and juveniles have been recorded on staging areas in late July (Seward Peninsula and Yukon-Kuskokwim Delta) and early August (NW Alaska) (McCaffery & Gill 2001). The first arrivals of juveniles in New Zealand are typically in the first week of October (PFB, unpubl. data).

Depending on where 3E was hatched, it could have fledged any time from mid-July to early August, and been around 8–11 weeks old when caught and banded in Alaska. At its recapture in New Zealand it would have been around 17–20 weeks old. The increase in bill length recorded confirms that godwits migrating south may not have reached adult structural size, though the single recapture cannot tell us whether or not 3E was fully adult in size when it migrated or when recaptured in October.

Bar-tailed Godwits are highly variable in size both between and within sexes. Bill lengths in New Zealand range from about 69 to 99 mm in males (mean 83.8, $n = 920$) and 90 to 129 mm in females (mean 108.9, $n = 862$); wing lengths range from 210 to 256 mm in males (mean 230.5, $n = 472$) and 216 to 264 mm in females (mean 243.7, $n = 549$) (JRC unpubl. data). 3E's measurements indicate he was a slightly below-average sized male when caught in New Zealand.

Only 32 juvenile Bar-tailed Godwits have been banded in Alaska recently (2004–2010); of these, just five have definitely been seen on the non-breeding grounds. Opportunities for gaining further information on the duration of growth in godwits will almost certainly remain few and far between.

Thanks to Adrian Riegen for leading the cannon-netting in New Zealand, Dan Ruthrauff and Lee Tibbitts for information on the Alaskan godwits, and to Dejan Stojanovic for the use of his photograph. Thanks to Kim Trust of the US Fish and Wildlife Service for funding the avian influenza work at Punaorat Point through which 3E came to be caught. We thank Włodzimierz Meissner for commenting on a draft of this note.

Battley, P.F. & Piersma, T. 2005. Body composition and flight ranges of Bar-tailed Godwits (*Limosa lapponica baueri*) from New Zealand. *Auk* 122: 922–937.

Karliniova, N., Remisiewicz, M. & Pinchuk, P. 2006. Biometrics and breeding phenology of Terek Sandpipers in the Pripyat' Valley, S Belarus. *Wader Study Group Bull.* 110: 54–58.

McCaffery, B.J & Gill, R.E., Jr. 2001. Bar-tailed Godwit (*Limosa lapponica*). *In: The Birds of North America*, no. 581. A. Poole & F. Gill. (eds). The Academy of Natural Sciences, Philadelphia & American Ornithologists' Union, Washington, D.C.

Meissner, W. & Ściborski, M. 2002. Autumn migration of the Bar-tailed Godwit (*Limosa lapponica*) in the Gulf of Gdańsk region. *Ring* 24: 3–15.

Piersma, T. & Gill, R.E., Jr. 1998. Guts don't fly: Small digestive organs in obese Bar-tailed Godwits. *Auk* 115: 196–203.

Longevity, movements, and site fidelity in Wandering Tattlers *Heteroscelus incanus*

ROBERT E. GILL, JR.[1], PAVEL S. TOMKOVICH[2], REGINALD DAVID[3], MAKSIM DEMENTYEV[4] & ARLEONE DIBBEN-YOUNG[5]

[1] Alaska Science Center, US Geological Survey, 4210 University Drive, Anchorage, Alaska 99508, USA. robert_gill@usgs.gov
[2] Zoological Museum, Moscow State University, Bolshaya Nikitskaya Str. 6, 125009 Moscow K-9, Russia
[3] Rana Productions, Ltd., PO Box 1371, Kailua-Kona, Hawai'i 96734, USA
[4] Vertebrate Zoology Dept., Moscow State University, Vorobjovy Gory, 119992 Moscow, Russia
[5] PO Box 580, Kaunakakai, Hawai'i 96748, USA

Keywords: Wandering Tattler, *Heteroscelus incanus*, longevity, fidelity, movements, Alaska, Hawai'i

Few shorebird species are as dispersed during both the breeding and non-breeding seasons as is the Wandering Tattler *Heteroscelus incanus.* Nesting occurs in North America in mostly montane regions of the Yukon, Canada, and throughout neighboring Alaska with isolated populations found across the Bering Strait south to the Koryak Highland in Far Eastern Russia. It is the only shorebird having major fractions of its population occurring on both continental and insular shores during the non-breeding season, overlapping broadly in western Oceania with the range of the Grey-tailed Tattler *H. brevipes* (Gill *et al.* 2002, Bamford *et al.* 2008, Branson *et al.* 2010). These traits, coupled with the species' generally solitary nature and small population size – likely in the few tens of thousands – have severely limited access to knowledge of its natural history. Here we report the first information on longevity, movements, and site fidelity of Wandering Tattlers based on marked individuals.

Between 1997 and 1999 we (RG, PT, MD) studied the nesting ecology of Wandering Tattlers and Surfbirds *Aphriza virgata* at Turquoise Lake, Alaska (60.780°N, 154.011°W; Fig. 1, see Gill & Tomkovich 2004 for details of the area). During the three field seasons we captured 35 adult tattlers and uniquely marked each based on placement of a green Darvic flag, a single Darvic band from among six different colors, and a numbered metal USGS band (Table 1). In 1997, we caught an additional six adults that were marked with a single marking scheme not distinguishable to individual.

Adult tattlers at Turquoise Lake were classified as either local breeders or as transients based on the frequency with which we saw them again at the banding site (Fig. 1). Local breeders frequently visited the outlet of the lake throughout the breeding season; transients were not seen again the year they were marked but several were seen in subsequent years, but only in early spring before dispersing to unknown breeding areas. Local breeders exhibited a high degree of breeding site faithfulness with 9 of 12 (75%) birds found nesting at Turquoise Lake the year following their initial capture at the site.

Fig. 1. Turquoise Lake, Alaska, looking east towards the Neacola Mountains. The outlet of the lake (center) is the source of the Mulchatna River (foreground) and the site where most Wandering Tattlers were captured and observed. (Photo: P. Tomkovich.)

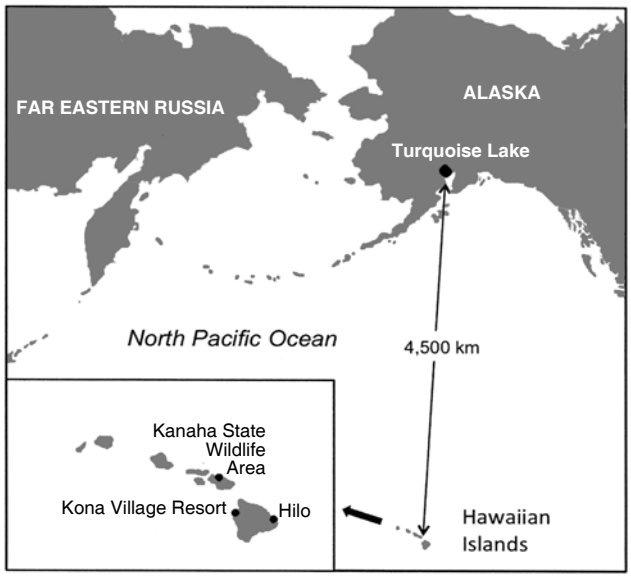

Fig. 2. The Turquoise Lake study area relative to the Hawai'ian Islands where marked Wandering Tattlers were subsequently seen.

Resightings of marked birds during the non-breeding season were also informative. Two of the 35 uniquely marked adults were subsequently seen away from the banding site a year or more after marking (Fig. 2). One tattler captured at Turquoise Lake on 24 May 1999 was seen by AD on the island of Hawai'i at Kona Village Resort (KVR; 19.832°N, 155.986°W; Fig. 3) on 19 Sep 1999 and on four other occasions there between Sep 2000 and Sep 2004 (Table 1). In 2004, we were fortunate to get an idea of its migrational timing since the bird was seen at the resort on 14 May, at Turquoise Lake 10 days later, and then found back at KVR on 29 Sep. The great circle distance between KVR and Turquoise Lake is 4,500 km (Fig. 2). It was not seen at KVR during a two-week period in May 2005 and has not been reported elsewhere since (Table 1). The exact nesting site of this bird is unknown. Since it was only seen at Turquoise Lake in spring, and always alone, we suspect it was a transient en route to a nesting area beyond the Turquoise Lake basin.

The second marked tattler, an adult male (sexed from DNA via Griffiths *et al.* [1998]), was captured on the Turquoise Lake study area with a brood on 14 Jul 1999 and seen by RD on the island of Hawai'i at Waikea Park in Hilo (19.728°N, 155.087°W; Figs 2 & 4) on four different occasions between 28 Aug 1999 and 23 Nov 2005 (Table 1). It then went unreported for over a five-year period until seen again by RD at the Kanaha State Wildlife Sanctuary (20.892°N, 156.457°W; Fig. 2) on 26 Jan 2010 on the neighboring island of Maui, about 190 km northwest of Hilo.

There have been fewer than 200 Wandering Tattlers marked in North America since the first was banded in 1959 (USGS 2010). Our sightings represent the first of tattlers seen away from their banding location. Both birds resighted were likely two or more years old when captured since insular-wintering Wandering Tattlers apparently do not go north until their third calendar year (Gill *et al.* 2002, Pyle 2008). Thus, the bird resighted in January 2010 was then a minimum of 12.5 years old. Anecdotal observations of tattlers at KVR suggest that the marked bird seen there used the area for several years prior to it being marked. AD first noted well-defined territories of tattlers there in Mar 1995 when two birds inhabited different ends of the resort's one kilometer of beach. Included in the territory of one bird was the outdoor dining area where it foraged for scraps among tables or on bits of egg and bread tossed to it by diners. [Evidently tattlers have a more discerning palate than, for example, turnstones (see Gill

Table 1. Resighting histories of adult Wandering Tattlers marked at Turquoise Lake, Alaska.

Band no.	Date marked	Date resighted	Where resighted	Seen by
1403-10075 (R/–:Gf/m) [a]	24 May 1999	19 Sep 1999	Kona Village, HI	AD
		29 Sep 2000	Kona Village, HI	AD
		15 May 2003	Kona Village, HI	AD
		14 May 2004	Kona Village, HI	AD
		23 May 2004	Turquoise Lake, AK	RG & MD
		29 Sep 2004	Kona Village, HI	AD
		10–23 May 2005	Kona Village, HI (not seen)	AD
1403-18129 (Y/m:Gf/–)[b]	14 Jul 1999	29 Aug 1999	Hilo, HI	RD
		11 Nov 2000	Hilo, HI	RD
		26 Sep 2004	Hilo, HI	RD
		23 Nov 2005	Hilo, HI	RD
		26 Jan 2010	Kanaha, HI	RD

[a] Bird 1403-10075 was marked with a red band on its left tibia, a green flag on its right tibia, and a metal band on its right tarsus (R/–:Gf/m).
[b] Bird 1403-18129 was marked with a yellow band on its left tibia, a metal band on its left tarsus, and a green flag on its right tarsus (Y/m:Gf/–).

Fig. 3. A portion of the non-breeding season territory of Wandering Tattler 1403-10075 at Kona Village Resort, Hawai'i. (Photo © Kona Village Resort.)

Fig. 4. Wandering Tattler 1403-18129 photographed at Hilo, Hawai'i, 11 December 2005. Note the yellow band has faded to cream. (Photo: R. David.)

1986) since tattlers never frequented the dining area during the mid-day and supper meals.] AD first noted an unmarked tattler "defending" the outdoor dining area and adjacent rocky shoreline in Mar 1995 and a lone bird was seen defending this area during seven subsequent visits to the resort until Jan 1999. In Sep 1999, a bird was again observed defending this area but this one was marked (Table 1). If this bird hatched during the July preceding its first sighting by AD at Kona Village Resort in Mar 1994 and, indeed, if it is the same bird we eventually banded, it would have been 10 years old when last seen in May 2005.

Based on the longevity of other species of transpacific migrant shorebirds that also exhibit delayed sexual maturity (cf., Marks 1991, Johnson *et al.* 2001, Pyle 2008, Woodley 2009, USGS 2010), it should not be unexpected for Wandering Tattlers to regularly reach 15 years of age or older. The current longevity record for Grey-tailed Tattler *H. brevipes* is 20.5 years (ABBBS 2010; C. Hassell, pers. comm.).

These observations further establish not only the first link between specific sites used by individual tattlers during the breeding and non-breeding periods, but also demonstrate a high degree of site faithfulness to areas used during both these periods. Observations have been too infrequent to determine when the inter-island movement in Hawai'i of bird 1403-18129 first occurred or if this bird and tattlers in general make more frequent or periodic inter-island movements. We would not be surprised, however, if such movements occur regularly given the much longer and more complex "within site" movements we are finding with satellite-tagged godwits *Limosa lapponica baueri, L. fedoa, L. limosa* and Whimbrel *Numenius phaeopus* on both their breeding and non-breeding grounds (R. Gill, unpubl. data). Non-breeding site fidelity among Grey-tailed Tattlers also appears very high where, for example, in NW Australia there has been not only an unusually high recapture rate (~10% among over 7,000 individuals ringed), but the vast majority has occurred within 25 km of the bird's initial capture site (Branson *et al.* 2010, C. Hassell & C. Minton, unpubl. data).

Overall, the longitudinal data presented here on uniquely marked individuals, especially those inhabiting remote habitats, provide the type of information needed for reliable evaluations of longevity, survival rates, and senescence in wild animal populations (e.g., Sandercock 2003, Nussey *et al.* 2008).

We thank Chris Hassell, Heather Gibbs, and Clive Minton for ringing information and Nils Warnock, Dan Ruthrauff, Colleen Handel, and Lee Tibbitts for comments on drafts of our manuscript. Any use of trade, product, or firm names in this publication is for descriptive purposes only and does not imply endorsement by the US government.

ABBBS. 2010. Australian Bird and Bat Banding Scheme. *http://www.environment. gov.au/biodiversity/science/abbbs*. Accessed 2 February 2010.

Bamford, M., Watkins, D., Bancroft, W., Tischler, G. & Wahl, J. 2008. *Migratory Shorebirds of the East Asian – Australasian Flyway; Population Estimates and Internationally Important Sites.* Wetlands International – Oceania. Canberra, Australia.

Branson, N.J.B.A., Shigeta, Y., Chiang, C.Y. & Minton, C.D.T. 2010. Movements of Grey-tailed Tattlers and Terek Sandpipers in the East Asian–Australasian Flyway. *Wader Study Group Bull*. 117: 27–34.

Gill, R.E., Jr. 1986. What won't turnstones eat? *British Birds* 79: 402–403.

Gill, R.E., Jr. & Tomkovich, P.S. 2004. Subarctic, alpine nesting by Baird's Sandpipers *Calidris bairdii*. *Wader Study Group Bull*. 104: 39–50.

Gill, R.E., Jr., **McCaffery, B.J. & Tomkovich, P.S.** 2002. Wandering Tattler (*Heteroscelus incanus*). In *The Birds of North America*, No. 642. A. Poole & F. Gill (eds). The Birds of North America, Inc., Philadelphia, PA.

Griffiths, R., Double, M.C., Orr, K. & Dawson, R.J.G. 1998. A DNA test to sex most birds. *Molec. Ecol.* 7: 1071–1075.

Johnson, O.W., Bruner, P., Rotella, J., Johnson, P. & Bruner, A. 2001. Long-term study of apparent survival in Pacific Golden-Plovers at a wintering ground on Oahu, Hawaiian Islands. *Auk* 118: 342–351.

Marks, J.S. 1992. Longevity record for the Bristle-thighed Curlew: an extension. *J. Field Ornith.* 63: 309–310.

Nussey, D.H., Coulson, T., Festa-Bianchet, M. & Gaillard, J-M. 2008. Measuring senescence in wild animal populations: towards a longitudinal approach. *Funct. Ecol.* 22: 393–406.

Pyle, P. 2008. *Identification Guide to North American Birds. Part II. Anatidae to Alcidae.* Slate Creek Press, Point Reyes Station, California.

Sandercock, B.K. 2003. Estimation of survival rates for wader populations: a review of mark–recapture methods. *Wader Study Group Bull*. 100: 163–174.

US Geological Survey. 2010. Bird Banding Laboratory. *http://www.pwrc. usgs.gov/bbl*. Accessed 3 February 2010.

Woodley, K.S. 2009. *Godwits: long-haul champions.* Penguin Group, New Zealand.

A new southernmost record of White-faced Plover *Charadrius dealbatus*

MUHAMMAD IQBAL[1], HERI MULYONO[2], RIZA KADARISMAN[2] & SURAHMAN[2]

[1] *KPB-SOS, Jalan Tanjung api-api km 9 Komplek P & K Blok E 1 Palembang 30152, Indonesia*
kpbsos26@yahoo.com
[2] *Sembilang National Park Office, Jalan AMD Kelurahan Talang Jambe*
Kecamatan Sukarame Palembang, Indonesia

Keywords: White-faced Plover, *Charadrius dealbatus*, non-breeding range, distribution, Sumatra, Indonesia

Recent literature has discussed the occurrence of "mystery pale *Charadrius* plovers" observed and photographed in Singapore in winter 1993/1994, and in Malaysia, Thailand and Vietnam from winter 2006/2007 onwards (Bakewell & Kennerley 2008, Kennerley *et al.* 2008). The conclusion is that these are the birds described by Robert Swinhoe in 1870, which he named *Aegialites* [= *Charadrius*] *dealbatus*, as a species distinct from Kentish Plover *Charadrius alexandrinus*. Subsequent confusion has resulted in the name dealbatus being applied as the subspecific name of the form of Kentish Plover that occurs in abundance in E and SE Asia (with an estimated population of 100,000 (Wetlands International 2006)), while the taxon described by Swinhoe *Charadrius dealbatus* has been overlooked by almost all subsequent taxonomists, and mistakenly described and illustrated as Kentish Plover. An investigation to establish the phylogenetic relationship between *Ch. dealbatus* and other small *Charadrius* plovers is currently in progress. If dealbatus proves to be distinct at the species level, it has been recommended that it be given the name *Charadrius dealbatus*, with the English name "White-faced Plover" (Kennerley *et al.* 2008).

The White-faced Plover specimens that have been examined are from China and are dated from April to July, which would encompass the likely breeding season. Outside the breeding season, it is generally believed that *dealbatus* ranges widely throughout coastal E and SE Asia (Kennerley *et al.* 2008). The northernmost specimen records come from Amoy (Xiamen, Fujian province, China), and the southernmost record is from Sumatra, where a male was trapped at Cemara (Jambi province) in Feb 2008 (Bakewell & Kennerley 2007, Kennerley *et al.* 2008).

On 16 Nov 2009, a number of plovers were observed on a sandy beach at Pulau Betet in the Sembilang National Park, Banyuasin 3 sub-district, Banyuasin District, South Sumatra

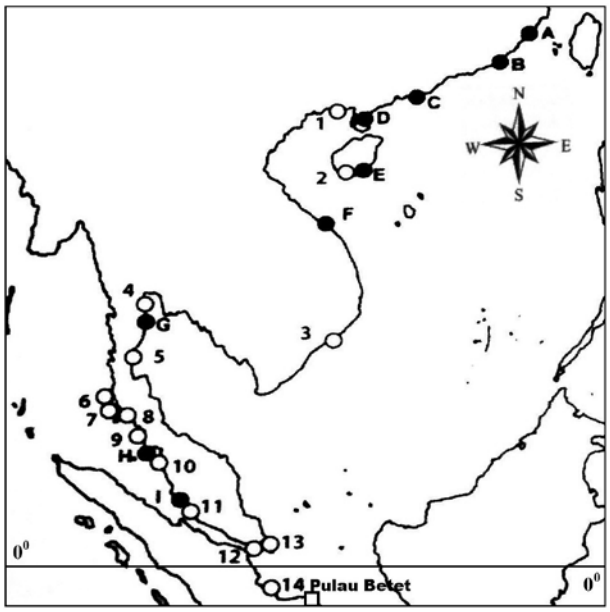

Fig. 1. Records of White-faced Plover *Charadrius dealbatus* (map reproduced from Kennerley *et al.* 2008). Solid circles show specimen record and open circles documented sightings. The open circle numbered 14 is Pantai Cemara and the square symbol shows Pulau Betet.

Fig. 2. Four presumed juvenile White-faced Plovers *Charadrius dealbatus* with a Kentish Plover *Charadrius alexandrinus* in the foreground. (Photo: Heri Mulyono.)

Fig. 3. A presumed juvenile White-faced Plover *Charadrius dealbatus* (foreground) clearly paler than five Terek Sandpipers *Xenus cinereus* (behind and left) and a Kentish Plover *Charadrius alexandrinus* (extreme right). (Photo: Heri Mulyono.)

Fig. 4. Presumed female non-breeding White-faced Plover *Charadrius dealbatus* (left) with two Kentish Plovers *Charadrius alexandrinus* (right). (Photo: Heri Mulyono.)

Fig. 5. A presumed juvenile White-faced Plover *Charadrius dealbatus* between a Kentish Plover *Charadrius alexandrinus* on the left and a Terek Sandpiper *Xenus cinereus* on the right (the bird at the back is a godwit Limosa. (Photo: Heri Mulyono.)

province, Indonesia (Fig. 1, 1°47'33"S, 104°32'80"E). Among them were at least six pale birds that showed the characteristics of the White-faced Plover based on criteria described by Bakewell & Kennerley (2008). Briefly these are: short breast patches, very pale ear-coverts and more extensive white on the forehead supercilium than Kentish (Figs 2–5). White-faced Plovers can appear slightly larger than Kentish Plovers though there is considerable overlap (Figs 2–5, Bakewell & Kennerley 2008). The birds appeared to be smaller than Terek Sandpipers *Xenus cinereus* (see Figs 3 & 5). Five of the pale plovers were presumed to be juveniles, based on conspicuous pale fringes to the mantle and scapulars, giving the upperparts a slightly scaled appearance (Figs 2, 3 & 5). One bird was presumed to be a non-breeding female by the pale forehead and supercilium, but the upperparts look darker than the other birds (Fig. 4).

Before the records of 16 Nov 2009, a typical White-faced Plover was recorded in the same area on 13 Dec 2008. Presumed White-faced Plovers have also been seen by MI at two other locations in Sumatra. One was on a sandy beach at the NE tip of Pulau Rupat (Riau province, 2°06'N, 101°41'E) on 18 Feb 2005; the other was on the Banyuasin Peninsular (South Sumatra province, 02°04'S, 104°57'E) on 31 Oct 2008. However, no photographs were taken to support these observations. The White-faced Plovers at Pulau Betet are the southernmost records for this species and provide confirmation that the taxon extends into the southern hemisphere. Previously, the southernmost record was from Cemara beach, Jambi province, Sumatra (1°22'S compared with Pulau Betet which is 01°47'), 50–60 km from Pulau Betet (Fig. 1).

Clarification of the taxonomic status of White-faced Plover will facilitate assessment of conservation needs. Although doubtless overlooked in the past, it seems unlikely that the population is large, and its preference for sandy coastal habitat almost certainly means that it faces threats from habitat conversion, degradation and human disturbance (Bakewell & Kennerley 2008). There is a clear need for ornithologists to pay more attention to White-faced Plovers in future, especially in Sumatra which seems to be at the southernmost limit of the non-breeding range. Ideally there should be a systematic coordinated survey of the entire range; only this will provide the information needed to assess the White-faced Plover's population size and trend and conservation needs.

We would like to thank David Bakewell for confirming our identification. We are also very grateful to Peter Kennerley and Humphrey Sitters for reviewing this paper and helping to improve the manuscript. The first author thanks Rufford Small Grant, WCS-RFP and Idea Wild who provided funds for conducting surveys in the Sembilang National Park and working with other authors to share information about shorebird issues in the area. The authors thank the head of the Sembilang National Park (Ir. Sumantri) who facilitated us conducting fieldwork in the park.

Bakewell, D.N. & Kennerley, P.R. 2008. Field characteristics and distribution of an overlooked *Charadrius* plover from South-East Asia. *Birding Asia* 9: 46–57.

Kennerley, P.R., Bakewell, D.N. & Round, P.D. 2008. Rediscovery of a long-lost *Charadrius* plover from South-East Asia. *Forktail* 24: 63–79.

Wetlands International. 2006. *Waterbird Population Estimates – Fourth Edition.* Wetlands International, Wageningen, The Netherlands.

Three records of Red Knots *Calidris canutus* possibly changing flyways

JIM WILSON[1], YVES AUBRY[2], CHRISTOPHE BUIDIN[3], YANN ROCHEPAULT[3] & ALLAN J. BAKER[4]

[1] *Sandneset, 8380 Ramberg, Norway. jimwils@frisurf.no*
[2] *Canadian Wildlife Service, PO Box 10100, Quebec, Canada, G1V 4H5*
[3] *1, chemin du Ruisseau, Rivière-St-Jean, QC, Canada, G0G 2N0*
[4] *Royal Ontario Museum, Toronto, Canada*

Keywords: Red Knot, *Calidris canutus, rufa, islandica,* migration, vagrancy

In recent years, re-sightings of individually-marked shorebirds have afforded many new insights into the migratory journeys they make; and occasionally they have revealed movements that could not have been predicted. Here we discuss three such movements involving Red Knots *Calidris canutus* that show unexpected links between sites previously thought to be used exclusively by two different subspecies, *rufa* and *islandica*.

Two recent re-sightings of individually-marked knots have shown movements linking the Mingan Archipelago (Canada), a major autumn staging area for *rufa* knots in the West Atlantic Flyway, with the spring staging areas of *islandica* knots in the East Atlantic Flyway.

The Mingan Archipelago National Park Reserve on the north side of the Gulf St.Lawrence (50°13'N, 63°49'W; Fig. 1), is an important staging area for *rufa* Red Knots on their southward migration to South America, with an estimated 7,000 stopping there in 2007 and 2008 (Baker 2009) (Fig. 1). During 2006–2008, 4,517 re-sightings were made there of 996 individually-marked knots, which had all been marked in the West Atlantic Flyway, in Argentina, Brazil, Chile, United States and Canada (Buidin *et al.* 2010). However, an adult male knot captured at Mingan on 21 Aug 2008 and fitted with a uniquely-engraved white flag (mass: 162 g, bill: 34.1 mm, wing-length: 164 mm) was re-sighted at Ásmundarstaðir, Melrakkaslétta, NE Iceland (66°29'N, 15°55'W) on 26 May 2010 (Guðmundur Örn Benediktsson, pers. comm.). NE Iceland is a major staging area for *islandica* knots migrating between wintering grounds in NW Europe and breeding grounds in NE Canada and Greenland (Whitfield & Magnusson 1987).

An analogous instance occurred, when an adult knot with a uniquely-engraved yellow flag and red ring was re-sighted at Mingan on 13 Jul 2010. This individual had been ringed on 26 May 2009 (mass: 165 g, bill: 35 mm, wing-length: 173 mm) as an adult in Porsangerfjord, N Norway (70°24'N, 25°33'E), a site where around 40,000 *islandica* stage during spring migration (Fig. 1) (Wilson *et al.* 2010).

There is also an earlier record of a Red Knot apparently changing from the East Atlantic to the West Atlantic flyway. The bird was originally ringed in Mar 1971 as an adult in Norfolk, E England, which is in the wintering grounds of the *islandica* subspecies, and recovered on Barbados in Aug 1972. Barbados lies along the migration route of the *rufa* subspecies which migrates between North and South America (COSEWIC 2007).

Rufa, the subspecies with the longest migration route, breeds in the central Canadian Arctic and migrates through Canada and eastern North America to its main wintering areas in Florida, Brazil, Argentina and Chile (Morrison & Harrington 1992). *Islandica* knots breed in the high Canadian Arctic and in N Greenland, winter in W Europe and migrate through Iceland and N Norway in spring (Davidson & Wilson 1992) (Fig. 1). Therefore, with different breeding, staging and wintering areas, it would seem unlikely that *rufa* or *islandica* knots would change flyway. The *canutus* subspecies breeds in Siberia, and migrates through W Europe to winter mainly in W Africa (Piersma *et al.* 1992), so it would seem very unlikely that they would cross the Atlantic.

We suggest four scenarios to account for these movements between flyways:

1. The birds were *rufa* knots which arrived in Europe as vagrants at the time of autumn migration, mixed with flocks of *islandica* knots in their wintering areas and followed them on northward migration with at least two of the birds using the main spring staging areas in Iceland and Norway. Other species of American shorebirds arrive as vagrants in Europe every year, but *rufa* knot would not normally be recorded because of the difficulty of distinguishing them from *islandica* and *canutus* in the field. The chances of three vagrants being ringed and subsequently sighted or recovered

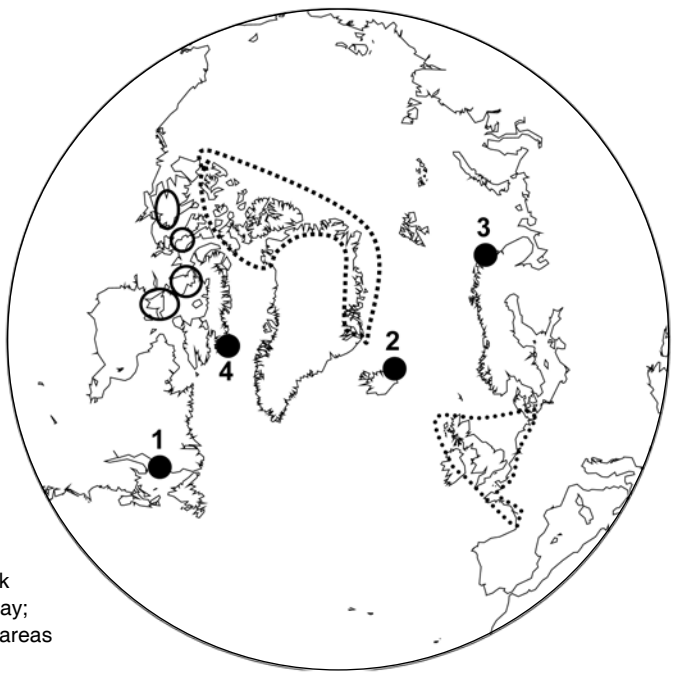

Fig. 1. Breeding areas of Red Knots *Calidris canutus* of the subspecies *rufa* in the Central Canadian Arctic (enclosed by solid lines), and *islandica* in NE Canada and Greenland (enclosed by a dotted line; and also the main wintering area of islandica in NW Europe (enclosed by a dotted line). Numbers indicate other sites mentioned in the text: 1. Mingan Archipelago National Park Reserve, Quebec, Canada; 2. NE Iceland; 3. Porsangerfjord, N Norway; 4. Broughton Island, Nunavut, Canada. (The breeding and wintering areas are based on Delany *et al.* 2009).

are extremely small, especially if we consider the small numbers of marked knots in Norway (1,793 during 2006–2009) and Mingan Archipelago (120 adults during 2007–2008). In contrast, thousands of *rufa* have been colour marked south of Canada (mostly in USA, Argentina, and Chile) and none of these have been reported in Europe.

2. The birds were *islandica* knots which reached the Mingan Archipelago as vagrants during their southbound migration. Colour ringing in Norway has shown that *islandica* knots return to Europe on a broad front from the breeding grounds in Greenland and Canada, with sightings stretching from W Ireland to Gotland in the Baltic (Wilson *et al.* 2008). However, knots are not numerous in S Greenland on migration. Most birds breeding in W Greenland and Canada must return via a crossing of the Greenland icecap or along the N Greenland coast (Salmonesen 1967). The first adult *rufa* arrive in the Mingan Archipelago on about 10 Jul (unpubl. data), about the same time that the first adult *islandica* arrive in Iceland (Morrison & Wilson 1992), so the apparently early date of the Norwegian knot at Mingan on 13 Jul fits with the migration schedules of both *rufa* and *islandica*. Under this scenario, the birds might continue migrating along the West Atlantic Flyway leading to the recovery on Barbados. Alternatively birds occurring at Mingan might attempt to return to Europe.

3. The bird re-sighted in NE Iceland was a *rufa* knot that overshot its breeding area in the low Canadian Arctic on its northbound migration and arrived in the breeding area of *islandica* in the high Arctic (Fig. 1), and subsequently followed their migration route to wintering areas in Europe. Buehler *et al.* (2006) showed that *islandica* is more closely related to *rufa* than to *canutus*, which mixes with *islandica* at staging areas in Germany and the Netherlands. They also suggested that *islandica* evolved from *rufa* and the migration route to Europe evolved from the breeding grounds in the New World and not from the wintering areas in the Old World. If this has happened in the past there is no reason why such mixing should not occur today. There is evidence that a few *islandica* switch staging areas and migration routes within Europe. Nine birds marked in N Norway during 2006–2009 on spring migration have been re-sighted in later springs in NE Iceland while two were re-sighted in W Iceland (Wilson *et al*. 2010). One bird ringed in Balsfjord, N Norway on 18 May 1976 was shot in W Greenland on 6 Jun the following year (Lyngs 2003) apparently having transferred to the W Iceland migration route, which involves crossing of the southern part of the Greenland icecap. The switch from the Norwegian to the Icelandic route involves a change in departure direction from the late winter fattening areas of the Wadden Sea of about 60°.

4. The birds ringed in N Norway and England were *islandica* which arrived in the breeding areas of *rufa* and subsequently followed their southbound (autumn) migration route through the Mingan Archipelago and Barbados. In spring, if birds continued west after crossing the Greenland icecap and crossed Baffin Island, they would reach the breeding areas of *rufa*. There are two recoveries on SE Baffin Island at Broughton Island on 9 and 11 Jun 1972 of knots ringed in England in March 1972 and Scotland in February 1971 (Morrison 1975). The recoveries are on a direct line towards the *rufa* knot breeding areas (Fig. 1). However, in 1972 very bad weather occurred in arctic Canada which may have affected the migration of those birds (Boyd 1992).

All of these scenarios seem plausible and we are not in a position to conclude which is the most likely explanation for the clearly atypical movements we report. Similarly, we cannot tell whether any of the three birds had permanently changed flyway and therefore probably their breeding area. Maybe further monitoring of individually-marked knots on both sides of the Atlantic will reveal the answers to these intriguing questions.

The research in Norway is supported by a grant from the Direktoratet for Naturforvaltning, Trondheim and Miljøvernavdelingen in the Finnmark County. The research and monitoring in Mingan Archipelago is supported by Parks Canada, Environment Canada, Royal Ontario Museum and World Wildlife Fund (Canada).

Baker, A.J. 2009. *Continuing Monitoring Annual Survival and Recruitment in the Endangered Red Knot Population Passing through Mingan Archipelago (Project #1440).* Unpub. report submitted to World Wildlife Fund, Toronto, Canada.

Boyd, H. 1992. Arctic summer conditions and British Knot numbers: an exploratory analysis. *Wader Study Group Bull*. 64, Suppl.: 144–152.

Buehler, D.M., Baker, A.J. & Piersma, T. 2006. Reconstructing palaeoflyways of the late Pleistocene and early Holocene Red Knot *Calidris canutus*. *Ardea* 94(3): 485–498.

Buidin, C., Rochepault, Y. & Aubry, Y. 2010. L'archipel de Mingan: une halte migratoire primordiale pour les oiseaux de rivage. *Le naturaliste Canadien* 134(1): 73–81.

COSEWIC. 2007. *COSEWIC Assessment and Status Report on the Red Knot* Calidris canutus *in Canada.* Committee on the Status of Endangered Wildlife in Canada, Ottawa. 58 pp.

Davidson, N.C. & Wilson, J.R. 1992. The migration system of European-wintering Knots *Calidis canutus islandica. Wader Study Group Bull*. 64, Suppl.: 39–51.

Delany, S., Scott, D., Dodman, T. & Stroud, D. (eds). 2009. *An Atlas of Wader Populations in Africa and West Eurasia*. Wetlands International, Wageningen, the Netherlands.

Lyngs, P. 2003. Migration and winter ranges of birds in Greenland. An analysis of ringing recoveries. *Dansk ornitologisk forening tidskrift* 1: 1–167.

Morrison, R.I.G. 1975. Migration and morphomtrics of European knot and turnstone on Ellesmere Island, Canada. *Bird Banding* 46(4): 290–301.

Morrison, R.I.G. & Harrington, B.A. 1992. The migration system of the Red Knot *Calidris canutus rufa* in the New World. *Wader Study Group Bull*. 64, Suppl.: 71–84.

Morrison, R.I.G. & Wilson, J.R. 1992. Observations of Knot migration in Iceland 1970–1972. *Wader Study Group Bull*. 64 Suppl.: 101–109.

Piersma, T., Prokosch, P. & Bredin, D. 1992. The migration system of Afro-Siberian Knots *Calidris canutus canutus. Wader Study Group Bull*. 64, Suppl.: 52–63.

Salomonsen, F. 1967. *Fuglene på Grønland*. Rhodos, København.

Whitfield, D.P. & Magnusson, J. 1987. The migration of waders through north-east Iceland. *Wader Study Group Bull*. 49, *Suppl*.: 85–89.

Wilson, J., Dick, W.J.A., Frivoll, V., Harrison, M., Soot, K.M., Stanyard., D., Strann, K-B., Strugnell, R., Swinfen, B., Swinfen, R. & Wilson, R. 2008. The migration of Red Knots through Porsangerfjord in spring 2008: a progress report on the Norwegian Knot Project. *Wader Study Group Bull.* 115(3): 171–176.

Wilson, J., Potts, P., Soot, K.M.R., Swinfen, R.C. & Swinfen, B.J. 2010. The migration of Red Knots through Porsangerfjord in spring 2010: a progress report on the Norwegian Knot Project. *Wader Study Group Bull.* 117(3): 167–172.