

A Whooper Swan (*Cygnus cygnus*) at Yellowstone National Park, Wyoming, with comments on North American reports of the species

Abstract

This article treats the occurrence of Wyoming's first Whooper Swan (*Cygnus cygnus*), provides an overview of the species' distribution in North America, and considers the problems posed for the ornithological record by waterfowl that have escaped from collections, specifically Whooper Swans.

Introduction

Waterfowl (order Anseriformes) are some of the most studied and observed groups of birds in North America, with countless publications available on the subjects of waterfowl identification and ecology. Although likely of Southern Hemisphere origin (Livezey 1996), waterfowl are now most diverse and especially abundant in the Northern Hemisphere, where many species are highly migratory. Aviculturalists and/or private propagators, zoological parks, and other venues with collections of regional and exotic waterfowl are widespread in these same zoogeographic regions. Escapees and presumed escapees from such collections pose regular difficulties for bird records committees around the world, which often cannot determine the provenance of individual birds with certainty and thus have sometimes taken to tabling, discarding, or rejecting outright most or all records of potentially vagrant waterfowl species. The treatment of Whooper Swan (*Cygnus cygnus*) in North America by avian records committees has been uneven, with western authorities recently including reported birds on official avifaunal lists but most central and eastern North American committees not including or, most often, not reviewing such reports. The recent record of a Whooper Swan at Yellowstone in Wyoming, in mid-continent, prompted synoptic consideration of past reports of this species on a continental scale and an evaluation of its status in North America.

The Yellowstone Whooper Swan, 2003–2004

Weekly winter surveys of Trumpeter Swans (*C. buccinator*) have been

conducted in Yellowstone National Park, Wyoming since 1986. On 26 November 2003, a day with sunny skies and temperatures in the twenties Fahrenheit, I was conducting one of these surveys in "the Narrows" area of Hayden Valley and located a swan (Figures 1–4) with the following characteristics, observed at 1100 MST with an 8 x 42 binocular at a distance of 70 m:

A large swan, the size of a Trumpeter Swan [of which 503 were present]; all white in plumage but with faint gray tinges on the neck; black legs and feet; a black bill with a bright lemon-yellow rhamphothecal material extending from the eye and the basal portions of the upper mandible to the nares, forming a lemon-yellow triangular patch on the bill. At the interface of the bill and the forehead was a thin black border. The lower mandible appeared black at a distance but on closer examination showed a triangular lemon-yellow patch, largest at the base of the bill and tapering off to a point approximately one-third down the length of the underside of the lower mandible. The



Figure 1. Whooper Swan at Yellowstone National Park, along the Yellowstone River in Hayden Valley, 19 December 2003. Photograph by Terry McEneaney.

Terry McEneaney

P. O. Box 546

Yellowstone National Park, Wyoming 82190

(email: terry_mceneaney@nps.gov)

bird occasionally delivered a *whoop-oup* call, in contrast to the familiar *ko-hoh* bugling of the Trumpeter Swans. Both legs were seen clearly when the bird walked onto the ice, and both were seen to be without band; the halux was present on both legs. Tips of retrices and remiges were unworn, and the bird was unpinioned. Behavior as wary as accompanying Trumpeter Swans.

Having logged more than 200,000 Trumpeter Swan sightings in 20 years with Yellowstone National Park and at Red Rock Lakes National Wildlife Refuge in Montana, I was quickly able to rule out an aberrant Trumpeter Swan and to rule in Whooper Swan, a species familiar from an Alaskan trip in 2000 (McEneaney 2004, in press). I alerted local and regional birders, and over the course of the winter, some 700 observers were able to see this individual, which traveled over the course of the season from the Yellowstone River in Hayden Valley to the Firehole River near Biscuit Basin, eventually returning to Hayden Valley before it departed some time after 1 March 2004, when last observed.

Distribution in Eurasia and North America

The current nesting range of Whooper Swan stretches from the tundra-like habitat of Iceland, to northernmost Scotland, through the boreal forest/taiga zone of Scandinavia, and across northern Russia through northeastern Siberia, including the Kamchatka Peninsula and the Gulf of Anadyr. The southernmost limits of the nesting range extend to Mongolia and Kazakhstan. Wintering grounds lie in Iceland and in western and central Europe south

as far as the Baltic Sea and eastward through the Black, Caspian, and Aral Seas to coastal China and Japan (Brazil 2003).

Although the Whooper Swan has been characterized as an ecological counterpart or "replacement" of the Trumpeter Swan and the two species have at times been considered conspecific or to form a superspecies, evidence suggests that the Whooper Swan is a larger derivative of the same stock that gave rise to the Tundra Swan (*C. columbianus*), including the Eurasian form known as Bewick's Swan (*C. c. bewickii*), which also shows a large area of yellow at the base of the bill (Parkes 1958, Livezey 1996). Whooper Swans differ from their similarly shaped counterpart in lacking an enlarged bony case on the sternum and are somewhat intermediate towards Tundra Swan in this regard. Also, the breeding range of Whooper Swan is more northerly than Trumpeter, and Whooper Swans undertake long-distance migrations that differ markedly from the restricted range of Trumpeter Swan, at least in modern times, and from the sedentary nature (in some contexts, as at Yellowstone) of Trumpeters (Brazil 2003). Although easily recognizable in the field as adults or subadults, Whooper and Trumpeter Swans are more difficult to distinguish as cygnets.

Whooper Swan formerly bred in easternmost North America in Greenland, where Bent (1962) notes that it "is said to have been exterminated [...] by the natives, who

pursued and killed young birds and the adults, when molting and unable to fly" and cites Hagerup (1891, *The Birds of Greenland*) that the species "formerly nested in South Greenland, but is now only a rare visitor," also noted by Salomonsen (1950). At present, the species is only a vagrant to Greenland according to Boertmann (1994), who lists 10 records (all May through September) from Southeast Greenland, nine records (June through September) from Northeast Greenland, and lists the species as occurring "probably annually" between February and October in West Greenland, where it is seen most often between Qaqortoq and Sisimiut.

In mainland eastern North America, records of Whooper Swan accrue chiefly from the northeastern quadrant of the continent, as is almost invariably the case with other large Palearctic waterfowl that breed westward to Greenland and/or Iceland, such as Pink-footed Goose (*Anser brachyrhynchus*), Greenland Greater White-fronted Goose (*A. albifrons flavirostris*), and Barnacle Goose (*Branta leucopsis*) (A.O.U. 1998). Nevertheless, because aviculturalists and others hold Whooper Swans in collections, most records of the species have been treated as probable or possible escapees and do not appear on state or provincial avifaunal lists (Table 1). A record of a Whooper Swan at Mud Lake, Alexander, Washington County, Maine on 10 September 1903 (Palmer 1949; photograph in Knight 1908, but data incor-

rect there) has sometimes been cited as referring to a bird of wild provenance, but waterfowl collections were already a part of American life in the early twentieth century. Nevertheless, there were no outward indications of captivity on the specimen (Palmer 1949). The relatively small wing measurements suggested to Palmer (1949) that it might have come from the Icelandic population, which although reportedly small birds are apparently no more so than individuals elsewhere (Palmer 1976). A search of the literature and correspondence with state and provincial bird records committees has produced no eastern North American records accepted by such committees. Nonetheless, dozens of Whooper Swans have been detected in the East and Midwest, and some of these birds have been of undetermined or indeterminate provenance, whereas others have been traced to waterfowl

collections. Most of the northeastern Canadian and U.S. records after 1992 have been assumed to be connected with the introduced breeding population of Whooper Swans in Massachusetts, present 1993–2002, or with several individual Whoopers known to have been released or to have escaped (see section on feral breeders below).

In Alaska, Whooper Swan has been documented both photographically and by specimen, of which there are at least seven (Gibson and Kessel 1997). The first Whooper in Alaska was reported in the Pribilof Islands at St. Paul, up to three birds in November and December 1941 (Wilke 1944), and subsequent early records come from the western and central Aleutian Islands on Atka (Kenyon 1963) and Amchitka (Kenyon 1961, 1963; Williamson et al. 1971). Though probably found wintering there one hundred years earlier (Turner 1885), it was first confirmed on Attu Island in the far western Aleutians in 1981, where it has also nested successfully in 1996 and 1997 (Sykes and Sonneborn 1998), the only North American breeding of wild birds recorded away from Greenland. Byrd et al. (1974) described Whooper Swans as arriving in small flocks of five to fifteen to winter at Adak, arriving as early as 9 November (1970) and departing as late as 9 April (1970). Kessel and Gibson (1978) term the species an "uncommon local winter visitant in the western and central Aleutian Islands from early November through mid-April" (earliest: 26 October 1957; latest 20 April 1975 and 8 May 1976) and a "very rare visitant at any season" in the Pribilofs, with records of single birds there between November and July in 1949, 1970, 1976, and 1977, in addition to the record of three in 1941. There are far fewer reports of the species for the mainland. Johnson and Sladen (1983) reported two near Kotzebue in 1971. Kessel and Gibson (1978) note a western mainland Alaska record of two at the Noatak River Delta on 19 June 1967, two at Wales 11 June 1975, three on St. Lawrence Island on 12 June 1976, one on the mainland at Selawik in June 1965, and two on the south-central mainland at Cordova on 23 October 1977. The highest count of the species in North America is apparently of 31 at Amchitka 10 April 1970 (Kessel and Gibson 1978).

A search of post-1978 literature indicates that most Alaska records involve singles or small groups (fewer than 10 birds) seen in the outer Aleutians (e.g., Shemya, Attu, Adak, Amchitka, Little Kiska, Buldir) and are from the nonbreeding season, fall and spring in particular; there are also few spring records from St. Lawrence Island. A late-spring record from the mainland at



Figure 2. Whooper Swan at Yellowstone National Park, on Firehole River north of Old Faithful geyser, 14 January 2004. The pattern/shape of yellow on Whooper Swans' bills appear to differ regionally. Study of the precise patterns could yield clues as to the provenance of individual swans (Brazil 2003). Photograph by Jay Lehman.

Table 1. Records and reports of Whooper Swans in eastern North America exclusive of Greenland, 1903–2004, arranged chronologically.

DATE (DAY/M/Y)	LOCATION	NUMBER	SOURCE/NOTES
10/09/1903 †	Mud L., Alexander, ME	1	Palmer 1949
07/1973	near Davidsonville, MD	2*	Johnson and Sladen 1983
winter 1978–1979	Hamilton/Dakville, ON	3 y.	James 1991
03/02/1980	Bronte, ON	1	Godfrey 1986
winter 1981–1982	near Hamilton, ON	1	James 1991
11/12/1983	Greensboro, Caroline Co., MD	1	Peterjohn and Davis 1996
11/03/1993+	around Robert Moses S.P., NY	3	Schiff and Wollin 1993, Perkins 1995 †
05/1993–19/10/2002	Essex Co., MA	3–12*	Berry 1997; fide J. Berry †
20/01/1992 †	Clermont, Lake Co., FL	2	fide B. Pranty
25–27/08/1992	Sargent Co., ND	1	Bergman and Homan 1995
02/1993	Black Dog L., Dakota Co., MN	1	fide P. Svingen
21/07–11/08/1994	Penouille, Gaspé, PQ	3	Aubrey and Bannon 1995a
18–20/08/1994	Cape North, Labrador, NL	3	Mactavish 1995
23/10/1994	Hennepin Co., MN	1	fide P. Svingen
20/01–14/02/1994	L. Mattamuskeet, NC	1	Davis 1995, fide R. Davis
01/1995	Martha's Vineyard, MA	3	Nikula 1995
–02/20–25/04/1995	Octorara L., Lancaster Co., PA		<i>Pennsylvania Birds</i> 9: 33, 91
03/1995	location unknown, MO	1	Brock 2000
–15–30/05/1995	several locations, NB	1	Maybank 1995
11–16/06/1995	Anticosti I., PQ	2	Aubrey and Bannon 1995b
10/1995	Jordan, Scott Co., MN	1	fide P. Svingen
–1996	Plymouth, MA	1	fide T. French
02/1996	Black Dog L., Dakota Co., MN	1	fide P. Svingen
04/1997	Carlos Avery W.M.A., MN	1	fide P. Svingen
16/04/1996	Nashua, NH	1 ^a	fide T. French
25/05/1997–10/01/1998	Grand Manan archipelago, NB	1	McLaren 1998
05/04/1997	Hampton, NH	1	Perkins 1997
06–12/1997	Great Bay, NH	4	Berry 1997; fide S. Mirick
02/02/1998+	Great Bay, NH	1 m.	Berry 1997; fide S. Mirick
13/06–04/07/1998	Washington Co., MN	5*	fide P. Svingen
05/1999	Carlos Avery W.M.A., MN	1	fide P. Svingen
08/1999	Great Bay, NH	1 f.	fide S. Mirick
12/10/1998–03/1999	Lubec, ME	1 ^b	Ellison and Martin 1999, Hunt 1999
winter 1998–1999	Connetquot S.P., NY	7	Schiff and Wollin 1993
14/03/1999	Hagar Pond, Marlborough, MA	1 ^c	fide T. French

17/01/1999	Eastham, MA	1	Hunt 1999
02/05/1999	Saint-Barthélemy, PQ	1	Bannon and David 1999
14/05/1999	Cowansville, PQ	1	Bannon and David 1999
07/05/1999 (text)	Great Bay, NH	6 y.	fide S. Mirick
08/06–27/07/1999	Trois-Pistoles, PQ	5	David et al. 1999
08/1999	Cobosseecontee L., ME	1	Ellison and Martin 2000
07/01–05/04/2000	Miss. River, Lee County, IA	1	Brock 2000
08–30/03/2000	Mason, near Cincinnati, OH	1	Brock 2000; fide J. Lehman
22/01–14/02/2000	Camp Dennison	1	Brock 2000; fide J. Lehman
27/01/2000	Foster, ND	1 ^d	Martin 2000
25–26/02/2000	Miller Beach, IN	1	Brock 2000
14/05/2000	Bucks Co., PA	1	unconfirmed; Internet
27/08/2000	Yamaska Park and Granby, PQ	1	Bannon et al. 2001
30/12/2001	St. Albans, VT	1	Hunt 2002
02/02/2002	Ferrisburgh, VT	1	Hunt 2002
21/04–30/06/2002	Galeton L., Potter Co., PA 1	1	<i>Pennsylvania Birds</i> 16: 123
31/07/2002	Port Stanley, ON	2	unconfirmed; at S.T.P.
11/11/2003 & 21/03/2004	L. Susquehanna, NJ	1	fide J. Burgiel, unbanded
24/03/2003	Kittatinny Valley S.P., NJ	1	fide J. Burgiel
16/04/2003	Licking Co., OH	1	fide J. McCormac
25/10–01/11/2003	Campbell L., McLeod Co., MN	1	fide P. Svingen
01/01/2004	Scott Co., MN	1	fide P. Svingen
05–08/02/2004	Marshall Co., IA	1	fide J. Dinsmore

Although many of the above reports cannot be linked conclusively to released or escaped birds, none has been accepted by a state records committee as representing a record of a wild Whooper Swan (very few reports have been reviewed). Many northeastern U.S. and Canadian reports of Whooper Swans have been assumed (in published sources) to be connected with the Whooper Swans that established themselves in northeastern Massachusetts 1993 through 2002 (see text). Many of the other reports, both in the East and the Midwest, clearly represent multiple sightings of the same individuals, whatever their provenance. In addition to the reports above, there were several reports of Whooper Swan in Minnesota during the 1980s, but I have been unable to ascertain their dates/locations.

^a This adult appeared at a small office park pond; its aggressive behavior led to its being captured by staff at the office park, who released it at Kittery, ME on 30 April 1996.

^b Believed by most observers to be the same individual as seen at nearby Grand Manan, NB several months earlier.

^c This bird was captured the next day by wildlife officials and put in a captive facility.

^d This toe-clipped bird was found near the Carrington golf course by Arrowwood National Wildlife Refuge employees and taken to a local zoo.

† Brazil (2003) incorrectly gives the year of the escaped Long Island birds as 1991 and the year of the first report of three Whoopers in Essex County, MA as 1992.

‡ The date and location for this specimen (photograph in Knight 1908) are incorrectly given in many sources.

◇ The year of this report is incorrectly published in most sources as 1991; these birds were known to be escapes.

* = Breeding records of feral birds; see main text. m. = male, f. = female, y. = yearling

Safety Sound, Nome from May through 24 June 1994 (Tobish and Isleib 1992) was unusual for the location.

As records of wintering Whooper Swans have apparently increased in Alaska, so too have they increased in western North America, particularly in the western third of the continent (Table 2). Nevertheless, Whooper Swans recorded in the contiguous United States have usually been combined under the category "controversial" (A.O.U. 1998). The increase in Whooper Swan reports along the West Coast, in concert with the proliferation of Alaskan records of the species, has led the California Bird Records Committee to accept some Whooper Swan records, as has the Oregon Bird Records Committee (Table 2). In some instances, Whoopers have been observed in close association with Tundra Swans, occasionally with juvenile birds whose identities have not always been clear, and published sources have offered inconsistent accounts of the identification of young birds seen in Oregon and along the Oregon-California border in particular (see

notes, Table 2). Observations of juvenile birds that associate with adult Tundra Swan as well as Whooper Swan have produced speculation as to the hybrid derivation of these birds, but hybrid young have only been reported from feral nesters in Alberta (Table 2). The association of Whooper with Tundra Swans has also sometimes produced assumptions of captive provenance in such birds, but a record of an adult Whooper Swan apparently bonded with a Tundra Swan at Golovin, Alaska 11–23 November 2000 and later (Tobish 2001) has perhaps tempered this assumption.

The Yellowstone Swan: contexts

In weighing questions of provenance, it is sometimes useful to consider the flock-mates. In recent years, the Trumpeter Swans resident in Yellowstone have numbered between 16 and 20. The Whooper Swan, however, accompanied 503 Trumpeter Swans on the first day of its observation. Several neck-collared Trumpeter Swans present that day were birds marked on nest-

ing grounds at Nahanni National Park, Yukon Territories, and Grand Prairie, Alberta. In the past several decades, data from neck-collaring studies and population trend analysis have indicated an influx of migrant Canadian Trumpeter Swans into Yellowstone beginning in mid-October. Many of these swans travel to Yellowstone in the fall by way of the East Front of the Rockies in Montana. As colder weather approaches, Yellowstone's swan numbers increase to several hundred individuals in the late autumn, certainly due to the influence of geothermal waters, particularly on the area's river systems. Once large lakes such as Yellowstone Lake begin freezing in late December or early January, most Trumpeters begin leaving the Yellowstone area. The few Tundra Swans that appear in Yellowstone in the fall typically leave the area earlier, usually just after the first cold spell.

For the Yellowstone Whooper Swan, it is not difficult to construct a plausible theory of wild provenance. Whooper Swan populations, as documented on the Japanese win-

Table 2. Records and reports of Whooper Swans in western North America exclusive of Alaska, 1977–2003, arranged chronologically.

DATE (DAY/M/Y)	LOCATION	NUMBER	SOURCE/NOTES
winter 1978-1979	Hamilton/Oakville, ON	3 y.	James 1991
11/11/1977	near Port Hardy, BC	1 ^a	Campbell et al. 2001
17-19/01/1984	near Grimes, Colusa Co., CA	1 *	Roberson 1986
20/11/1985	Pescadero, CA	2	unreviewed/unconfirmed
16/12/1988	Venice I., near Stockton, CA	1	Yee et al. 1989
28/01/1989	Mountain Lake Park, CA	1	C.B.R.C. (in ms.)
24/11/1991	Lower Klamath N.W.R., CA	1 ^b	Yee et al. 1992a,
18/01/1992			
9-10/12/1993	Richvale, CA	1 *	C.B.R.C. (in ms.)
winter 1993-1994	Olivehurst, Yuba Co., CA	1 *	unreviewed/unconfirmed
21/12/1993	Howard Slough W.A., CA	1 *	C.B.R.C. (in ms.)
10-21/11/1994	Summer L., OR	1 ^c	St. Louis 1995; Tweit and Gilligan 1995
26-27/02/1994	Lower Klamath N.W.R., CA	1 *	C.B.R.C. (in ms.)
17/01-07/02/1995	near Grimes, Colusa Co., CA	1	Yee et al. 1995
03-04/01/1996	near Grimes, Colusa Co., CA	1	Bailey and Singer 1996
25-27/07/1996	Seal Bay, Vancouver I., BC	1	Campbell et al. 2001
27/11-01/12/1997	Airlie, Polk Co., OR	1	Tweit and Gilligan 1998, Tweit and Tice 1998
24-28/01/1998	Lower Klamath N.W.R., CA/OR	1	C.B.R.C. (in ms.), O.B.R.C.
5-7/11/1998	Courtenay, Vancouver I., BC	1	Brazil 2003; D. Cecile, <i>in litt.</i>
01/01/1999	Seven Mile Ln., Glenn Co., CA	1	C.B.R.C. (in ms.)
17-19/04/1999	Irricana Sloughs, AB	1	Koes and Taylor 1999
7-17/11/1999	Mamit Lake, BC	2 ^d	Campbell et al. 2001
4-11/04/2000	Irricana Sloughs, AB	1 ^e	Koes and Taylor 2000
01-06/11/2000	Summer L., OR	4	Mlodinow and Tweit 2001a
01/01-10/03/2001	Lower Klamath N.W.R., CA/OR	4	Glover et al. 2001, Erickson and Hamilton 2001 Mlodinow and Tweit 2001b Mlodinow et al. 2001

11/01/2001	Fairmont Hot Springs, BC	1	D. Cecile, <i>in litt.</i>
10/03/2001	Lower Klamath N.W.R., CA	1 ^f	Cole and McCaskie 2004
5-11/03/2001	Somers, MT	1	Trochlell 2001
19/12/2001	L. Almanor, Plumas Co., CA	1	C.B.R.C. (in ms.)
15-30/11/2003	Somers, MT	1	Trochlell 2003
26/11/2003-01/03/2004	Yellowstone N.P., WY	1	present paper

Records in **boldface** print have been reviewed and accepted as referring to birds of wild provenance by state records committees or state-level monographs. Between the Oregon and California records, there is assumed to be much duplication of individuals. There are no reports of the species for Saskatchewan (contra Patten 2000, Brazil 2003).

^a Campbell et al. (2001) note that this record was in context of a large Trumpeter Swan flock and that Kessel and Gibson (1978) list 2 Whooper Swans among a flock of 26 Trumpeter Swans at Cordova in south-coastal Alaska 23 October 1977.

^b This bird was also reported on the Oregon side of the refuge 07/12/1991–22/02/1992 but was not accepted as having actually been in the state of Oregon (file Oregon B.R.C.).

^c This bird was in close association with a Tundra Swan and three immature birds that were initially published as hybrid young, but the birds were observed at great distance and assumed to be hybrids only because of their apparent association with the Tundra Swan. No case for hybrid derivation was based on close study of plumage or structure (file H. Nehls). Most regional observers believe that the Summer L., OR birds are the same individuals as those documented in several winters at Lower Klamath N.W.R., OR/CA, based on typical movements of swans in the area after the freeze-up of Summer L.

^d According to observers Wayne Weber and Andy Raniseth, this bird was in close association with a Tundra Swan and two immature birds that were also believed to Whoopers, although some observers suggested they young have been hybrids. Campbell et al. (2001) indicate the presence, however, of one adult and one HY bird and do not indicate hybrid derivation for the juvenile.

^e Evaluated by the Alberta Records Committee and "determined to be an escapee from the Irricana area that mated in the previous summer with a feral Tundra Swan and raised two young in Irricana. These birds may be the source of the family group reported from nearby interior British Columbia in fall 1999" (file R. Koes).

^f While one adult and 3 juvenile Whooper Swans present at Unit 4 of Lower Klamath N.W.R., CA 01/01-10/03/2001 was approved by the California Bird Records Committee, "the identification of a smaller adult at adjacent White L. on the same refuge on 10/03/2001 was questioned and not accepted (although endorsed by a majority), with at least one member suggesting it was a Whooper Swan x Tundra Swan hybrid from a mixed pair with three young present during the winter of 2000–2001" (Cole and McCaskie 2004).

* Not published in *North American Birds* and predecessor journals because of missing or partial seasonal report. C.B.R.C. = California Bird Records Committee; O.B.R.C. = Oregon Bird Records Committee.

tering grounds, have increased steadily, from 7500 in 1982 to 18,000 in 1990 to 32,000 in 2000 (Brazil 2003). During the same period, Alaskan records—all assumed to be of wild birds—have shown increases as well, although the ornithological exploration of the western Aleutian islands has also increased in the past three decades, and the apparent increase in Alaskan records may be owing in part to better coverage. The species is known to fly at high elevations and to cover large distances in a single flight (Brazil 2003), and birds from eastern Siberia that turn up in mainland Alaska occasionally flock with Tundra or Trumpeter Swans. The appearance of the Yellowstone Whooper Swan was preceded by a powerful low-pressure system that crossed from Siberia 19–22 November, which apparently also brought a Siberian Accentor (*Prunella montanella*) to Paradise Valley of Montana, about 50 km from the Hayden Valley, 22 November and later. In wider context, many Siberian species that have proven to be regular visitors to Alaska also show pronounced patterns of occurrence south along the Pacific coast and weaker but detectable patterns in the interior West.

Nevertheless, given the presence of feral/released Whooper Swans in the western Midwest (the North Dakota birds could pertain to Minnesota releases), as well as breeding feral Whoopers in Alberta and a

recent suspected escapee seen in 2001 and 2003 in Somers, Montana (Table 2; not the same individual as the Yellowstone swan), it is not possible, strictly speaking, to rule out captive provenance in any of the western Lower 48 records. However, there are many reasons to weigh the condition, behavior, and arrival timing of each individual when evaluating records.

Aviculturalists' perspectives on escapees

Was the Yellowstone bird a wild swan or more likely an escapee? I conducted a thorough review of Whooper Swan captivity records in the area, communicating directly with both aviculturalists and wildfowl propagators. All captive Whooper Swans around Yellowstone—in Montana, Idaho, and Wyoming—could be accounted for by owners. Together with information on the condition of the swan, this finding indicates that the provenance of this individual was certainly not a waterfowl collection within the region.

My interviews with aviculturalists, including the primary propagator of Whooper Swan in North America, impressed me with how knowledgeable they are—and how committed to their avocation of breeding or raising waterfowl in captivity. My impression, too, has been that aviculturalists are a very private and rather close-knit group, with few adherents inclined to express their views

publicly on escapees or other subjects. Most of the aviculturalists I contacted expressed the opinion that far fewer waterfowl have escaped from captivity in North America in recent years than in times past, and that those few that do rarely stray more than about 50 km from home collections. Most are unfit for long flights or coping with predators and other hazards, and almost all captive-reared birds seem reliant on humans when away from home collections, according to most collectors, some of whom have relocated escapees and returned them to collections. The expense and investment of time that captive waterfowl represent to these owners mean that virtually all of them are loath to lose their birds.

In the United States of America, recent regulations appear to have reduced markedly the number of waterfowl lost from collections, in the opinion of aviculturalists interviewed. Because of the threats to endemic wildlife by exotic diseases and introduced species, for instance, both the U. S. Fish and Wildlife Service and various state wildlife agencies have instituted new restrictions on private propagators of waterfowl. Those possessing Mute Swans (*C. olor*), for instance, must possess a permit and complete an annual report, as this species is now covered under the Migratory Bird Treaty Act. In some states, aviculturalists with captive birds are required to complete annual

reports and pass annual inspections of their birds and their facilities and sanitation practices. In many cases, captive birds are required to be rendered permanently flightless, which sometimes requires a surgical procedure. U. S. Fish and Wildlife Service encourages federal bands to be placed on waterfowl in addition to private identification bands. Escaped birds, particularly hatch-year birds, are always a concern for state agencies, and so most aviaries are required to have netting or even double-netting installed.

In discussing specifically the case of the Yellowstone Whooper Swan with aviculturalists, all felt that the bird could not have been of captive provenance, especially given the harsh conditions of the park. Yellowstone National Park is one of the most hostile winter environments in the Lower 48 States. Temperatures of -30° to -45° F are not uncommonly recorded in the park (lowest on record is -66° F), and the winter season of 2003–2004 was particularly harsh, with deep snows and temperatures in the range of -30° F recorded on several days. In the opinion of aviculturalists, an escaped captive bird would have a very difficult time surviving both the winter weather and various large predators. Of interest in this regard, a now-extirpated population of some 120 feral Mute Swans in the nearby Paradise Valley of Montana never ventured up into the harsher environment of Yellowstone (McEneaney 2001). The aviculturalists also expressed the opinion that a captive-bred bird would almost certainly show unwary behavior and probably approach humans for food.

History of nesting feral Whooper Swans in eastern North America

One reason for the difficulty in sorting out records of Whooper Swan in eastern North America in recent years, especially the 1990s to the present (the period from which most reports accrue), is that there have been multiple instances of escaped/ released Whooper Swans, most on the East Coast but several also in the Midwest. The accounts below treat released Whooper Swans that were documented to have nested (or believed to have nested and published as such); additionally, there is a report of a feral Whooper Swan that allegedly nested successfully with a feral Tundra Swan in Alberta (Table 2).

• Maryland 1970–1973

In May 1967, a resident of

Arnold, Anne Arundel County, Maryland purchased a pair of Whooper Swans and released them on his property. In May 1970, they nested, but all four cygnets were killed by predators. A second brood produced three fledglings that year, one of which paired with the adult female (after the death of the male), the other two pairing together in a nearby pond but ranging around the county. In May 1973, the young pair attempted to nest but was unsuccessful, again owing to predators. This pair relocated to the Patuxent River near Davidsonville, where again unsuccessful in nesting. They were banded and neck-collared 22 July 1973 and have not been seen in the area since that time (Johnson and Sladen 1983).

• New York 1993

In early March 1993, during a strong winter storm, waterfowl collectors on Long Island and in upstate New York apparently lost three and two Whooper Swans from collections, respectively, when outdoor holding areas collapsed (Schiff and Wollin 1993, Nikula 1995); the upstate birds were eventually recaptured (E. Brinkley, *in litt.*), but the Long Island birds were not. It was widely assumed in the birding community that the Long Island birds found their way to Massachusetts (Perkins 1993), where they were thought to have ranged as far initially as Martha's Vineyard (Nikula 1995). However, a clear connection between the New York and Massachusetts birds (see next section) has never been established, and so it is unclear what happened to the 1993 Long Island birds.

• Massachusetts 1994–2002

The saga of Whooper Swans in Essex

County, Massachusetts resists brief summary. In the spring of 1993, three Whoopers were observed among the local Mute Swans in Ipswich, Massachusetts. These birds—based on the presence of a band on one individual and their tame behavior—were believed at that time to have come from a waterfowl collection whose location was unknown (Berry 1997, French 1997). It was later learned that these birds were almost certainly from a propagator in Gloucester, Massachusetts, who had given or sold probably four Whoopers to a property owner in Ipswich, Massachusetts. The farm was sold, and the new owners were unaware of the history of the swans, but at least two were free-flying as of at least 1995 (T. French, *in litt.*). One bird, possibly injured, was killed by a pair that returned in spring, according to the new property owners.

The following summary is taken from Berry (1997) and from communication with Jim Berry, who kept close track of these birds during their stay in this area, through 2002. In the spring of 1994, the original three were joined by three more Whoopers that retained some gray in the plumage (thus second-year [SY] birds). These younger birds were not seen in summer 1994, although at some point in 1994, the Whoopers of Ipswich numbered four adults, and it is thought that one of the three SY birds may have remained. These swans spent time between Clark Pond and Rantoul Pond, with two males eventually becoming nest-helpers to nesting Mute Swans (no hybridization occurred)—at Rantoul Pond during the 1995 through 2002 nesting seasons and at Clark Pond during the 1996 through 2001 nesting seasons. Because these males were not mating with swans of their own species and producing young, the



Figure 3. The Whooper Swan at Yellowstone (center bird; here 26 November 2003) flocked exclusively with Trumpeter Swans, with which it was thought to have arrived from northern Canada, based on neck-collar codes of several flock-mates. Photograph by Terry McEneaney.



Figure 4. The Whooper Swan at Yellowstone (center; here 19 December 2003 along the Yellowstone River in Hayden Valley) spent the winter in company with migrant and local Trumpeter Swans, a species sometimes considered to be the closest relative of the Whooper. Photograph by Terry McEneaney.

Massachusetts Division of Fisheries and Wildlife elected not to remove them (French 1997). The only mortality documented in the Essex County birds was the killing of a crippled adult by a nesting pair in early spring of 1996 (T. French, *in litt.*) and one HY bird shot later that year, but the Clark Pond Whooper most likely died in March 2002 (J. Berry, *in litt.*).

Breeding of Whooper Swans was confirmed on two occasions in Massachusetts: first at a small farm pond along Argilla Road about one km west of Rantoul Pond in Ipswich in 1996, when four young fledged, and in 1998, when five young fledged. Both of these nesting records came to light only recently, however, and have not been previously published. The 1996 brood was noted on Rantoul Pond on 1 and 13 October, but the observers had no knowledge that the birds had been raised locally at that time (J. Berry, *in litt.*). Later that season, this family group of six birds in all moved to the Plum Island section of Parker River National Wildlife Refuge, where present well into July 1997 and later. The Massachusetts Division of Fisheries and Wildlife attempted to capture the birds in this year without success. No other nestings of the species have been documented, though other nestings are suspected. A group of six year-old Whoopers seen on Rantoul Pond in April 1999 was assumed retrospectively to have been the offspring of the Argilla Road pair—but the previous year produced supposedly five, not six cygnets.

At one point, the state was host to no fewer than 12 Whooper Swans (seven adults and one brood of five young), a peak count that was documented in Ipswich on 15 November 1998, but sightings of the species in Massachusetts have dwindled since 1999, a year in which the Massachusetts Division of Fisheries and Wildlife and the Animal Rescue League of Boston captured and vasectomized the breeding male Whooper of the known pair (13 April; T. French, *in litt.*). The last sighting of the species in the state came from Rantoul Pond, two adults seen on 19 October 2002 (J. Berry), with no sightings subsequently published in *Bird Observer*.

• New Hampshire 1997–2001

At Hampton, New Hampshire, an adult male Whooper Swan that was clearly of captive provenance turned up at in April and May 1997; though at first thought to be from the Essex County group, there is stronger evidence to suggest it and at least three others were unintentionally lost by an unlicensed collector in Newcastle, New Hampshire (Hunt 1999; T. French, *in litt.*). In early June 1997, an unbanded adult and then later three unbanded SY Whoopers turned up at Great Bay, New Hampshire, not far away and only about 48 km from Ipswich. Simultaneously, in Massachusetts, most of the local Whooper Swans (four at Plum Island, two in Ipswich) were accounted for, thus leading to speculation about a second nesting in 1996 somewhere

in New England—possibly the missing two of the six first seen in Essex County in 1994 (Berry 1997). These Great Bay birds eventually dispersed.

On 2 February 1998, a male Whooper Swan again visited Great Bay and remained there, off and on, for a year. By January of 1999, that individual had bonded regularly to a human male at the site, attacking the man's wife and tenant regularly for the next two years, through February 2001, when it was last seen (*vide* S. Mirick). The adult male ignored all other Whoopers in the area that later visited, including a somewhat wary female in August 1999 and a flock of six SY Whoopers on 7 May 1999 at the site—almost certainly the same six that had visited Rantoul Pond the month before (*vide* S. Mirick). (This behavior is typical of a captive human-imprinted bird that has been released.) Thus it would seem that the Massachusetts and the New Hampshire swans had come into contact with one another by 1999 (T. French, *in litt.*).

In another similar instance, an immature Whooper that turned up 25 May 1997 on Grand Manan Island, New Brunswick stayed through 1 January 1998. Though its provenance was unknown (usually presumed to be from Massachusetts), it accepted hand-outs and allowed close approach, as was true of most of the Massachusetts birds. At one point, in late November 1998, it was rescued from a small remaining open hole in the ice, with the rescuer essentially risking his own life to save it (*vide* B. Dalzell). Similar tales

come from Lubec, Maine (very close to Grand Manan), where presumably the same swan spent part of the winter and evaded capture, and from Nashua, New Hampshire and Middlesex, Massachusetts (Table 1). Most observers who approached the escaped adults and subsequent progeny from the Massachusetts birds found them at least "unwary" and in most instances rather tame.

Between Massachusetts and New Hampshire, the highest combined total of Whooper Swans for a single day was 16 birds counted between Essex County (12) and Great Bay (4) on 10 November 1998 (T. French, *in litt.*). Given the lack of evidence that these swans have since been removed from the wild or died, it is entirely possible that over a dozen Whooper Swans from this population are still present somewhere in North America.

• Minnesota

The only documented nesting of Whooper Swan in Minnesota comes from June–July 1998 in Washington County, where an adult was observed with four cygnets. No other adult was present, but it is assumed that this pairing was of two Whooper Swans (*vide* P. Svingen; see Table 1). In 1993, Parker Backstrom interviewed several propagators in eastern Minnesota. Likewise speaking on condition of anonymity, one propagator admitted that he had raised and deliberately released into the wild an unknown number of Whooper Swans over a period of several years. Moreover, this propagator deliberately released Whooper Swan x Trumpeter Swan hybrids in to the wild, as he considered them unfit for sale to collectors or other breeders. Peder Svingen (*in litt.*) reports that all of the dozen or more reports of Whooper Swan in the state, including those that have shown up in the winter with wild swans, are considered to be of former captives. The population of Minnesota's breeding Trumpeter Swans, which now stands around 1000 birds, could well have an admixture of Whooper genes, if the allegedly released Whoopers and the hybrid swans have survived (*vide* P. Svingen).

Resources and recommendations for records committees

Because of released individuals, some of which may persist in the wild for many years, it may indeed be nearly impossible to determine the provenance of most Whooper Swans in the eastern and middlewestern parts of North America. According to propagators, the states of Ohio, Michigan, Iowa, Indiana, Illinois, Texas, Kansas, New York, Maryland, Pennsylvania, and Massachusetts all have considerable numbers of Whooper

Swans in private collections. These collections are very dynamic enterprises, with many transfers annually. Nevertheless, most state-level natural resources departments keep track of such collections, and some are willing to share their databases with ornithologists. In addition, zoos, aviaries, tourist entertainment facilities, city parks, estates, subdivisions, and various foundations also have the capacity to be home to waterfowl such as Whooper Swan, and these should be investigated where possible. The International Species Inventory System (ISIS), an excellent on-line resource available free to the public at <www.isis.org>, reports for instance that 20 Whooper Swans are held in professional facilities such as zoological parks in North America (archive accessed 16 July 2004). A check of this site can reduce the amount of time needed to narrow down the search for the source of lost birds.

As of the time of this writing, only a few reports of Whooper Swan have ever been reviewed by records committees in the East, with even fewer images of these birds archived for the permanent record. This is understandable, given the large number of feral birds documented over the past three decades, most of whose current whereabouts are unknown. Nevertheless, if we are ever to make sense of the movements of wild Whooper Swans in North America, observers must first change the practice of leaving these birds undocumented, and records committees at the state and provincial level that do not currently do so would do well to establish ties with authorities who monitor captive waterfowl and the facilities that keep them, in order to be able to research more thoroughly and adjudicate more evenly the provenance of waterfowl reported in their regions.

Acknowledgments

This paper was a team effort, enlisting the help of almost every regional editor currently working with *North American Birds*. I wish to thank in particular Bill Pranty, Pam Hunt, Dave Powell, Steve Mirick, Ricky Davis, Mike Rogers, Don Cecile, Harry Nehls, Richard Erickson, Steve Mlodinow, Jim Berry, Jay Lehman, Margaret J. C. Bain, Joe Burgiel, Jim MacCormac, Bill Whan, Mike Rogers, James J. Dinsmore, Thede Tobish, Luke Cole, Peder Svingen, Marshall Iliff, Sy Schiff, Parker Backstrom and Brian Dalzell, all of whom supplied and double-checked information used in Tables 1 and 2, which were generated independently of the recently published monograph on Whooper Swan (Brazil 2003). Jim Berry was especially helpful and patient in clarifying the complex situation with the Massachusetts Whooper Swans, as was Tom French of the

Massachusetts Division of Fisheries and Wildlife. Paul E. Lehman, Marshall J. Iliff, and Louis R. Bevier went over the manuscript several times and made many helpful suggestions, as well as digging out several old or obscure references. Thanks also to several aviculturalists for extensive discussions about collectors and escaped birds; all of them wish to remain anonymous for the purposes of this paper.

Literature cited

- American Birding Association. 1996. *ABA Checklist: Birds of the Continental United States and Canada*. American Birding Association. Colorado Springs, Colorado.
- American Ornithologists' Union [A. O. U.]. 1998. *Check-list of North American birds*. Seventh edition. American Ornithologists' Union, Washington, D.C.
- Aubry, Y., and P. Bannon. 1995a. The fall migration: Québec region. *National Audubon Society Field Notes* 49: 16–20.
- . 1995b. The nesting season: Québec region. *National Audubon Society Field Notes* 49: 903–906.
- Bailey, S. F., and D. Singer. 1996. The winter season: Middle Pacific Coast region. *National Audubon Society Field Notes* 50: 218–220.
- Bannon, P., and N. David. 1999. The spring migration: Québec region. *North American Birds* 53: 256–257.
- Bannon, P., S. Denault, Y. Aubry, and N. David. 2001. The fall migration: Québec region. *North American Birds* 55: 23–25.
- Bent, A.C. 1962. *Life Histories of North American Waterfowl*. Part II. Dover Publications. New York, New York.
- Bergman, D. L., and H. J. Homan. 1995. Sighting of a Whooper Swan in North Dakota. *South Dakota Bird Notes* 47: 34–35.
- Berry, J. 1997. Notes on the Essex County Whooper Swans, 1993–1997. *Bird Observer* 25: 240–245.
- Boertmann, D. 1994. A[n] annotated checklist to the birds of Greenland. *Bioscience* 38: 1–63.
- Brazil, M. 2003. *The Whooper Swan*. T&AD Poyser, London.
- Brock, K. J. 2000. The winter season: Middlewestern Prairie region. *North American Birds* 54: 183–187.
- Byrd, G. V., D. L. Johnson, and D. D. Gibson. 1974. The birds of Adak Island, Alaska. *Condor* 76: 288–300.
- California Bird Records Committee [C.B.R.C.]. in ms. *Rare Birds of California*, R. A. Erickson, R. A. Hamilton, and M. A. Patten, eds. Western Field Ornithologists, Camarillo, California.
- Campbell, R. W., N. K. Dawe, I. McTaggart-Cowan, J. M. Cooper, G. W. Kaiser, A. C. Stewart, and M. C. E. McNall. 2001. *The*

- Birds of British Columbia*. Volume 4. University of British Columbia Press, Vancouver.
- Cole, L. W., and G. McCaskie. 2004. Report of the California Bird Records Committee: 2002 records. *Western Birds* 35: 1–33.
- David, N., Y. Aubry, and P. Bannon. 1999. The nesting season: Québec region. *North American Birds* 53: 361–362.
- Davis, R. 1995. Briefs for the files: Winter 1993–1994. *Chat* 59: 28–39.
- Ellison, W.G., and N.L. Martin. 1999. The fall migration: New England region. *North American Birds* 53: 30–34.
- . 2000. The fall migration: New England region. *North American Birds* 54: 26–30.
- Erickson, R. A., and R. A. Hamilton. 2001. Report of the California Bird Records Committee: 1998 records. *Western Birds* 32: 13–49.
- French, T. 1997. The Essex County Whooper Swans: the MDFW position. *Bird Observer* 25: 246–247.
- Gibson, D. D. and B. Kessel. 1997. Inventory of the species and subspecies of Alaska birds. *Western Birds* 28: 45–95.
- Glover, S. A., S. B. Terrill, D. S. Singer, and D. Roberson. 2001. The winter season: Middle Pacific Coast region. *North American Birds* 55: 223–226.
- Hunt, P. 1999. The winter season: New England region. *North American Birds* 53: 143–147.
- . 2002. The winter season: New England region. *North American Birds* 56: 154–157.
- James, R. D. *Annotated Checklist of the Birds of Ontario*. 1991. Royal Ontario Museum, Toronto.
- Johnson, J. C., and W. J. L. Sladen. 1983. Whooper Swans released in Maryland. *Maryland Birdlife* 39: 3–4.
- Kenyon, K. W. 1961. Birds of Amchitka Island, Alaska. *Auk* 78: 305–326.
- . 1963. Further observations of Whooper Swans in the Aleutian Islands, Alaska. *Auk* 80: 540–542.
- Kessel, B., and D. D. Gibson. 1978. Status and distribution of Alaska birds. *Studies in Avian Biology* 1: 1–100.
- Knight, O. W. 1908. *The Birds of Maine*. C.H. Glass, Bangor, Maine.
- Koes, R. F., and P. Taylor. 1999. The spring migration: Prairie Provinces region. *North American Birds* 53: 292–293.
- . 2000. The spring migration: Prairie Provinces region. *North American Birds* 54: 295–296.
- Livezey, B. C. 1996. A phylogenetic analysis of geese and swans (Anseriformes: Anserinae), including selected fossil species. *Systematic Biology* 45: 415–450.
- Mactavish, B. 1995. The fall migration: Atlantic Provinces region. *National Audubon Society Field Notes* 49: 13–16.
- Madge, S. and H. Burn. 1986. *Waterfowl: an identification guide to the ducks, geese, and swans of the world*. Houghton Mifflin, Boston.
- Martin, R. 2000. The winter season: Northern Great Plains region. *North American Birds* 54: 193–194.
- Maybank, B. 1995. The spring migration: Atlantic Provinces region. *National Audubon Society Field Notes* 49: 221–224.
- McLaren, I. A. 1998. The winter season: Atlantic Provinces region. *Field Notes* 52: 164–167.
- McEaney, T. 2001. 2000 Yellowstone Bird Report. NPS-YNP publication. YCR-NR-2001-01. 26 pages.
- . 2004. 2003 Yellowstone Birds Report. NPS_YNP publication. YCR-NR-2004-01. 26 pages.
- . in press. Recent additions to the Yellowstone bird checklist. *Yellowstone Science* 12.
- Mlodinow, S., and B. Tweit. 2001a. The fall migration: Oregon–Washington region. *North American Birds* 55: 93–97.
- . 2001b. The winter season: Oregon–Washington region. *North American Birds* 55: 219–222.
- Mlodinow, S., G. Lillie, and B. Tweit. 2001. The winter season: Oregon–Washington region. *North American Birds* 55: 347–351.
- Nikula, B. 1995. The winter season: New England region. *Field Notes* 49: 126–130.
- Palmer, R. S. 1949. Maine birds. *Bulletin of the Museum of Comparative Zoology* 102
- . 1976. Handbook of North American birds. Volume 2: waterfowl. Part 1. Yale University Press, New Haven, Connecticut.
- Parkes, K. C. 1958. Systematic notes on North American birds: 2. The Waterfowl (Anatidae). *Annals of the Carnegie Museum* 35: 117–125.
- Patten, M. 2000. The Changing Seasons: warm weather and cross-continental wonders. *North American Birds* 54: 146–149.
- Perkins, S. 1993. The spring migration: New England region. *American Birds* 47: 393–397.
- . 1995. The spring migration: New England region. *American Birds* 49: 227–230.
- . 1997. The spring migration: New England region. *Field Notes* 51: 844–847.
- Peterjohn, B., and P. Davis. 1996. First report of the Maryland Records Committee. *Maryland Birdlife* 52: 3–43.
- Roberson, D. 1986. Ninth report of the California Bird Records Committee. *Western Birds* 17: 49–77.
- Salmonsén, F. 1950. *Grønlands Fugle/The Birds of Greenland*. Munksgaard, Copenhagen, Denmark.
- Schiff, S., and A. Wollin. 1993. The spring season 1993. Region 10: Marine. *Kingbird* 43: 272.
- . 1999. The spring season 1999. Region 10: Marine. *Kingbird* 49: 180.
- St. Louis, M. 1995. Whooper Swan at Summer Lake Wildlife Area, Oregon, and California wintering areas. *Oregon Birds* 21: 35–37.
- Sykes, P. W., Jr., and D. W. Sonneborn. 1998. First breeding records of Whooper Swan and Brambling in North America at Attu Island, Alaska. *Condor* 100: 162–164.
- Tobish, T. G. 2001. The fall migration: Alaska region. *North American Birds* 55: 889–91.
- Tobish, T. G., Jr., and M. E. Isleib. 1992. The nesting season: Alaska region. *American Birds* 45: 1149–1151.
- Trochlell, D. 2001. The spring migration: Idaho–Western Montana region. *North American Birds* 55: 325–327.
- . 2003. The fall migration: Idaho–Western Montana region. *North American Birds* 58: 107–108.
- Turner, L. M. 1885. Notes on the birds of the Nearer Islands, Alaska. *Auk* 2: 747–749.
- Tweit, B., and J. Gilligan. 1995. The fall migration: Oregon–Washington region. *National Audubon Society Field Notes* 49: 92–95.
- . 1998. The fall migration: Oregon–Washington region. *Field Notes* 52: 114–118.
- Tweit, B., and B. Tice. 1998. The winter season: Oregon–Washington region. *North American Birds* 52: 248–251.
- Wilke, F. 1944. Three new bird records for St. Paul Island, Alaska. *Auk* 61: 655–656.
- Williamson, F. S. L., W. B. Emison, and C. M. White. 1971. Amchitka bioenvironmental program. Annual Progress Report. Studies of the avifauna on Amchitka island, Alaska. July 1, 1969–June 30, 1970. Battelle Memorial Institute, Columbus Laboratory, U. S. AEC Report MMI-171-131.
- Yee, D. G., R. A. Erickson, A. D. Barron, and S. F. Bailey. 1989. The winter season: Middle Pacific Coast region. *American Birds* 43: 361–364.
- Yee, D. G., S. F. Bailey, and B. E. Deuel. 1992a. The fall migration: Middle Pacific Coast region. *American Birds* 46: 142–147.
- . 1992b. The winter season: Middle Pacific Coast region. *American Birds* 46: 310–313.
- Yee, D. G., S. F. Bailey, and D. S. Singer. 1995. The winter season: Middle Pacific Coast region. *National Audubon Society Field Notes* 49: 192–195. ◀