Kanuti NWR Progress Report FY07-02
Interior Alaska Trumpeter Swan Survey, Kanuti National Wildlife Refuge,
August - September 2005

Purpose: Aerially census interior Alaska's Trumpeter Swan population
Location: Kanuti National Wildlife Refuge (NWR) and surrounding areas
Dates: August 30 – September 1, 2005
Participants: Mike Spindler**,** Christopher Harwood
Author: Christopher M. Harwood
Report Date: October 4, 2006

Summary:

After summer-long smoky conditions finally ameliorated, Refuge staff participated in the regional Trumpeter Swan (*Cygnus buccinator*) aerial census, held every five years in interior Alaska. All 14 assigned 1:63, 360 scale USGS quadrangles (Bettles 1:250,000 scale sectional) were surveyed during August 30 – September 1. We observed 325 total swans, including 252 adults and 73 young. Twenty-two swan broods were observed among 68 pairs (average brood size = 3.3 young per successful family; brood size range = 1-7 young per brood). There were 109 swans observed in 19 flocks, ranging from 3 to 21 adults (average flock size = 5.7 adults per flock). Nearly all population parameters (e.g., number of observations, adults, young, etc.) were at all-time highs, including paired birds (likely representing the most stable part of the population when comparing between years), which have increased by 126% since 1990.

Background:

Beginning in 1968, and every five years since 1975, the U. S. Fish and Wildlife Service (USFWS) has been censusing interior Alaska's summering Trumpeter Swan population. The survey has since documented an adult summering swan population that has followed a logistic curve, from nearly 2000 individuals in 1968 to over 17,000 in 2005 (Conant et al. 2001; D. Groves, unpubl. data). As the population has expanded north and west into the Interior, additional areas have been added to the surveyed area. It should be noted here while the survey targets interior Alaska and presumably Trumpeter Swans and their nesting habitats, Tundra Swans have been documented within the study area, but are nonetheless lumped in with Trumpeters (see "Discussion Points" section).

Trumpeter Swan habitat designated within nine 1:63,360 scale USGS quadrangles (quads) of the Bettles 1:250,000 scale sectional (i.e., "greater Kanuti NWR") was first surveyed during the 1985 statewide survey (data not included in this report). In 1990, an additional five quads were added to the survey area and these 14 remained constant through 1995 and 2000. In 2005, the Waterfowl Management division of USFWS added another quad, bringing the total to 15 quads surveyed within the Bettles sectional. Data presented in this report represent the most stable cohort of quads per year (i.e., same 14 quads done 1990 – 2005)

Study Area and Methods:

In 2005, Kanuti NWR staff was tasked with surveying all potential Trumpeter Swan summer habitats (King 1973, Conant et al. 2001) within the 14 Bettles quads surveyed in 1990, 1995, and 2000 (Fig. 1). Waterfowl Management would be responsible for Bettles D-6 (not pictured, and

results from which not used in this report). Refuge staff used an Aviat Scout to fly generally north-south parallel tracks 2.25 – 2.5 km apart at 150-180 m above ground. The pilot circled all swan groups to record precise location in the aircraft GPS and to ensure correct identification of number/type (single, pair, flock [≥3 adults together], brood) and age (adult or cygnet) of individuals observed. The rear-seat observer similarly noted all locations and composition of observations on the appropriate USGS topographic quad map.

Results:

General Conditions
Smoky conditions on and near Kanuti NWR, resulting from the third-worst wildfire season in State recorded history, delayed Refuge participation in the survey for two weeks after the scheduled start date. Spindler and Harwood finally departed Fairbanks on August 29, 2005. They surveyed 12 quads (Bettles A-3 through A-5, B-3 through B5, C-3 through C-6, and D-3 and D-4) in 19.1 hours from August 30 – September 1. A Waterfowl Management flight crew surveyed A-6 and B-6 for efficiency's sake (it was on the way to their next region). Except for some low clouds/fog in the southeast corner of the Refuge on one day, weather conditions were generally highly favorable.

Swan Observations
All-time highs of adults, cygnets, and total swans (adults plus cygnets) were observed in the 14 surveyed quads (Table 1a). Paired birds, which generally represent the most stable index of the resident population's status among years, have increased 126% since 1990 (Table 1a; Fig. 2). The central part of the Refuge south of the Koyukuk River and north of the Kanuti River has shown the most recent influx of pairs (Fig. 2).

The greatest cygnet production to date was documented in 2005 as total cygnets, total broods, and cygnets per successful brood (does not take into account failed attempts) either exceeded or matched previous years' production (Tables 1a and 1b). Even broods per pair, a fairly coarse metric of production which can underestimate production if immigration of failed- or non-breeding pairs into the area exceeds emigration of failed- or non-breeders out of the area, was the second-highest yet recorded. Observed brood sizes ranged from 1 to 7.

The number of flocks and flocked bird also exceeded previous years' surveys (Tables 1a and 1b). High variability among years in number and size of flocks again continued in 2005. Flocks ranged in size from 3 to 21 adults.

Discussion points

The quinquennial statewide swan survey in interior Alaska purports to census the State's summering Trumpeter Swan population (Conant et al. 2001). There has been undoubtedly a dramatically growing summering "swan" population within the Interior, as well as within the greater Kanuti NWR area (Conant et al. 2001). Just how much of this local population growth can be attributed to an increase in number and distribution of Trumpeter Swans is unknown at this time.

In June 1989, Wilk (1993) observed 16 (59%) and 11 (41%) pairs of Trumpeter and Tundra Swans (*C. columbianus*), respectively, in an area approximated by that surveyed in 2005 in the greater Kanuti NWR area. We do not currently know the respective percentages of the two species summering in the area. However, on Koyukuk NWR, another Interior refuge within the

same "Koyukuk" stratum as Kanuti, Bryant et al. (2005) found that the ratio of nesting Trumpeters:Tundras in 2004 (n = 30 nesting "swan" pairs) had changed to 50:50, in stark contrast to the 4:96 ratio (n = 28) determined from 1985-87. If summering Trumpeter Swans in the nearby Kanuti area are similarly filling available habitat, as well as displacing Tundra Swans from their historical habitats, then we can indeed expect that the survey's purported purpose (i.e., censusing Trumpeter Swans), is largely met. An effort in the greater Kanuti NWR area similar to that at Koyukuk NWR would determine what the present percentages of the respective swan species are and thus help substantiate the survey's purpose.

In 2005, USFWS's Waterfowl Management added another Bettles quad to be surveyed. As the Trumpeter Swan population has expanded its range throughout the history of this survey, regular additions to the cohort of surveyed quads has been necessary. Just how much further growth of the swan population can be expected in future years, both within the Interior as a whole, as well the local area, is presently unknown.

Almost every possible demographic parameter of the population (e.g., pairs, total birds, even cygnets) is showing similar growth presently. This report suggests that paired swans are likely the most stable (and best) index of the local resident population's status (e.g., growing, stable, declining). This is largely due to the fact that "total swans" incorporates "flocked birds." Flocked birds likely include failed- and/or non-breeding swans from outside the local area. Also, the propensity that this cohort of the population uses the local area annually is likely quite variable. Similarly, annual cygnet production can be variable because of factors like weather, predation, etc. Meanwhile, successful resident paired swans and likely even some failed- or non-breeding pairs attempting to reinforce and maintain nesting territories, remain into the survey period. Of course all paired swans observed during the survey are not necessarily locally resident and may include pairs that have moved in from outside areas. For example, it is highly unlikely that Lake Todatonten is large enough to support as locally resident the nine pairs observed there in 2000 (Fig. 2, just southwest of refuge border). Nevertheless, pairs will likely remain as the best indicator of the resident greater Kanuti population, particularly if and when the Interior population growth starts to asymptote (at which point, not all demographic components of the resident population will parallel so closely).

Literature Cited:

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. Unpublished USFWS Report. Koyukuk/Nowitna National Wildlife Refuge Complex, Galena, Alaska.

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King, J.G. 1973. The use of small airplanes to gather swan data in Alaska. Wildfowl 24:15-20

Wilk, R. J. 1993. Observations on sympatric tundra, *Cygnus columbianus*, and trumpeter swans, *C. buccinator*, in north-central Alaska, 1989-1991. Can. Field-Nat. 107(1): 64-68.

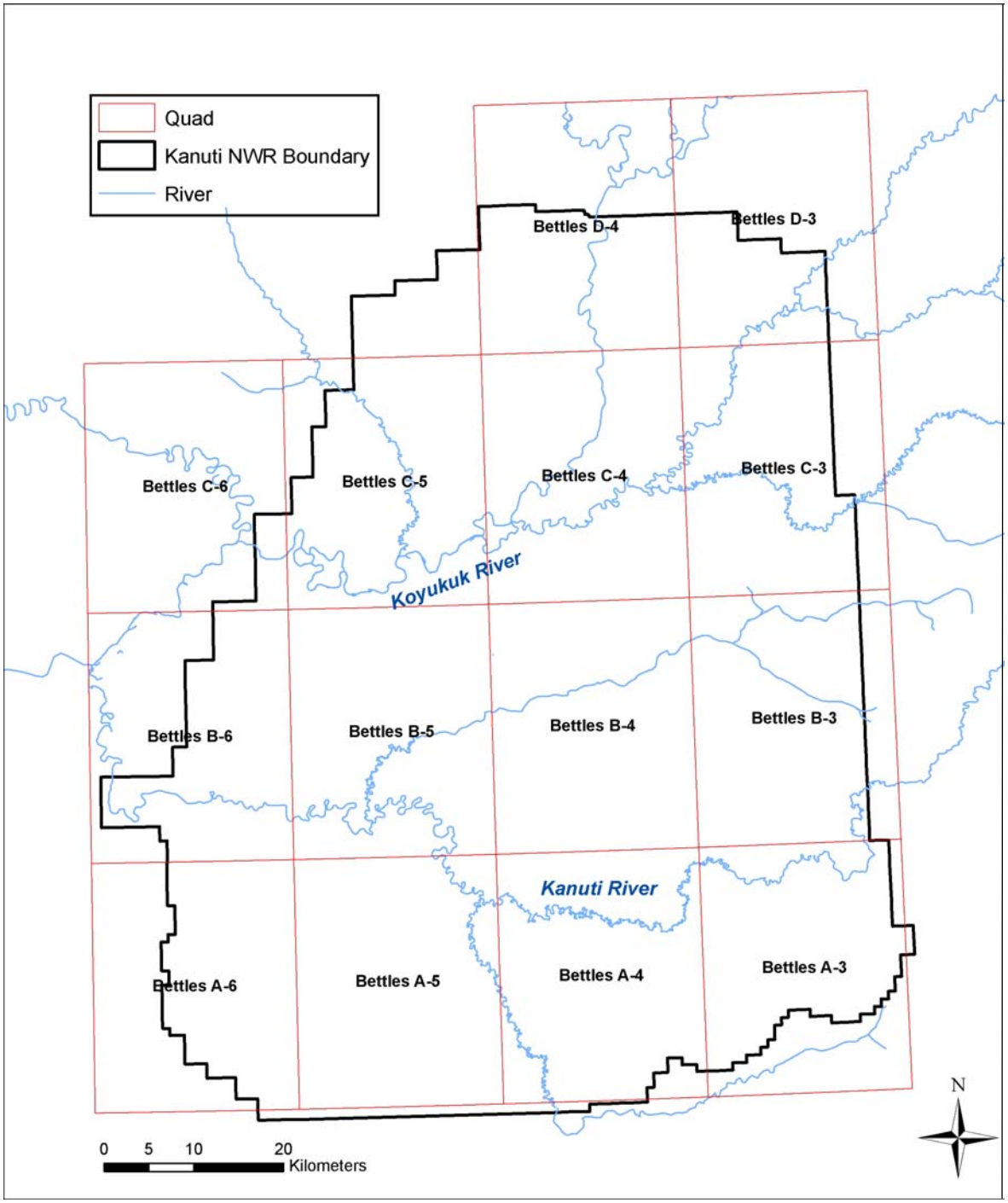

Figure 1. Depiction of 14 1:63,360 scale USGS quadrangles (Bettles 1:250,000 scale sectional) surveyed for swans near Kanuti NWR, summer 2005.

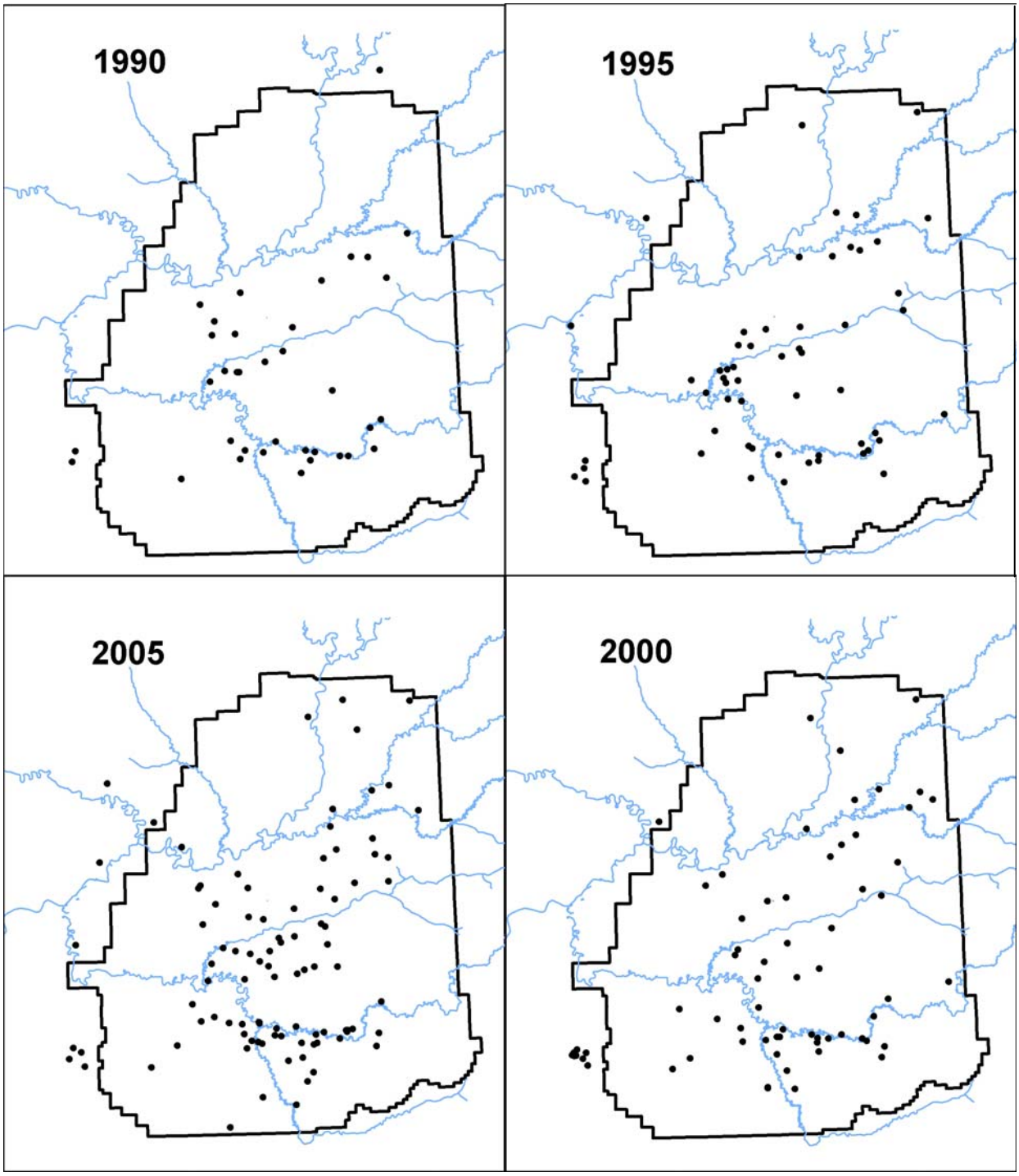

Figure 2. Illustration of increase in swan pairs found on 14 quads within the Bettles sectional over 15-year period, 1990 – 2005. Kanuti NWR boundary and major rivers shown for reference.

Table 1a. Comparison of summering swans observed on 14 quads within the Bettles sectional (aka "greater Kanuti NWR"), 1990-2005.

Year	Total Observations	Single Adults	Paired Adults	Flocked Adults	Total Adults	Total Young	Total Swans
1990	41	5	60	3	68	26	94
1995	57	8	74	57	139	34	173
2000	69	6	112	27	145	23	168
2005	94	7	136	109	252	73	325

Note: Does not include data from 1985 because only nine quads were surveyed at that time. Also does not include the lone observation from Bettles D-6 in 2005 (1 adult pair with brood of 3 cygnets).

Table 1b. Comparison of summering swans observed on 14 quads within the Bettles sectional (aka "greater Kanuti NWR"), 1990-2005 (continued).

Year	Total Pairs	Total Flocks	Total Broods	Brood Size[1]	Flock Size	% Broods Per Pair
1990	30	1	8	3.3	3.0	26.7%
1995	37	11	13	2.6	5.2	35.1%
2000	56	6	10	2.3	4.5	17.9%
2005	68	19	22	3.3	5.7	32.4%

Note: Does not include data from 1985 because only nine quads were surveyed at that time. Also does not include the lone observation from Bettles D-6 in 2005 (1 adult pair with brood of 3 cygnets).

[1] Number of cygnets per *successful* pair (does not include failed broods)