

STATUS OF HUDSONIAN GODWITS ON THE YUKON-KUSKOKWIM DELTA, ALASKA

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ABSTRACT: Over 100 observations of the Hudsonian Godwit (*Limosa haemastica*) on the Yukon-Kuskokwim Delta in western Alaska since 1983 show that the species is a fairly common migrant, uncommon summer visitant, and rare, perhaps locally uncommon, breeder there. Spring arrival and fall departure dates are among the earliest and latest, respectively, in Alaska. Observations of breeding behavior and/or recently fledged young provide compelling evidence for breeding at 15 sites. Although some probable breeders are found along the taiga-tundra ecotone described as breeding habitat for the species elsewhere, others use dwarf-shrub meadows well beyond treeline. Postbreeding birds are usually found in low numbers, but occasional aggregations of 100 Hudsonian Godwits are among the largest concentrations of this species reported in Alaska. The Yukon-Kuskokwim Delta may support a significant fraction of the Hudsonian Godwit population in Alaska.

The Hudsonian Godwit is considered a species of high conservation concern (Brown et al. 2000), in part because of the isolation of its major breeding populations. It breeds in three disjunct regions of North America, Hudson Bay, northwestern Northwest Territories, and Alaska (Hayman et al. 1986), but our understanding of its breeding biology is derived almost exclusively from a single study near Churchill, Manitoba (Hagar 1966). In comparison to that among other shorebird species, gene flow among Hudsonian Godwit populations is very low, and the level of genetic differentiation among the three populations is one of the highest reported for any species of bird (Haig et al. 1997). These disjunct populations almost certainly differ in their migration strategies (Kessel and Gibson 1978) and may differ in use of breeding and staging habitats as well. Because of the potential differences among populations at the continental level, population-specific investigations are needed if effective conservation strategies are to be planned and implemented.

The value of population-specific data applies at smaller spatial scales as well. Within Alaska, current information suggests that Hudsonian Godwits may occur in disjunct populations separated by hundreds of kilometers. The species is a confirmed breeder only in south-central Alaska around Cook Inlet (Williamson and Smith 1964, Kessel and Gibson 1978). It is also considered an uncommon probable breeder 600–900 km northwest of Cook Inlet around Kotzebue and Norton sounds (Kessel and Gibson 1978) and a possible rare breeder at the base of the Seward Peninsula (Kessel 1989). Although these Alaska populations appear to be separated geographically, and may be separated genetically, the relative paucity of ornithological field work across much of the intervening distance has not allowed for a test of these hypotheses.

The Yukon-Kuskokwim Delta is between the two known or suspected centers of breeding in Alaska, situated immediately south of Norton Sound and 500 km west of Cook Inlet. As a result, the status of the species in this

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area may shed light on the broader question of population distinctiveness within Alaska. Hudsonian Godwits have been considered rare summer visitants on the delta, an evaluation based upon a single observation at Takslesluk Lake and their regular occurrence in small numbers between late June and late August along the lower Kashunuk River (Kessel and Gibson 1978). Recent observations elsewhere on the delta, however, suggest that Hudsonian Godwit numbers are greater, seasonal occurrence is broader, and geographic distribution is more extensive than previously realized. Because effective conservation of a population is predicated upon an understanding of its status, we summarize Hudsonian Godwit observations on the delta since 1983. We include information on seasonal occurrence, distribution, numbers, and habitat.

STUDY SITE AND METHODS

At 80,000 km², the Yukon-Kuskokwim Delta is one of the largest deltas in North America (Thorsteinson et al. 1989). The greater delta region, including Nunivak Island, portions of the Kilbuck Mountains, and the uplands of the Andreafsky Wilderness, is included within Yukon Delta National Wildlife Refuge. The vast alluvial plain is dotted with innumerable lakes and ponds and drained by dozens of major rivers and scores of smaller streams and sloughs. Vegetation is predominantly wet grass and sedge meadows along the coast, moist sedge and dwarf-shrub meadows inland (Tande and Jennings 1986, U. S. Fish and Wildlife Service 1988, Kincheloe and Stehn 1991). Spruce and hardwood forests are more limited in distribution, extending from the eastern interior of the delta to within 100 to 125 km of the coast, primarily along the Yukon and Kuskokwim rivers and their tributaries.

Since 1983, we and our colleagues have recorded Hudsonian Godwit observations during the course of other field work on the refuge. For the purpose of this paper, we define "observations" as unique combinations of date and location, regardless of the number of birds detected. Details of sightings were either transcribed into field notes or recorded on cassettes at the time of the observations. Observations from the lower Kashunuk River are not included here because this site was already known to be within the species' range (Kessel and Gibson 1978). Descriptions of godwit habitats follow Kessel (1979).

Because of the location of both the refuge headquarters (Bethel, 60° 47' N, 161° 47' W) and our field projects over the last decade, most Hudsonian Godwit observations were from one of four regions: the Andreafsky Wilderness and vicinity, Bethel and vicinity, Kgun Lake, and Kigigak Island (Figure 1). The Andreafsky River drains the southern Nulato Hills, which are characterized by a series of northeast-trending ridges (which range from 300 to 900 m in elevation with rounded summits and gentle to steep slopes) dominated by dwarf-shrub meadows and, at higher elevations, dwarf-shrub mats. The valley of the Andreafsky River features a mosaic of riparian habitats including tall shrub communities, mixed deciduous-spruce forests, scattered woodland (i.e., riparian spruce bogs or "muskeg"), and wet meadows. Most of the Andreafsky watershed is included within the 5263-

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km² Andreafsky Wilderness. We and/or our colleagues annually spent between 2 days and 4 months in this area; most field work occurred in May and June. Since 1985 we have visited 55 townships in the Andreafsky region.

The Bethel region is relatively flat and straddles the spruce taiga-tundra interface along the Kuskokwim River (Figures 1 and 2). Muskeg and wet meadows are widespread in the Kuskokwim's floodplain. Tall and medium shrub habitats occur both within and immediately adjacent to the forested river corridor; surrounding uplands are dominated by dwarf-shrub meadows. Observations in this region come primarily from scouting and censusing along Kuskokwim River Breeding Bird Survey routes since 1994, a breeding-bird inventory on National Guard training lands in 1995 and 1998 (Andres et al. 1999), and our observations within Bethel's city limits.

Kgun Lake lies between the Yukon and Kuskokwim rivers and is about 90 km from the Bering Sea coast (Figure 1). Kgun Lake is connected to smaller adjacent lakes and ponds by a complex network of sloughs. Rapidly changing water levels frequently result in the exposure of ephemeral mudflats among the Kgun Lake wetlands. Harwood was at Kgun Lake in 1993 (25 July–31 August) and 1994 (26 July–31 August).

Kigigak Island (32.5 km²) is located along the Bering Sea coast (Figure 1). The island contains numerous shallow ponds and lakes as well as an extensive network of tidal sloughs. Vegetation communities range from low areas with wet meadows, grass meadows, and salt-grass meadows to dwarf-shrub meadows on small scattered uplands. The entire island is surrounded by mudflats ranging from a few tens of meters to several kilometers in width. We were at Kigigak Island from 17 July to 27 August 1995.

Although we never conducted surveys specifically for Hudsonian Godwits, we did conduct two additional bird surveys that covered extensive portions of the delta. During a duck-production survey from 1990 to 1992, we visited 260 plots of 259 ha each randomly distributed across the entire delta. In 1998 and 1999, we conducted 30 Breeding Bird Survey routes along the Yukon and Kuskokwim rivers. On these surveys, we recorded detections of all species of birds. Sites with Hudsonian Godwits other than the four major areas listed above are described briefly in Results.

RESULTS

We report 119 Hudsonian Godwit observations on the Yukon-Kuskokwim Delta since 1983. We made 88 observations; colleagues working with us made another four observations. Three additional sightings were reported by Andres et al. (1999). The remainder were located in field notebooks, files, or unpublished reports archived at Yukon Delta National Wildlife Refuge. Twenty-eight observations involved birds exhibiting distinctive breeding behaviors, including eleven observations of pairs, nine of courtship and/or territorial behavior, seven of predator-mobbing or distraction displays (indicating the presence of eggs or young), and one of a male with three recently fledged juveniles.

Of the observations reported here over 85% are from the Andreafsky Wilderness and vicinity, Bethel, Kgun Lake, or Kigigak Island (Table 1).

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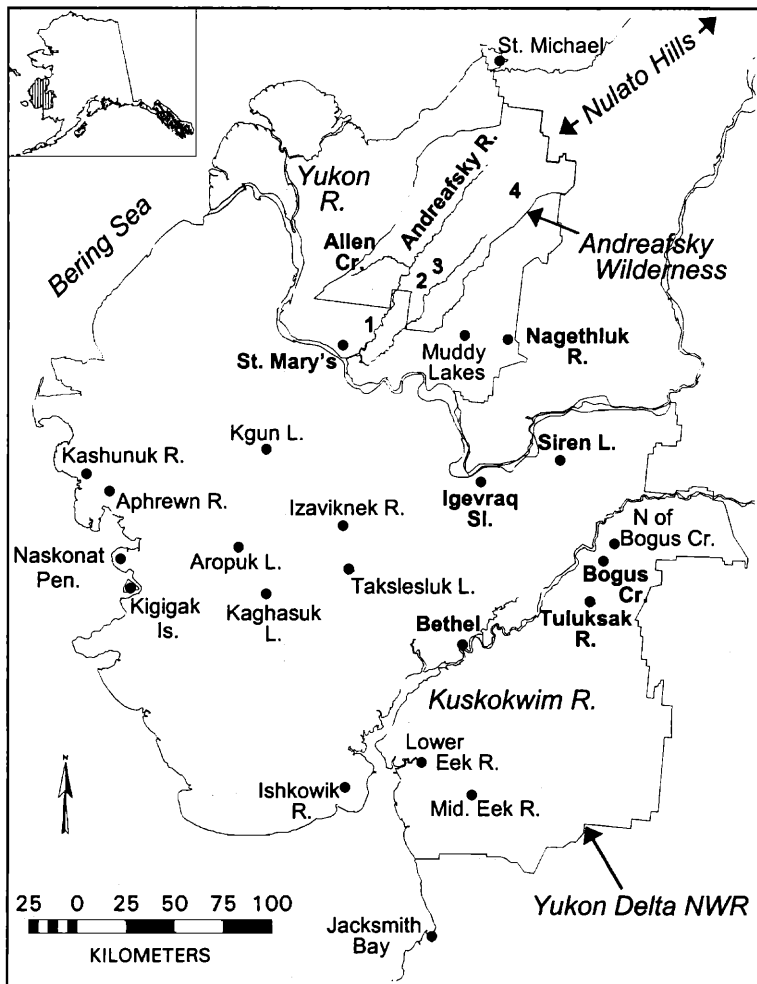


Figure 1. Yukon-Kuskokwim Delta with locations of Hudsonian Godwit observations. Locations in bold represent sites with pairs and/or probable breeders (i.e., birds exhibiting courtship and/or antipredator behavior). Numbered locations represent sites with breeding evidence within Andreafsky watershed in addition to Allen Creek (2 sites) and St. Mary's: 1, unnamed tributary of Andreafsky River; 2, along Andreafsky 3.5 km downstream of Allen Creek; 3, North Peak; 4, Needle Mountain.

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Table 1 Summary of Hudsonian Godwit observations in four areas of the Yukon-Kuskokwim Delta, Alaska, 1985–1999

Location	Total obs.	Earliest date	Latest date	Observations by month				Breeding evidence
				May	Jun	Jul	Aug	
Andreafsky	28	5 May	26 Jul	15	10	3	nd ^a	Yes ^b
Bethel	25	2 May	29 Aug	10	10	3	2	Yes ^b
Kgun Lake	27	25 Jul ^c	17 Aug	nd	nd	11	16	No
Kigigak Island	21	4 Jul ^d	10 Aug	nd	nd	16	5	No

^and, no data.

^bSee text for details.

^cHudsonian Godwits were seen on 25 July 1993 and 26 July 1994, our first days at Kgun Lake in those two years, respectively.

^dSingle observation noted on 4 July 1991. In 1995, the earliest date was 17 July, our first day at Kigigak Island.

Andreafsky Wilderness and Vicinity

Hudsonian Godwits were detected in 14 of the 55 townships visited in and around the Andreafsky Wilderness. The earliest spring record, 5 May 1986, involved a pair and a second male along the lower Andreafsky River, about 2 km northeast of St. Mary's. The river was still frozen, and the three birds were foraging on a mudflat that had been exposed as a result of sublimating shorefast ice. The pair was actively defending a feeding territory against the second male. Presumably the same trio was present at the same site nine days later. The latest observed northward migration was on 17 May 1986, 12 km NNW of St. Mary's, when two males flew northwest.

Single pairs were seen on upper Allen Creek and along the Andreafsky River, 3.5 km downstream of the mouth of Allen Creek, and two separate pairs were seen near Needle Mountain. We observed additional evidence of breeding at three other sites. Along lower Allen Creek on 15 July 1994, we saw a male and three recently fledged juveniles in a brood aggregation that included adults and young of Bristle-thighed Curlews (*Numenius tahitiensis*) and Whimbrels (*N. phaeopus*). Both species of curlews are confirmed breeders at that site, and we suspect that the juvenile Hudsonian Godwits were raised locally as well. Two of three individuals in that same area on 24 May 1999 were doing breeding flight displays. Also on 24 May 1999, a male Hudsonian Godwit and a Whimbrel mobbed a Rough-legged Hawk (*Buteo lagopus*) just west of North Peak. Finally, 23 km south of the wilderness border along an unnamed tributary of the Andreafsky, we saw four to six birds on 18 and 19 June 1985. At this site, godwits performed aerial advertisement displays, courtship chases, and attack-mobbing of human observers and a Golden Eagle (*Aquila chrysaetos*). The latest observations of Hudsonian Godwits in the Andreafsky watershed were of single birds along the middle Andreafsky River each day 24–26 July 1985.

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Among 28 observations in the Andreafsky River watershed, three were of probable migrants (steady flight to north or northwest in May); the rest were in upland or wetland habitats. Among these 25 observations, 12 were in the river corridor of either the Andreafsky or its larger tributaries, primarily along riparian shorelines or in association with muskeg and wet meadows. The remaining 13 were in dwarf-shrub meadows beyond the influence of spruce.

Among observations involving only pairs and/or obvious breeding behaviors, four were in the river corridor and six were in dwarf-shrub meadows. Of the latter, three (including the adult male with recently fledged young) were along Allen Creek at elevations <100 m. The remaining three, including one in a valley west of North Peak and two near Needle Mountain in the upper Andreafsky watershed, as well as three single birds near the latter site, were found at elevations ranging from 130 to 475 m.

Bethel and Vicinity

The earliest spring migrants were observed on 2 May in both 1995 and 1997. The latest spring migrants were seen on 16 May 1991, when flocks of two and eight flew northwest over Bethel. The earliest record of breeding activity in the Bethel area was 20 May in both 1992 and 1998. In 1992 a male performed aerial advertisement displays 3 km south of Bethel, and in 1998 a pair performed courtship chases at Hangar Lake on the north edge of town. Additional evidence for breeding includes an alarm-calling adult at Akiachak on 30 June 1995, an alarm-calling and distracting pair at Bethel on 5 July 1995 (both in Andres et al. 1999), and a singing male along the Gweek River on 5 June 1999, where one or more adults were detected during the third week of June in four of five years from 1994 to 1998. The status of a pair at Atmautluak on 11 July 1998 could not be determined (Andres et al. 1999). The latest observation in the Bethel region was of a single bird flying east over Hangar Lake on 29 August 1998.

Near Bethel, we observed nearly all Hudsonian Godwits in or immediately adjacent to the floodplain of the Kuskokwim River (including a tributary, the Gweek River). Habitats ranged from muskeg to dwarf-shrub meadows, with most sightings either near the edge of spruce forest or in wet habitats within scattered spruce woodland. The pair at Atmautluak was a notable exception, occurring in an area dominated by wet meadows 30 km beyond the line of spruce trees.

Kgun Lake

In 1993 Harwood observed Hudsonian Godwits daily from his arrival on 25 July to 14 August, and then again on 17 August. In 1994 he saw godwits on only four dates between his arrival on 26 July and 4 August. The most seen on a single day was ten (26 July 1993). We do not know if an adult with a flying juvenile on 6 August 1993 was a local breeder or a migrant.

Kigigak Island

In 1995 we observed Hudsonian Godwits daily from our arrival on 17 July to 4 August, then again on 10 August. All were juveniles except for a single male in alternate plumage on 31 July. Most observations involved birds

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feeding or commuting between feeding sites on the island. Hudsonian Godwits fed at low tide on the intertidal mudflats. During high tides, they roosted and fed inland in both low-lying salt-grass meadows and upland dwarf-shrub meadows, eating crowberries (*Empetrum nigrum*) in the latter habitat. Observations of passage migrants high over the island included two with 39 Bar-tailed Godwits (*L. lapponica*) flying southeast in a "V" on 22 July and one with 17 Bar-tailed Godwits flying south-southeast on 2 August.

Peak numbers on Kigigak Island occurred in late July. The maximum seen at one time was 18 individuals with 212 Bar-tailed Godwits on 23 July. Daily high counts, representing the total seen during a day's field work, did not necessarily represent distinct individuals. The maximum daily high count was 58 (8 separate sightings) on 22 July. At least ten birds were seen on eight days between 20 and 28 July, with 20 birds seen on 5 of those days. After 28 July, daily high counts were ≤ 6 .

Other Observations

The remaining 18 observations were scattered across 16 sites (Figure 1, Table 2). This total includes detections on three of 260 duck-productivity plots (north of Bogus Creek, south of Izaviknek River, and near Ishkowitz River) and on three of 30 riparian Breeding Bird Survey routes (Igevrak Slough, Bogus Creek, and Tuluksak River).

DISCUSSION

Spring Migration

In south-coastal Alaska, Hudsonian Godwits usually arrive in early May; the earliest dates are 28 April 1977 and 29 April 1997 on the Copper River Delta and in Cook Inlet, respectively (Kessel and Gibson 1978, Gill and Tibbits 1999). We detected Hudsonian Godwits as early as 2 May on the Yukon-Kuskokwim Delta, which is the earliest recorded arrival date for western Alaska. The arrival of birds at or near breeding sites on the delta in the first week of May (including a pair defending a feeding territory on 5 May 1986) suggests that at least some godwits en route to the delta use staging sites in south-coastal Alaska only briefly or not at all. If the latter scenario is accurate, delta breeders would have to fly directly to the breeding grounds from either still-undefined spring staging areas or directly from the wintering grounds in southern South America (Morrison and Ross 1989, McCaffery 1996). Such a direct flight, a distance of $\approx 3,000$ km, has been suggested for Hudsonian Godwits arriving in south-coastal Alaska (Kessel and Gibson 1978). Recent studies suggest that Bar-tailed Godwits may be capable of nonstop flights of $\approx 1,000$ km between Alaska and New Zealand (Piersma and Gill 1998). Because the Hudsonian is a regular visitor in small numbers to New Zealand (Higgins and Davies 1996), at least some apparently have similar capabilities. If spring migrants also make nonstop flights from their wintering grounds (e.g., Chiloe Island, Chile; see McCaffery 1996), a direct route to the Yukon-Kuskokwim Delta is only 772 km (<6%) longer than a flight to the Copper River Delta and only 460 km (<4%) longer than a direct flight to Cook Inlet.

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Table 2 Additional Records of Hudsonian Godwits on the Yukon-Kuskokwim Delta, Alaska, 1983-1999

Location	Date	Number of birds	Habitat ^a	Breeding evidence ^b
Aphrewn River	17 May 1999	1	a	none
Muddy Lakes	24 May 1983	1	b	none
Nagethluk River	2 Jun 1983	3	c, b	alarm calls
Lower Eek River	5 Jun 1985	<5	NR	none
Nagethluk River	7 Jun 1985	5	c, d, b	none
Nagethluk River	8 Jun 1985	3	c, b	none
Kaghasuk Lake	11 Jun 1998	200	e	none
Igevraq Slough	11 Jun 1998	1	f	singing male
Bogus Creek	15 Jun 1999	1	f, b	singing male
Tuluksak River	15 Jun 1999	1	f, b	singing male
Siren Lake	17 Jun 1992	1	a, b, g	attack-mobbing ^c
Naskonat Peninsula	27 Jun-3 Jul 1992 ^d	1	a	NR
Middle Eek River	2 Jul 1985	<5	NR	NR
Jacksmith Bay	13 Jul 1998	30	e	none
North of Bogus Creek	25 Jul 1992	1	NR	NR
South of Izaviknek River	31 Jul 1992	2	NR	NR
Ishkowik River	4 Aug 1992	1	NR	NR
Southwest of Aropuk Lake	14 Aug 1998	150-200	e	none

^aa, wet meadow; b, dwarf shrub tundra; c, quaking bogs surrounding upland lakes; d, grassy island in upland lake; e, mudflats; f, riparian woodland; g, open spruce woodland; NR, not recorded.

^bCourtship displays and/or antipredator behaviors.

^cMale attack-mobbed a Northern Harrier (*Circus cyaneus*).

^dSingle observation between 27 June and 3 July, but exact date not specified in field notes (Yukon Delta Natl. Wildlife Ref. files).

Breeding

From courtship and/or anti-predator behavior, we consider Hudsonian Godwits to be probable breeders at 15 locations on the Yukon-Kuskokwim Delta: Andreafsky Wilderness region (7 sites), Bethel (3 sites), Nagethluk River, Siren Lake, Igevraq Slough, Bogus Creek, and the Tuluksak River. In addition, we consider godwits at Muddy Lakes and on the Eek River (middle and lower) to be possible breeders on the basis of their occurrence in habitats similar to that used by Hudsonian Godwits exhibiting breeding behavior elsewhere on the delta.

Observations during the breeding season at Bethel and Siren Lake were in habitat mosaics including woodlands (either spruce or mixed spruce-deciduous) and open wetland habitat (either bogs or wet meadows), usually with dwarf-shrub meadows adjacent or nearby. Half of the observations in the Andreafsky area were in similar habitats. Wet meadows near the interface of taiga and tundra have been identified as important habitat characteristics for breeding Hudsonian Godwits elsewhere in Alaska (Williamson and Smith 1964) and Canada (Hagar 1966). We failed to detect Hudsonian Godwits at many sites with these habitat characteristics, however, and some sites with

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godwits lacked taiga and/or wet meadows. For example, near the Nagethluk River and at several sites in the Andreafsky watershed, Hudsonian Godwits were found in dwarf-shrub meadows well away from treeline. At the Nagethluk, godwits were found in association with lacustrine quaking bogs, but in the Andreafsky watershed, a few observations were in dwarf-shrub meadows several kilometers away from the nearest large wetlands.

The absence of Hudsonian Godwits from many areas of apparently suitable habitat produced a patchy breeding-season distribution on the delta. For example, in the Bethel region (Figure 2), we found them in Bethel and along the Gweek River, and Andres et al. (1999) found them at Akiachak and Atmautluak as well. Hudsonian Godwits were not seen, however, in Napaskiak (Williamson 1957), Napakiak, Nunapitchuk, Kwethluk, or Akiak (Andres et al. 1999). We do not know if this patchiness is a function of very low abundance, annual variation in site occupancy, and/or subtle habitat differences between occupied and unoccupied sites. A detailed analysis of breeding habitat use by Hudsonian Godwits throughout their range, including a consideration of regional variation, is warranted.

Postbreeding

Observations of postbreeding birds on the Yukon-Kuskokwim Delta, including the latest record for the species in western Alaska (29 August), were widely distributed (Figure 1). Except at Kgun Lake, we do not know if

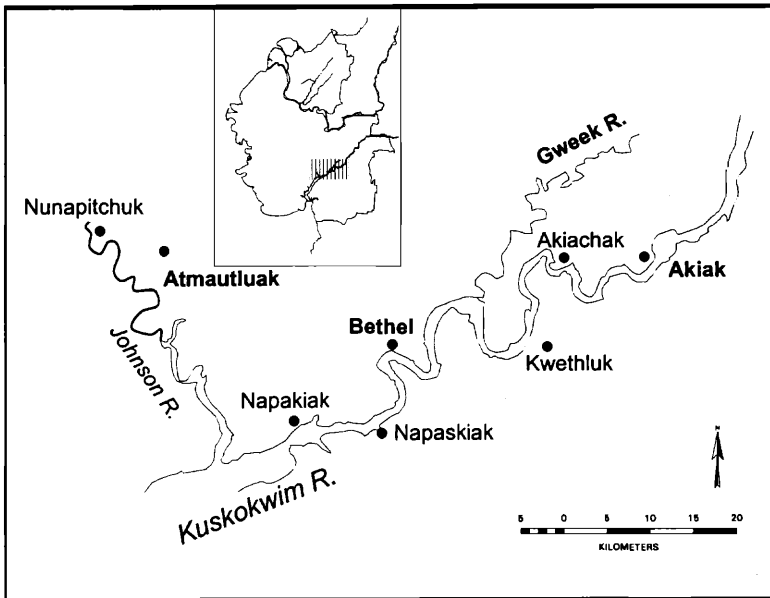


Figure 2. Bethel and vicinity, with villages mentioned in text. Locations in bold represent sites with pairs and/or probable breeders (see Figure 1 for definition).

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use of these sites is consistent from year to year, nor do we know if there are more such sites. We also do not know if the inland sites (e.g., Kgun, Takslesluk, and Aropuk lakes) are used independently as isolated staging areas, as a network of wetlands to be exploited sequentially as birds move south, or opportunistically as precipitation and wind allow. Along the coast, postbreeding godwits have been seen at the mouth of the Yukon River (refuge files), the lower Kashunuk River, Kigigak Island, and Jacksmith Bay. Surprisingly, however, they were not detected on either ground or aerial surveys of the extensive mudflats of the central delta (Gill and Handel 1990). This is particularly unexpected because the surveyed area included sites along the outer coast <10 km west and north of the Kashunuk River and Kigigak Island, respectively.

In western Alaska, Hudsonian Godwits may move south through coastal areas at least as far as Carter Bay, 25 km south of Jacksmith Bay. At Carter Bay, migrant adults peaked during the third week of July and then dropped off rapidly, while juveniles peaked during the first week of August (Seppi 1997). If birds are drifting south, these data are consistent with our observations at Kigigak Island, 240 km to the north. We did not arrive at the site until the third week of July and saw only a single adult, but juveniles peaked in the fourth week of July.

We do not know the migratory destinations of Hudsonian Godwits after they leave southwest Alaska. Numbers in Cook Inlet are low during autumn migration (Gill and Tibbitts 1999), and it is unlikely that that site serves as a major staging area for the delta's birds. Quill Lakes in Saskatchewan may support a few thousand Hudsonian Godwits annually (Alexander and Gratto-Trevor 1997), and genetic analyses indicate that these birds are from the Alaska breeding population (Haig et al. 1997). The birds using Quill Lakes, however, are predominantly adults. Numbers peak 1–4 weeks after the adults' peak at Carter Bay (Alexander and Gratto-Trevor 1997, Seppi 1997). Even if Quill Lakes do support adults from western Alaska during autumn migration, the staging sites and routes used by juveniles remain to be discovered. In addition, the wintering grounds of Alaska breeders have not been determined. Identifying the sites used by the Alaska population throughout the annual cycle should be a high conservation priority.

Other Observations

Several observations cannot be confidently classified by migratory or breeding status. Because two single birds on wet coastal meadows on the Aphrewé River and Naskonat Peninsula exhibited no breeding behaviors and were in a habitat not known to be used by breeding birds, we suspect that they were a spring migrant and a failed or nonbreeder, respectively. Details of behavior and habitat were not recorded for the birds observed north of Bogus Creek, south of the Izaviknek River, and near the Ishkowiak River, so we cannot infer their status.

Perhaps the most intriguing observation was of a flock of 200 birds in alternate plumage feeding on a mudflat in Kaghasuk Lake on 11 June 1998. Our observations elsewhere on the delta indicated that breeding birds should be on their territories (and perhaps incubating) by the second week of June. The Kaghasuk flock seemed too late for spring migrants and too early for an

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aggregation of failed breeders. Similar numbers of Hudsonian Godwits have been found in early June at the mouth of the Koyuk River in northwest Alaska (Kessel and Gibson 1978) and in Cook Inlet in south-central Alaska (Gill and Tibbitts 1999). The status of birds in these early June concentrations is unknown.

Relationships Among Alaska Populations

Historical and recent sightings of Hudsonian Godwits on the Yukon-Kuskokwim Delta are distributed from St. Michael in the north (Grinnell 1910) to Jacksmith Bay in the south (this study), a distance of nearly 450 km. Godwits occur from the outer coast, along the lower Kashunuk River (where they occur annually in small numbers; C. Ely, pers. comm.) and at Kigigak Island, east to at least 240 km inland. The geographic breadth of these observations suggests that the degree of spatial isolation among the Alaska breeding populations of the Hudsonian Godwit may not be as extreme as previously supposed. Probable breeders near Needle Mountain in the northern Andreafsky Wilderness (Figure 1) were only 120 km south of Unalakleet along eastern Norton Sound, where Andres et al. (1999) classified the species as a possible breeder. Similarly, possible breeders along the Eek River (Figure 1) were only 160 km NW of villages around Nushagak Bay, where Hudsonian Godwits were confirmed as breeders by Andres et al. (1999). In addition, this latter region is only 350 km west of sites used by Hudsonian Godwits in Cook Inlet, and much of the intervening distance consists of habitats used by godwits elsewhere in southwest Alaska. We hypothesize, therefore, that the Hudsonian Godwit may have a roughly continuous distribution in Alaska from Cook Inlet west and north to Kotzebue Sound. If this hypothesis can be supported by additional field work and/or genetic analyses, it may be appropriate to consider Alaska breeders as a single population.

Relative Abundance and Status on the Yukon-Kuskokwim Delta

Large concentrations of Hudsonian Godwits are rare in Alaska. Kessel and Gibson (1978) reported maximum spring and fall counts of 204 and 106 birds, respectively, in south-coastal Alaska. More recently, hundreds have been found during migration in Cook Inlet, with up to 1000 or more present during peak periods (McCaffery 1996, Gill and Tibbitts 1999). Virtually all other observations of concentrations ≥ 100 birds are from western Alaska. Just south of the delta, hundreds congregate in late summer at Carter Bay, with a maximum daily high count of 413 on 20 July 1995 (Seppi 1995, 1997). North of the delta, ≥ 100 were found along 20 km of coastline at the mouth of the Koyuk River on 13 June 1976 (Kessel and Gibson 1978).

All other records of large flocks of Hudsonian Godwits in western Alaska are from the delta: 100 on the lower Kashunuk River on 9 August 1966 (Kessel and Gibson 1978), flocks of 200 on the north Yukon Delta in mid-July 1977 (refuge files), 200 at Kaghasuk Lake on 11 June 1998 (this study), and 150-200 5 km southwest of Aropuk Lake on 14 August 1998 (this study). We do not know if Hudsonian Godwits congregate annually at these sites, nor do we know if there are additional sites with comparable concen-

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trations. Given the vast expanse of the delta and the limited coverage to date, it is not unreasonable to speculate that the delta may support between several hundred and a few thousand breeding and/or migrating birds each year. This would represent a significant fraction of both the Alaska and global populations of the species, which have been estimated at ≤ 5000 –7500 and 50,000 individuals, respectively (Gill and Tibbitts 1999, Brown et al. 2000). Within this context, and using the terminology of Kessel and Gibson (1978), we conclude that Hudsonian Godwits are fairly common migrants, uncommon summer visitants, and rare, perhaps locally uncommon, breeders on the Yukon-Kuskokwim Delta.

ACKNOWLEDGMENTS

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