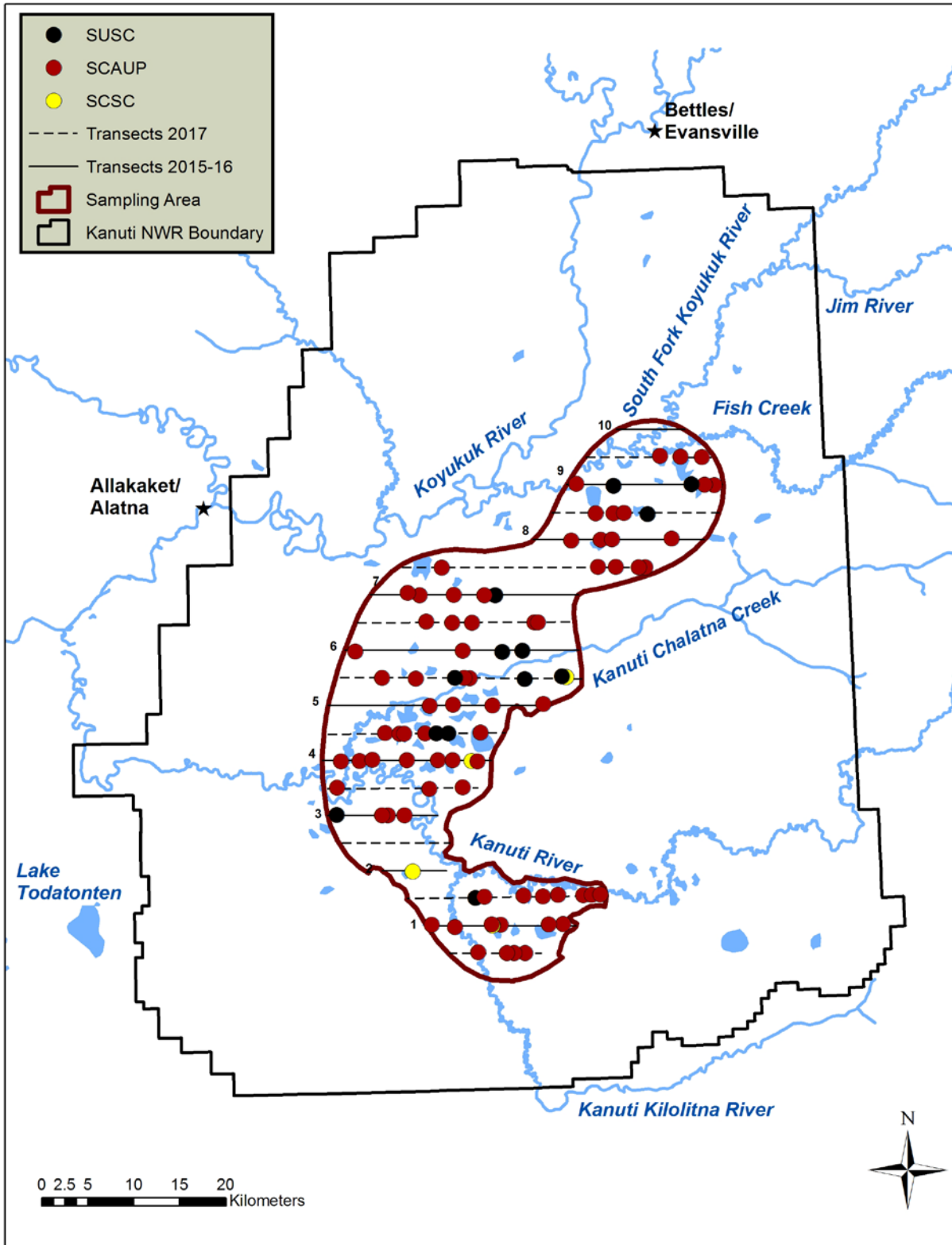


Figure 1. Locations of scaup and scoter observations during aerial survey, Kanuti NWR, 11 June 2017. Figure includes original transect lines (solid; numbered 1–10 south to north) and new lines (dashed; numbered 11–20 from north to south; numbers not shown).