

# The Vagrancy of Gray Kingbird in North America

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## ABSTRACT

This paper summarizes extralimital records, including breeding records beyond the core range, of Gray Kingbird (*Tyrannus dominicensis*) in North America, almost all of which are from coastal areas along the Atlantic and Gulf Coasts. Most records of vagrants are overwhelmingly likely to be from migratory populations, but specimens of vagrants are few and the taxonomy at the subspecific level remains unsettled enough that positive identification of the source population(s) has not been feasible. Likewise, the dearth of data on migratory pathways of Gray Kingbird precludes extensive speculation on probable causes of vagrancy, though here we attribute spring appearances out of range to "overshooting"

and fall appearances to "misorientation," both phenomena that are well documented in similar species.

In the compilation of records away from core range, we find clear patterns of vagrancy. Both spring and fall records out of core range show bimodality. The bimodality in spring may be attributable to differential migration by sex, while the fall bimodality may pertain to different migrations by age classes. Spring vagrant records span the species' normal migration window, as does the earlier fall peak, but a separate, later fall peak involves birds that appear up to a month later than the latest individuals have withdrawn from other portions of its range in the United States. Though the displacement of some birds may be affected by weather, no strong correlation between patterns of wind and weather and the vagrancy of this species could be established in this summary.

There are very few records of vagrants during summer (late June through mid-August), and none exist during winter away from Florida and Mississippi. Records of vagrants are chiefly coastal, with just 19 from the continent's interior. While partially a product of observer bias, the distribution of records illustrates this species' strong affinity for coastal environments. This paper documents an increase in the number of vagrant Gray Kingbirds recorded since the 1970s, due in part to a minor range extension but primarily to the sharp increase in the popularity of amateur ornithology in the East.

## INTRODUCTION

The charismatic Gray Kingbird (*Tyrannus dominicensis*) is one of eight species in its genus that regularly breeds in continental North America north of Mexico (Figure 1). As humans have continually reshaped the landscape throughout its range, the Gray Kingbird has established itself as one of the most ubiquitous birds in its core range in the West Indies. An open-country species, it has benefited from the clearing of forests and the cre-



**Figure 1.** A Gray Kingbird, probably a juvenile based on the brown cast and neat pale margins to the upperwing coverts, hangs out at Buxton, North Carolina 21 October 1993. The Carolinas have hosted almost half of the continent's vagrant Gray Kingbirds in the past 100 years, and the Outer Banks of North Carolina have held most of those, including at least one nesting pair. Photograph by Stephen J. Dinsmore.





Figure 2. The breeding range of Gray Kingbird is illustrated, with migratory and resident populations delineated. Map by Virginia Maynard.

ation of more open spaces. In breeding season, its boisterous, twittering call is heard continuously, variously described as "pit-teer-rrry" or "pe-cheer-ry" (Peterson 1980), and it enjoys an uncommon affection among humans, evidenced by the variety of colloquial names fastened to it, most of which relate to its call: Petchary, Chinchary, Pitirre, Pitirre Abejero, Titirre, Pestigre, Pipirite, Pick-Peter, Christomarie, and Fighter (Bond 1993).

Gray Kingbirds breed from the coastal southeastern United States (Alabama to South Carolina) south throughout the West Indies to northern South America (Venezuela; west probably to Colombia and perhaps Panama; Ridgely and Gwynne 1989, A.O.U. 1998, Hilty 2003). Northern populations—including those in the United States, the Bahamas, Cuba, the Cayman Islands, and Jamaica—winter southward from Hispaniola and Puerto Rico to northern South America (increase in numbers detected fall through winter in Netherland Antilles and Trinidad and Tobago, for example; Voous 1983, French 1991).

In this review, we consider "vagrant" Gray Kingbirds to be individuals documented away from Florida, Alabama, Mississippi, and coastal Georgia. Gray Kingbird is prone to long-distance vagrancy, as are several species of migratory tyrannids, including Tropical Kingbird (*Tyrannus melancholicus*; Mlodinow 1998), Fork-tailed Flycatcher (*Tyrannus*

*savanna*; Monroe and Barron 1980, Lockwood 1999), Sulphur-bellied Flycatcher (*Myiodynastes luteiventris*), Ash-throated Flycatcher (*Myiarchus cinerascens*), Variegated Flycatcher (*Empidonomus varius*; Abbott and Finch 1978), and others. We believe that errant Gray Kingbirds occur in the spring primarily as "overshooting" northbound migrants, whereas fall vagrants are presumed to be misoriented birds engaging in "reverse migration." In our analysis of records, we have not been able to establish a strong positive correlation between particular patterns of wind or weather and the out-of-range occurrences of Gray Kingbird, although southerly or southwesterly winds sometimes precede appearances of the species out of range in both spring and fall; in one instance, a hurricane has been credited with the displacement of a vagrant, though such is essentially impossible to demonstrate conclusively.

#### TAXONOMY AND THE SUBSPECIFIC IDENTIFICATION OF VAGRANTS

Determination of the source population of vagrants would be of interest, but apparently individuals are not diagnosable to population or subspecies in the field or perhaps even in hand. The Gray Kingbird has traditionally been divided into two subspecies, nominate *T. d. dominicensis* over most of the range and *T. d. vorax* in the Lesser Antilles, which is

essentially resident, although some birds are believed to winter south to northern South America (Ridgway 1907, A.O.U. 1957, T aylor 1979, Rodner et al. 2000). Differences are slight and poorly characterized, but *T. d. vorax* is said to average larger with a larger bill, and darker gray upperparts, with axillars and underwing coverts less strongly yellowish (Ridgway 1907). Geographic variation within the species was examined by Brodkorb (1950) and Haberman et al. (1991), and both found that sedentary populations were generally larger-billed and shorter-tailed. Nevertheless, because significant sexual dimorphism exists in bill length and wing shape (Haberman et al. 1991), identification to one group or the other requires ascertaining the sex, which is not possible in the field. Brodkorb (1950) divided the species into five subspecies, but these were never widely recognized, and no differences were seen by Monroe (1968). Haberman et al. (1991) found significant morphometric differences among populations examined by them, with two broad groups discernible: migratory and non-migratory populations. Although a change in taxonomy was suggested by Haberman et al. (1991) and adopted by Pyle (1997), the study was not specifically designed to address taxonomic issues. For example, they did not examine type specimens or specimens from type localities and did not evaluate plumage





**Figure 3.** A Gray Kingbird well offshore is a rare sight: this bird landed on the oil-drilling platform Exxon Green Canyon 18, some 130 km south of the Louisiana coast, on 22 May 2000 and remained through 25 May. These platforms, like remote islands, are magnets for weary migrants and are good places to detect vagrants. Photograph by Brian L. Sullivan.

coloration, including characters said to differentiate *T. d. vorax*.

Vagrant tyrannids, like most vagrant landbirds, appear to be consistently from migratory populations or taxa (see, for example, analysis of records for Fork-tailed Flycatcher, Lockwood 1999), and thus it seems that the most likely source of North American and Bermudian vagrants are from the northern, migratory populations. It is impossible, however, to determine the geographic provenance of the few specimen records, but it is possible that some proportion of the vagrant records of Gray Kingbird involve individuals from the migratory populations in Cuba, the Isla de Pinos, and/or Jamaica. To our knowledge, the several specimens of vagrant Gray Kingbirds have not been identified to population or subspecies, and of the 204 Gray Kingbirds logged as banded in the Bird Banding Laboratory's database, none has produced a return or recovery (*vide* M. Kathleen Klimkiewicz).

## DISTRIBUTION AND MIGRATION

### Breeding

A strictly coastal species, the Gray Kingbird is seldom found breeding more than a few kilometers from the coast (Stevenson and Anderson 1994), except in South America, where it has bred up to 400 km inland in the Venezuelan llanos north of the Orinoco River (Hilty 2003). Common as a breeder throughout the Caribbean and peninsular Florida, it breeds sparingly along the Gulf Coast of the United

States from the Florida panhandle west to Mississippi and north along the Atlantic Coast to Georgia. In Florida, the birds are especially common in the Keys. They breed north along both coasts through Duval County on the Atlantic side and to Wakulla and Franklin Counties on the Gulf. North and west of these counties, breeding is less frequent but still occurs, especially on barrier islands. Nesting is irregular west of Florida and into Alabama (Smith and Jackson 2002). In Mississippi, it nests regularly in small numbers on some offshore islands, most notably Horn Island, where they were seen annually 1963-1967 but not noted again after the 1969 landfall of Hurricane Camille until 1974 (S. J. Peterson, pers. comm.). Nesting was first confirmed in Mississippi on Horn Island in 1976 (Weber and Jackson 1977), and at least five pairs were present there in 1979 (S. J. Peterson, pers. comm.). It has nested just once on the mainland in Mississippi at Biloxi, Harrison County, where one pair successfully nested in 1998 and returned in at least the two subsequent years (S. J. Peterson, pers. comm.). There are more than 15 additional records from mainland Mississippi (S. J. Peterson, pers. comm.), mostly corresponding to the spring and fall migration peaks.

Gray Kingbird breeds very sparingly in Georgia and is a very rare breeder in South Carolina and North Carolina. In Georgia, it is noted as "a rare transient and very local summer resident on [the] coast...nesting sporadically on St. Simons and Sea Islands, Jekyll Island and Brunswick" (Beaton et al. 2003).

Gray Kingbird was first noted in South Carolina in 1832 by J. J. Audubon (Smith and Jackson 2002). It was considered by Post and Gauthreaux (1989) to be a "very rare vagrant and casual breeder on the coast." The only recent breeding record for South Carolina is of a pair that summered at Debidue Beach, Georgetown County, and produced at least one fledgling, which was seen 13 July 1993 (Davis 1993). The last prior breeding record for South Carolina was in 1896, though a pair was seen in suitable nesting habitat on Fripp Island, Beaufort County 11-13 May 1984 (McNair and Post 1993).

The first Gray Kingbird record for North Carolina was noted in March 1957 (Funderburg and Soots 1959), and that summer, the species apparently nested at Southport village, Brunswick County. The sightings are chronicled by Chamberlain (1957): "A group of Gray Kingbirds spent some weeks around Southport village. The first was noted, June 28, on a wire, by Waters Thompson; on Aug. 21, four were present at this same site and one of those was examined closely by Cecil Appleberry, who thought that the head shading was not so dark as the birds he had seen in Florida; he suspected it might be a bird of the year. Again on the 22nd, three were present (Mrs. A.)." The details of the record suggest nesting, especially given that four birds would be unlikely to be together in a group unless as a family unit, and we suspect that this group represented a first North Carolina nesting. Gray Kingbirds returned to the same area in 1958, 1959, 1962, and 1995, but the sightings were of single birds, with no further indications of nesting observed. The next indication of nesting in the state was in 1996, a few kilometers away at Fort Caswell, Brunswick County. A single Gray Kingbird seen 18 May was joined by a second bird 1 June, and a nest was found later in the month, but there were no published reports indicating whether eggs were laid or young were successfully reared (Davis 1997a, Davis 1997b). A pair returned to the same area the following year, with one bird seen sitting on a nest 18 May (Davis 1997c) and a nest with two eggs photographed 21 June (Davis 1998). A sighting at Caswell Beach 5 June 1999 may have referred to a member of the nesting pair returning two years later (Davis 2000), and it is possible that the birds were present in 1998 and not reported.

### Migration and Wintering

While resident in the more southerly portions of its range, Gray Kingbirds from the northern part of the breeding range—the United States, the Bahamas, Cuba, the Isla de Pinos, the Caymans, and Jamaica—are fully migratory (Haberman et al. 1991, Smith and Jackson 2002). Migrant Gray Kingbirds winter from Hispaniola south through the Caribbean to Panama, and east through Colombia,



Venezuela, Guyana, Suriname, French Guiana, and Brazil (Smith and Jackson 2002). It is not known how different breeding populations apportion the winter range.

There are few winter records from Florida (Stevenson and Anderson 1994). Smith and Jackson (2002) note that Gray Kingbirds may stray inland more often in the winter, and two Florida specimens taken in winter—at Madison (11 February 1889) and at Lakeport (30 January 1945; Stevenson and Anderson 1994)—illustrate this point. Stevenson and Anderson (1994) mention five coastal reports in winter: Paradise Key, 26–28 December 1917; Tampa Bay, 28 November–11 December 1940; near Coot Bay, 12 February 1956; West Palm Beach, 30 December 1964; and Fort Lauderdale, 7 January and 1 February 1965. Approximately a dozen other winter reports exist for Florida, but there is little extant information to support them (Stevenson and Anderson 1994). There is one winter record from Mississippi: one at Horn Island, Jackson County, 22 February 1976 (Weber and Jackson 1977; S. J. Peterson, pers. comm.).

As with other species in the genus *Tyrannus*, migration is diurnal and perhaps crepuscular. Gray Kingbirds over land appear to migrate primarily coastally, but there is at least some inland dispersal in Florida (Sprunt 1954). In Central America, it is a casual or very rare spring (mid- to late March) and fall (early September to early October) migrant along the immediate Caribbean coast of Costa Rica, where it is most often seen migrating with Eastern Kingbirds (*Tyrannus tyrannus*; Stiles and Skutch 1989). In Panama, Wetmore (1972) considered it an uncommon spring (March; latest dates in late April) and fall (September; earliest records in late August) migrant and winter resident along the Caribbean coast. Wetmore (1972) further noted that while wintering birds were usually found singly, migrant individuals typically occurred in small flocks.

Away from central Panama, where the species regularly winters (and possibly breeds) around Panama City (Ridgely and Gwynne 1989), there is but one sight record from the Pacific Coast of Central America: one at Jiménez, Costa Rica, in May (Stiles and Skutch 1989). Howell and Webb (1995) considered it an uncommon to rare transient on Caribbean islands off Belize and Quintana Roo, Mexico, a rare transient on the adjacent coasts, and a probable rare transient in Honduras. They noted no records from the northern or western sides of the Yucatan Peninsula (states of Yucatán and Campeche), although vagrant individuals must surely occur there, especially in fall. Stevenson and Anderson (1994) note that Gray Kingbird movement in Florida usually occurs in small flocks along the coast, numbering as many as 20 individuals. Fall roosts have recently been noted involving 50–

60 birds (Pranty 2001, 2002). In the spring, migrant Gray Kingbirds begin to appear back on the breeding grounds in late March, with migrants having been noted as early as 16 March in the Keys. By mid-April, most of the breeders have arrived in northern part of their breeding range in Florida (Smith and Jackson 2002). Later birds arrive on territory as late as early June. In Jamaica, Gray Kingbirds typically arrive in late March and depart in early October (Downing and Sutton 1990). Garrido and Kirkconnell (2000) note a range of dates between 19 February and 6 October on Cuba, the Isla de Pinos, and the offshore cays.

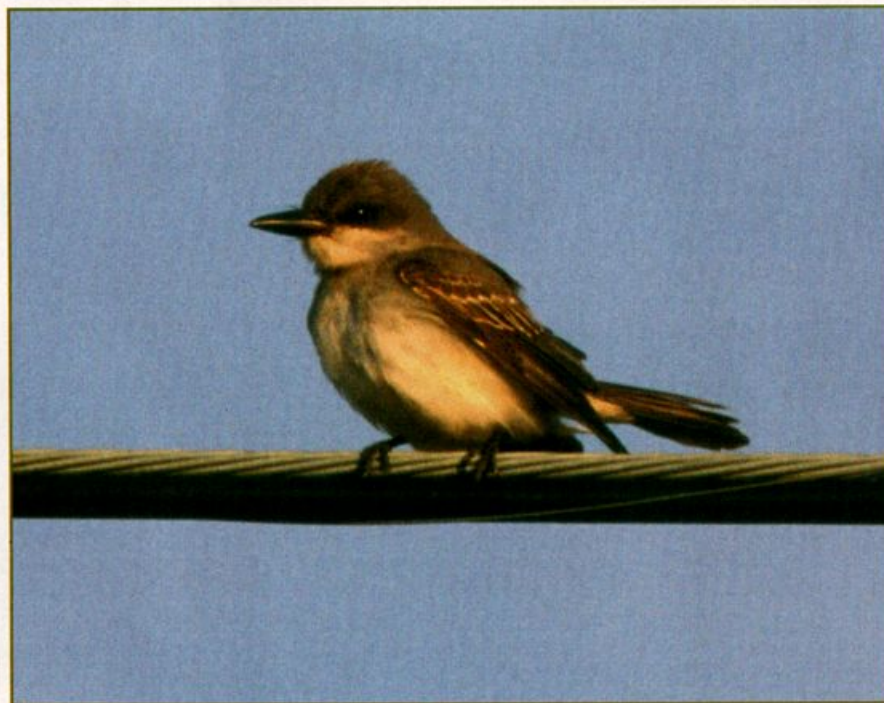
The birds breeding on the periphery of range in Georgia, the Carolinas, Mississippi, and Alabama apparently undertake their fall migration beginning in mid-August. Birds breeding in southern Florida are on the move later in September or early October (Smith and Jackson 2002). October migrants in the Bahamas at Nassau were noted to stop for a few hours to feed, refuel, and rest before continuing migration later in the day (Brudenell-Bruce 1975). Floridian fall migrants have been seen to move in an easterly direction off of Florida (Stevenson and Anderson 1994) and Bahamian birds in a southeasterly direction (Brudenell-Bruce 1975). Whether the routes taken by these migrants involve a direct crossing of the Gulf of Mexico or a series of shorter flights from one island to the next remains unknown (Smith and Jackson 2002), but it seems likely that they island-hop through the Lesser Antilles, the Virgin

Islands, Puerto Rico, and the Bahamas. To the west of Florida, the recent studies of bird migration based on oil-drilling platforms off Florida, Texas, and Louisiana in the Gulf of Mexico have detected small numbers of Gray Kingbirds during spring, most apparently birds off course, but a few possibly birds returning to nesting areas on the Gulf Coast (Figure 3). There are very few data on migration for this species, so future observations here and elsewhere could prove valuable.

## VAGRANCY

Records of vagrant Gray Kingbirds in the U.S.A. and Canada through 31 December 2000 were compiled from a literature review comprising numerous sources, including studies of bird distribution in various states (e. g., Levine 1998, Veit and Petersen 1993), journals of ornithological record (e. g., *North American Birds* and its predecessors; *Chat*) and other sources when deemed reliable (e. g., certain Rare Bird Alerts, and personal communications). For states with established records committees that review sightings of Gray Kingbird, we used those records that had been reviewed and accepted by the appropriate state records committee. In other cases, as with historical records never reviewed by committees but traditionally included in state monographs, we used our own discretion. Data presented in the text do not distinguish between well-documented sight records and records supported by photographic evidence

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**Figure 4.** Unlike the case with other vagrant tyrannids, records of vagrant Gray Kingbirds along the Atlantic coast diminish with almost mathematic precision away from core range. This bird at Kiptopeke, Virginia on 14 November 2000 provided one of a eight records from the state's Eastern Shore; the Carolinas have ten times that many records, whereas islands and peninsulas to the north on the coast can claim only 23 total from Maryland to Massachusetts. Photograph by Brian L. Sullivan.



**TABLE 1.** ALL RECORDS OF VAGRANT GRAY KINGBIRDS, AS DEFINED BY THIS PAPER, BY LOCATION AND DATE, THROUGH DECEMBER 2000.

DATE(S)	LOCATION	NOTES	REFERENCE
29 Sep 1889	Vancouver Island, Cape Beal, BC	*	Godfrey 1986
9-10 Oct 1974	Old Lyme, Old Tyme Twp., CT	imm., ph	Zeranski & Baptist 1990
8-22 Nov 1992	Greenwich Pt., Greenwich Twp., CT		Szantyr et al. 1996
15 May 1999	Carlyle L., Clinton Co., IL	ph (NAB 53:343)	NAB 53:286, 343
10-19 Apr 1986	Grand Isle, Jefferson Par., LA		J.V. Remsen pers. comm.
20 Apr 1994	Grand Isle, Jefferson Par., LA		J.V. Remsen pers. comm.
25 Apr 1964	Creole, 1 mi. south of Cameron, Cameron Par., LA		J.V. Remsen pers. comm.
30 Apr 1984	Grand Terre, LA		J.V. Remsen pers. comm.
30 Apr-1 May 1995	offshore, 20 km offshore from Mississippi River delta, Plaquemines Par., LA		J.V. Remsen pers. comm.
1 May 1970	Peveto Beach Woods, Cameron Par., LA	*?	J.V. Remsen pers. comm.
3 May 1954	Grand Isle, Jefferson Par., LA		J.V. Remsen pers. comm.
3 May 1995	Grand Isle, Jefferson Par., LA		J.V. Remsen pers. comm.
4 May 1995	mouth Baptiste Collette, Cameron Par., LA		J.V. Remsen pers. comm.
5 May 1990	St. Bernard, St. Bernard Par., LA		J.V. Remsen pers. comm.
9-13 May 1984	Grand Isle, Jefferson Par., LA	ph	J.V. Remsen pers. comm.
11 May 1948	offshore, Gulf of Mexico, 32 miles s. of the mouth of the Mississippi River, LA		J.V. Remsen pers. comm.
18 May 1994	Grand Isle, Jefferson Par., LA		J.V. Remsen pers. comm.
18 May 2000	Lafourche Par., LA		NAB 54:293
22-25 May 2000	offshore, Exxon platform Green Canyon 18A, ca. 130 km S Morgan City, Terrebonne Par., LA	ph	B.L. Sullivan pers. comm.
26 May 1991	Grand Isle, Jefferson Par., LA		J.V. Remsen pers. comm.
28 May 1984	Ft. Jackson, Plaquemines Par., LA		J.V. Remsen pers. comm.
30 May 1985	offshore, 20 mi. SSE of SW pass of Mississippi River, LA		J.V. Remsen pers. comm.
23 Oct 1987	nr Thornwell, Jefferson Davis Par., LA	*?	J.V. Remsen pers. comm.
7 Nov-5 Dec 1993	Plaquemines Par., LA		J.V. Remsen pers. comm.
9 Sep 1988	Squibnocket, Martha's Vineyard, Dukes Co., MA	ph (at Mass. Audubon Soc.)	Veit & Petersen 1993
23 Oct 1869	Lynn, Essex Co., MA	*(BMS 17432)	Veit & Petersen 1993
22 Nov 1931	West Newbury, Essex Co., MA	*(PMS 6315)	Veit & Petersen 1993
3 May 1983	Anne Arundel Community College, Anne Arundel Co., MD	ph	Peterjohn & Davis 1996
14 Jun 1975	Girdletree, Worcester Co., MD	ph	Peterjohn & Davis 1996, Holmes 1975
20 Jun 1998	Dameron, Saint Mary's Co., MD	ph (FN 52:444)	MD/DCRC file # [1998-031], ABAFN 52:444
22 Jul 1995	Point Lookout S.P., Saint Mary's Co., MD	+	MD/DCRC file # [1995-035]
14-18 Oct 1984	Oceana Co., MI		McPeck & Adams 1994
12 Mar 1957	Buxton, Dare Co., NC		Parnell & Quay 1962
16 Apr 1959	William B. Umstead SP, Wake Co., NC	Found in an extensive tract of mature upland oak-hickory climax forest during a significant migrant wave	Funderburg & Soots 1959
26 Apr 1975	Morehead City, Carteret Co., NC		Chat 39:79
30 Apr 1994	Stacy, Carteret Co., NC		Chat 59:79
early Apr 1993	Sunset Beach, Brunswick Co., NC	ph	Chat 58:65
9 May-2 Jul 1998	Cape Lookout, Carteret Co., NC	nesting?, possibly two on 2 Jul	Chat 63:41
16 May 1978	Atlantic Beach, Carteret Co., NC		Chat 42:87
18 May 1973	Cape Hatteras, Buxton Woods Trail, Dare Co., NC		Chat 37:109
18 May 1985	Eagle I., nr Wilmington, Brunswick Co., NC		Chat 49:104
18 May-late Jun 1996	Ft. Caswell, Brunswick Co., NC	nesting; on nest in June but success or failure not doc'd, first bird present from 18 May, second bird arrived 1 Jun	Chat 61:63, 125
18 May-late Jun 1997	Ft. Caswell, Brunswick Co., NC	nesting, returned to Ft. Caswell, "where one bird was found sitting on a nest May 18"; ph of nest w/ 2 eggs by Wayne Irvin; nest success was not determined. One bird continued until at least 6/21/1997.	Chat 61:286, 62:45
19 May 1986	Pea I. Coast Guard Stn., Dare Co., NC		Chat 51:55
19 May 1988	south of Avon, Dare Co., NC	ph in NCSM	Chat 53:48
20 May 1999	Cape Hatteras, Dare Co., NC		Chat 63:188
22 May 1988	Bogue Banks, Carteret Co., NC		Chat 53:75
23 May 1980	Ft. Fisher, New Hanover Co., NC		Chat 44:116
24-25 May 1993	Portsmouth I., Carteret Co., NC	ph	Chat 58:65
26-28 May 1997	Buxton, Dare Co., NC		Chat 61:286
27 May 1991	Bodie I. Lighthouse, Dare Co., NC		Chat 56:67
29 May 1959	Southport, Brunswick Co., NC	probably a returning bird from nesting pair of 1957-58, possibly remained to nest but not reported again	Funderburg & Soots 1959
29 May 1999	Cedar I. Ferry terminal, Carteret Co., NC		Chat 63:188
31 May 1982	Bodie I., Dare Co., NC		Chat 46:120
31 May 1982	Cape Hatteras, Dare Co., NC		Chat 46:120
1 Jun 1994	Buxton, Dare Co., NC		Chat 59:79
3 Jun 1977	Atlantic Beach, Carteret Co., NC		Chat 41:100
4 Jun 1994	Pt. Lookout, Carteret Co., NC		Chat 59:79
5 Jun 1994	Frisco, Dare Co., NC		Chat 59:79
5 Jun 1999	Caswell Beach, Brunswick Co., NC	nesting	Chat 64:30
7 Jun 1982	Topsail I., Pender Co., NC		Chat 47:30
10 Jun 1995	Battery I., nr Southport, Brunswick Co., NC	nesting	Chat 60:75
13 Jun 1975	Topsail Beach, Pender Co., NC		Chat 39:27
22 Jun 1981	northeast of Atlantic, Carteret Co., NC		Chat 46:23
25 Jun 1999	Cape Hatteras, Dare Co., NC		Chat 64:30
27 Jun 1985	Fort Macon SP, Carteret Co., NC		Chat 50:26

28 Jun-23 Aug 1957	Southport, Brunswick Co., NC	nesting?	Funderburg & Soots 1959
25 Jul 1962	Southport, Battery I., Brunswick Co., NC	nesting	Parnell & Quay 1962
5 Aug 1966	N. Wilkesboro, Wilkes Co., NC		Chat 30:111
3 Sep 1973	Pea I. NWR, Dare Co., NC		Chat 38:28
22 Sep 1989	Ft. Fisher, New Hanover Co., NC		Chat 54:95
28 Sep 1974	North River Marsh, nr Morehead City, Carteret Co., NC		Chat 40:20
6 Oct 1979	Cape Hatteras lighthouse, Dare Co., NC	ph	Chat 44:50
20-21 Oct 1993	Buxton, Dare Co., NC	imm., ph	Chat 58:135
spring-summer 1958	Southport, Brunswick Co., NC	nesting pair, probably returning pair from 1957	Grey 1964
30 May 1923	Cape May Point, Cape May Co., NJ		Halliwell et al. 2000
9 Sep 1993	Brigantine NWR, Atlantic Co., NJ		Halliwell et al. 2000
18 Sep 1946	Point Pleasant, Ocean Co., NJ		Bull 1964
18 Sep 1988	S. Cape May Meadows, Cape May Co., NJ	+ (NJBRC)	Halliwell et al. 2000
29 Sep & 3 Oct 1993	S. Cape May Meadows, Cape May Co., NJ	ph	Halliwell et al. 2000
30 Sep 1962	Bound Brook, Somerset Co., NJ	+ (NJBRC)	Halliwell et al. 2000
7 Oct 1997	Sandy Hook, Monmouth Co., NJ	ph	NAB 52:38
29 Apr 1921	Orient, Suffolk Co., NY	ad fem, *(NYSM 25091)	Bull 1974
7 Jun 1930	Jones Beach, Nassau Co., NY		Bull 1974
22 Aug 1930	Long Island, Dyker Beach, Kings Co., NY		Bull 1974
11-12 Sep 1976	Tobay, John F. Kennedy Wildlife Sanctuary, Nassau Co., NY		Levine 1998, Kingbird 26:204
18-19 Sep 1960	Westhampton Beach, Suffolk Co., NY	following Hurricane Donna of 12 Sep	Bull 1974
25 Sep 1989	Montauk, Suffolk Co., NY	staying "a few days"	Levine 1998, Kingbird 40:56
28 Oct-4 Nov 1992	Tomhannock Res., Rensselaer Co., NY		Levine 1998, Kingbird 43:72
31 Oct-4 Nov 1987	Tyre, Seneca Co., NY		Levine 1998, NYSARC 1988
?? ?? 1874	Setauket, Suffolk Co., NY	* lost; according to Griscom(1923:228) "one was taken...but is without further details." Bull (1964) gives 1874 as the year	Griscom 1923, Bull 1974
26 Jul 1986	Point Pelee National Park, Essex Co., ON	reported as juv.	Wormington 1987
4 Oct 1994	Hawk Cliff, Elgin Co., ON	imm., ph (FN 49:43)	Pittaway 1995
5 Oct 1996	Sturgeon Creek, nr Pt. Pelee, Essex Co., ON	imm.	Dobos 1997
29 Oct 1970	Hay Bay, nr Kingston, Lennox and Addington Cos. ON	imm.	Hughes 1971
31 Oct 1982	Ottawa-Carleton Regional Municipality, nr Ottawa, Carleton Co., ON	ph	James 1984
31 Mar 1977	Isle of Palms, Charleston Co., SC		Chat 41:100
9 Apr 1964	Edisto Beach, Colleton Co., SC		Chat 28 (2)
17 Apr 1973	Sullivan's I., Charleston Co., SC		Chat 37:88
21 Apr 1963	Hunting Island State Park, Beaufort Co., SC	2 birds seen together	Chat 27:58
23 Apr 1972	Charleston, Mt. Pleasant, Charleston Co., SC		Chat 36:83
23 Apr 1992	Georgetown, Georgetown Co., SC		Chat 57:60

28 Apr 1966	Hilton Head I., Beaufort Co., SC		Potter 1966
29 Apr 1979	Awendaw L., nr Charleston, Charleston Co., SC	another or the same was seen later in the week near McClellanville	Chat 43:99
5 May 1968	Edisto Beach, Colleton Co., SC		Chat 32:80
11-13 May 1984	Fripp I., Beaufort Co., SC	pair	McNair & Post 1993
13 May 1961	Edisto Beach, Colleton Co., SC		Chat 25:96
15 May 1997	Savannah Spoil Site, Jasper Co., SC		Chat 61:286
19-30 May 1963	Edisto Beach, Colleton Co., SC		Chat 27:82
20 May 1975	McClellanville, Charleston Co., SC		Chat 39:97
20 May 1979	Sullivan's I., Charleston Co., SC		Chat 43:99
21 May 1974	Sullivan's I., Charleston Co., SC		Chat 38:97
24 May 1962	Hunting I., Beaufort Co., SC		Chat 26:81
24 May 1962	Parris I. golf course, Beaufort Co., SC		Chat 26:81
25 May 1997	Edisto Beach, Colleton Co., SC		Chat 61:286
15 Jun 1962	Folly I., Charleston Co., SC		Chat 26:81
20 Jun 1968	Isle of Palms, Charleston Co., SC		Chat 32:63
?? Jun-13 Jul 1993	Debidue Beach, Georgetown Co., SC	nesting, pair and imm. present at least 13 Jul	Davis 1993
21 Jul 1962	Beaufort Co., SC		Chat 26:103
31 Jul 1980	nr Georgetown, SC		Chat 45:52
7 Aug 1976	nr L. Moultrie, Berkeley Co., SC		Chat 41:54
22 Aug 1996	Buckhall Landing Campground, Awendaw, Charleston Co., SC		Chat 61:214
28 Aug 1997	Hilton Head I., Beaufort, SC		Chat 62:136
18 Sep 1999	Aiken Co., SC	possibly arrived with Hurricane Floyd	Bailey 2001
26 Sep 1926	no location data, SC		Post & Gauthreaux 1989
26 Sep 1976	Kiawah I., Charleston Co., SC		Chat 41:54
25 Oct 1980	Santee NWR, Clarendon Co., SC		Chat 45:52
27-28 Oct 1989	Greeleyville, Williamsburg Co., SC		McNair & Post 1993
28 Oct 2000	James I., Charleston Co., SC		Chat 65:79
early Oct 1993	Moore's Landing, Charleston Co., SC		Chat 58:135
19 Nov 1956	Savannah River Plant area, Aiken Co., SC		Odum and Norris 1957
24 Apr 1974	West Galveston I., Galveston Co., TX	ph (TPRF 323)	AB 28:824
23 May-1 Jun 1992	Corpus Christi, Nueces Co., TX	ph (TPRF 1982)	TBRC 1992-74, AB 46:449
31 Aug 1951	Rockport, Aransas Co., TX		TBRC 1988-218, AFN 6:27, Oberholser 1974
28 Apr 1990	Virginia Beach, VA		AB 44:409
18 May 1978	Chesapeake Bay Bridge-Tunnel, VA	ph	Kain 1987
2 Jul 1977	Chincoteague NWR, Accomack Co., VA		Kain 1987
19 Sep 1999	nr Lynnhaven Inlet, Virginia Beach, VA		NAB 54:39
24 Sep 1994	Chincoteague NWR, Accomack Co., VA	ph	FN 49:32
30 Sep 1997	Back Bay NWR, Virginia Beach, VA	ph, w/ a Western Kingbird	R. Simpson pers. comm.
2 Oct 1984	Chincoteague NWR, Accomack Co., VA		Kain 1987
10 Oct 2000	N of Capeville on Rte. 600, Northampton Co., VA		NAB 55:38
29 Oct 1999	Sunset Beach, Northampton Co., VA		NAB 54:39
12-14 Nov 1994	N of Kiptopeke SP, Northampton Co., VA	imm., ph (Armistead 1995)	FN 49:32
13-25 Nov 2000	1.4 km N of Eastern Shore of Virginia NWR, Northampton Co., VA	imm., ph, video	NAB 55:38

**Table 2.** Records of vagrant Gray Kingbirds, summarized by season and state/province through December 2000. All records have been endorsed by the appropriate state records committees, except for those in the states of Virginia and the Carolinas, which do not review all records of the species. Note also that while July records are listed in the fall section, they (along with late June and early August) appear to fall into a separate pattern not allied well with well-developed spring or fall patterns.

State	Total number of records	Spring records	Fall records
Massachusetts	3	0	3 – Sep, Oct, Nov
Connecticut	2	0	2 – Oct, Nov
New York	9	2 – Apr, Jun	6 – Aug, Sep (3), Oct (2)
New Jersey	7	1 – May	6 – Sep (5), Oct
Maryland	4	3 – May, Jun (2)	1 – Jul
Virginia	11	2 – Apr, May	9 – Jul, Sep (3), Oct (3), Nov (2)
North Carolina	43	36 – Mar, Apr (4), May (19), Jun (12)	7 – Jul, Aug, Sep (3), Oct (2)
South Carolina	35	22 – Mar, Apr (7), May (11), Jun (3)	13 – Jul (2), Aug (3), Sep (3), Oct (4), Nov (1)
Louisiana	20	18 – Apr (5), May (13)	2 – Oct, Nov
Texas	3	2 – Apr, May	1 – Aug
Ontario	5	0	5 – Jul, Oct (4)
Illinois	1	1 – May	0
Michigan	1	0	1 – Oct
British Columbia	1	0	1 – Sep
Bermuda	31+	12 – Mar, Apr (6; 8 birds), May (5)	19 – Sep (9; 10 birds), Oct (9; 11 birds), Nov

**Table 3.** Inland records of vagrant Gray Kingbirds through 2000, by state/province.

State/Province	Number of records	Spring records	Summer records	Fall records
Georgia	1	0	0	1 – Oct
South Carolina	5	0	1 – Aug	1 – Sep, 2 – Oct, 1 – Nov
North Carolina	2	1 – Apr	1 – Jul	0
New York	2	0	0	2 – Oct
Ontario	5	0	1 – Jul	4 – Oct
Illinois	1	1 – May	0	0
Michigan	1	0	0	1 – Oct
British Columbia	1	0	0	1 – Sep

continued from page 151

or specimen, but the level of documentation can be found in Table 1. Gray Kingbird records by state are listed in detail in Table 1 and are summarized in Table 2. A published record for Wisconsin (A.O.U. 2000) is apparently in error, as there are no records or reports from that state (L. Semo, M. Korducki, J. Frank, R. Domagalski, pers. comm.). Although some have been published, additional reports from Nova Scotia (2), New Brunswick (1), Maine (1), and Delaware (1) were considered inadequately documented, as were additional records from Ontario (1), New Jersey (1), Virginia (2), and Texas (1).

Vagrant Gray Kingbirds occur almost exclusively along the immediate coast (Table 1). Of the 165 vagrant records compiled

herein, including 78 from the Carolinas, all but 19 have been along the immediate coast or within a few kilometers of the immediate coast. We do not consider the three records from Maryland's Chesapeake Bay shore to represent inland occurrences and have instead included those with other coastal individuals. Individuals moving northward along the coast may be reluctant to cross Chesapeake Bay and hug the Western Shore, bringing them far into Chesapeake Bay.

The geography of the East Coast would appear to influence the distribution of vagrant Gray Kingbirds (Tables 1, 2, 3). Cape Hatteras, Long Island, Cape Cod, southern Nova Scotia, and Newfoundland (and to a lesser extent, Cape May) project well to the east, forming east-facing fronts to intercept

birds making over-water movements. These areas represent the first potential landfall for migrant birds flying over the open ocean. Consequently, these areas have produced a plethora of records of vagrant landbirds along the East Coast. Records of coastal species such as Gray Kingbird would seem especially likely to cluster at such coastal concentration points. The bulk of Gray Kingbird records north of South Carolina hail from the Outer Banks of North Carolina (25), the Virginia Eastern Shore (8), Cape May, New Jersey (3), and Long Island, New York (5). The number of Gray Kingbird records by state appears to correspond stepwise to each of these barriers along the East Coast: south of the Outer Banks, the species has been a nearly annual vagrant since 1960, from Cape Hatteras to Long Island there have been 26 records since 1950, while north of Long Island there have been just three records since 1950. On the Gulf Coast of Louisiana and Texas, barrier islands and peninsulas jutting into the Gulf have also produced most of the records. Grand Isle, Louisiana, one of the more renowned vagrant traps in that state, has enjoyed the greatest number of Gray Kingbird records for a single site (7). It is noteworthy, too, that extremely limited coverage of offshore oil platforms, which serve as islands to migrating birds, has produced an additional four records.

Observer effort, the location of population centers, and the ease of access to coastal areas play a major role in when and where vagrant birds are detected, and it is worth noting that the state-by-state coverage is far from uniform in these respects. Coastal New Jersey, New York, Connecticut, and Massachusetts have had exceptionally good coverage over the years and have long ornithological histories beginning in the late 1800s. By contrast the coasts of Maryland, Delaware, and Virginia have been relatively poorly covered but have been given increased attention in recent years. This uneven coverage may be one additional reason for the disproportionately high number of records in New Jersey and New York, but it is worth noting that those states also have extensive coastlines that are easily accessed. The majority of the Atlantic coastline in Maryland (64 km) and Virginia (176 km) is protected by barrier islands that are accessible only by boat; the 6400 km of Chesapeake Bay coastline is also largely privately owned and difficult of access. Along the Gulf Coast, coverage is more even geographically but less consistent between spring and fall. There has been tremendous recent interest in witnessing the trans-Gulf migration during April and May, but coverage of the Gulf Coast migrant traps drops off sharply thereafter, and fall coverage is comparatively poor in these areas. By contrast, coverage along the East Coast may be biased

towards increased coverage in the fall, with less coverage in spring.

In addition to records from Brazil and Jiménez, Costa Rica, there is a record of Gray Kingbird from Puerto Pitahaya, El Oro, Ecuador, 16 April 1993 (Ridgely and Greenfield 2001). The paucity of records in other parts of the Americas is likely attributable to comparatively sparse coverage in equatorial Brazil, northeastern Mexico, and along the Pacific Coast of Central America. However, Gray Kingbird is a frequent vagrant to Bermuda. The Bermudas' location in the middle of the North Atlantic Ocean makes the archipelago a classic vagrant trap, and to date there are at least 31 records of Gray Kingbird (E. Amos, A. Dobson, pers. comm.). Specific dates available for 31 Bermuda records better fit the overall pattern for the East Coast (cf. Figure 9), where early-fall records predominate, in contrast to the pattern for the Carolinas (cf. Figure 8). This suggests that the pattern is more consistent with long-range vagrancy rather than the short-range overshooting that predominates in the Carolinas (to which breeders from northern Florida and Georgia presumably arrive, having overshoot their breeding grounds).

Records of vagrant Gray Kingbirds have been increasing with time (Figure 5). This increase in the number of records may be due primarily to the growth in popularity of birding (Cordell and Herbert 2002) and to refinements in seeking out unusual and vagrant species. The marked increase in the number of records beginning in the 1970s is concurrent with the first significant increases in the popularity of birding. It is probably impossible to tell if this increase in records over the years reflects the growth in the number of field observers or reflects an actual increase in the overall numbers of Gray Kingbirds. While Gray Kingbird records along the Atlantic Coast north of North Carolina have been accumulating slowly, there appears to be a flood of records in North and South Carolina beginning around 1958. Gray Kingbird has since been found almost annually in those states. The first modern breeding record in South Carolina in 1993 and the first breeding records in North Carolina in 1957-1958 and 1996-1997 may be a hint of a minor range extension along the Atlantic Coast. Online density maps shown by J. Price (1995; <<http://www.npwr.usgs.gov/resource/distr/birds/breedrng/breedrng.htm>>) further suggest a slight range expansion. Stevenson and Anderson (1994), however, suggest that Gray Kingbird has declined within Florida as a breeder in recent decades, noting a decline in two of the three (Plantation Key and Boca Raton) Breeding Bird Surveys where it was recorded more than once. At the third (Fort Walton Beach), it has not been recorded since 1994 (Smith and Jackson 2002). Finally, the

current trend toward global warming may also have loosened the climatological constraints on breeding range, allowing birds to breed more often at more northerly latitudes.

### Length of stay

Vagrant Gray Kingbirds are conspicuous and tend to attract significant attention from birders, thus it is unlikely that a vagrant Gray Kingbird would not be found by birders in ensuing days unless it has moved on or died. The date of initial appearance is always less certain, as any given bird may have been present in the area for days or even weeks prior to its discovery. However, given how few birds remain for extended periods (see below), it is probable that many Gray Kingbirds, especially those in spring and early fall, are in fact present for just one day.

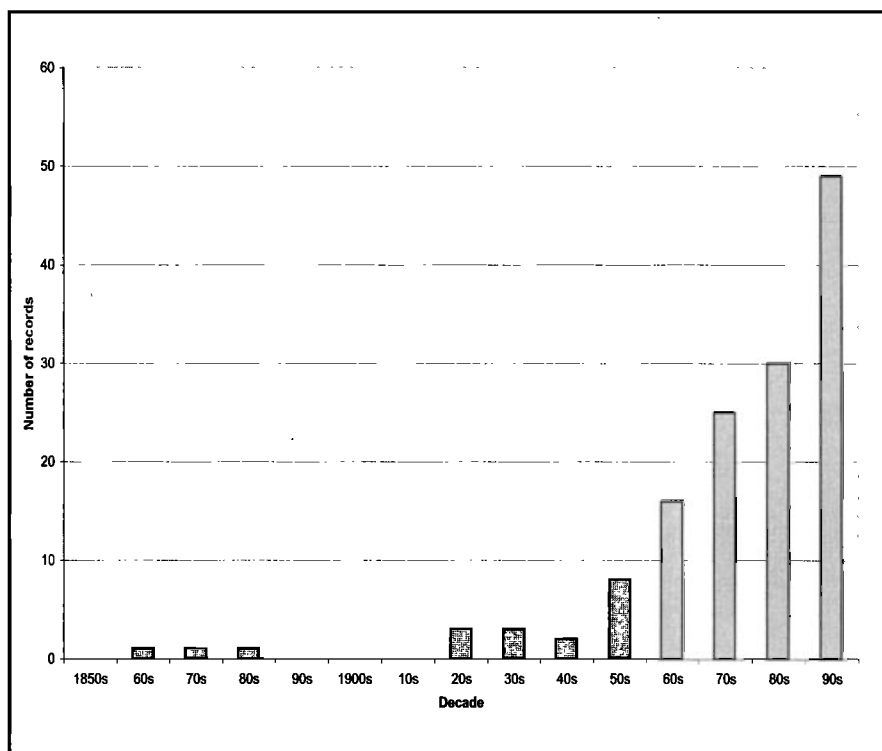
Excluding records of breeding birds, those of collected birds, and the two records before 1900, just 24 birds have been noted on more than one day. Of the 60 fall vagrant records, 14 records have spanned more than one day, all of them East Coast occurrences (except for single Louisiana and Michigan records). In general, vagrants on the East Coast are rarely seen for more than one day in the early part of the fall but regularly remain for longer stays later in the season, especially after October (P. E. Lehman, pers. comm.). This pattern is evident in Gray Kingbird vagrancy. Of the 31 vagrant records between 22 August and 10 October, 26 (84%) stayed

just one day, while the other 5 birds had stays of 2-5 days (mean=2.6). Of the 22 records between 11 October and 5 December, nine have stayed for more than one day and four have stayed one week or more (mean=7.4 days), three of those in November. Two of the longest lingerers have also been the latest: 13-25 November 2000 in Virginia and 7 November to 5 December 1993 in Louisiana. The tendency for late-season vagrants to stay for longer periods is probably due to their generally lower migratory fitness at that time. Insect food is much scarcer by November, and a vagrant may have a much more difficult time rebuilding fat reserves from a long migratory flight, which may even have involved reorientation after being caught over open water at dawn.

Of the 72 spring records, just nine birds have been noted on more than one day (mean=6.7 days), and all have been Carolina or Gulf Coast records (three from Louisiana, one from Texas). The 1986 Grand Isle bird, which was seen for 10 days, was notably the earliest spring arrival (other than an 1850 Bermuda record), perhaps suggesting that the more stressful early-season conditions prohibited the bird from continuing its migration. Other records, especially from the Carolinas, may pertain to prospecting nesters.

### Seasonal distribution of records

Vagrant Gray Kingbirds tend to occur in two primary periods: spring (late March to early



**Figure 5. Annual distribution of records: number of twentieth-century records of vagrant Gray Kingbirds, graphed by decade. The sharp increase in records in the final third of the century is largely attributable to the rise of birding's popularity during the same period but may also reflect the minor expansion in the species's range.**



June) and fall (late August to mid-November). These peaks correspond strongly with migration peaks reported by other authors. Four anomalous records in July and early August do not fit well with known patterns of movement in this species.

Data concerning the age of vagrants might prove useful for understanding causes of their vagrancy. Unfortunately, ageing of Gray Kingbird is relatively difficult. The shape of the sixth through tenth (p10 outermost) primaries differs by age and sex, being narrow and tapered in juveniles (August through March) and distinctly notched in adults (more so on adult males; Pyle 1997). This requires excellent views to ascertain but is sometimes possible in the field especially by viewing the far wing of a bird sitting on a telephone wire. Buff tips to primary coverts, or especially worn primary coverts (January through November) should be indicative of second-year individuals (Pyle 1997). We were able to obtain ageing information for only eight vagrant Gray Kingbird records. Those records included: one adult female collected at Orient Point, NY 29 April 1921 (Levine 1998), and six juveniles from 4 October through 25 November. A final record, from Point Pelee, ON 26 July 1986 was reported as a juvenile by Wormington (1987), but the date is well-enough removed from the other juveniles that reassessment of the documentation may be warranted.

Spring vagrants ( $n=72$ ) occur from late March to mid-June, with the strongest peak from late April to late May (Figure 6). Fall vagrants ( $n=60$ ) span the period from late August to late November, with a strong peak from mid-September to late October (Figure 6). These peaks correspond well with the spring migration peak noted by other authors

(e. g., Stevenson and Anderson 1994, Wetmore 1973, Smith and Jackson 2002). Stevenson and Anderson (1994) even note laggard individuals migrating through the first week of June in Florida. Three July records outside the Carolinas are anomalous. Note that the spring peak is divided into a late April to early May peak and a late May peak. Both the spring and fall peaks are bimodal, which may suggest differential migration timing by birds of different sex, age classes, or populations. Since it is well known that males of many species migrate earlier than females in spring, it is possible that this suggestion of a bimodal peak is due to the earlier migration peak of males versus females (but note that the early 29 April 1921 record from Long Island was of an adult female). Interestingly, one bird of the Fort Caswell, NC nesting pair had arrived by 18 May, while the other individual was not noted until 1 June. It is also possible, and perhaps likely, that the bimodal spring pattern reflects birder activity. On the North Carolina coast, there is certainly a major influx of birders over Memorial Day weekend, when pelagic birding trips are popular and shorebird migrants are widespread. Perhaps additional records will help to clarify whether this appearance of a bimodal spring peak is a function of observer effort or a true natural phenomenon.

Fall vagrants occur between late August and mid-November (one exceptional bird in Louisiana remained to early December), with the strongest peak from mid-September to late October (Figure 6). This peak corresponds closely with the fall migration of the species. As is the case for many other vagrants on the East Coast—e. g., Rufous Hummingbird (*Selasphorus rufus*) and Ash-throated Flycatcher (*Myiarchus cinerascens*)—the peak vagrancy season is somewhat

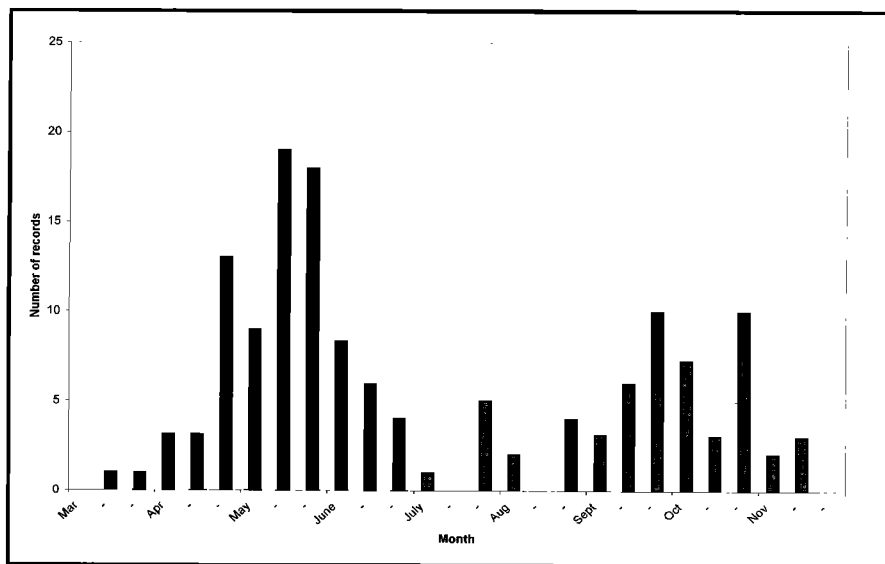
later than the migration peak in other parts of the species' range. The fall peak shows a bimodality similar to that shown in spring, with the mid-September peak dropping off to a mid-October nadir, before rising abruptly in late October, when there are 11 records. The bimodality of the fall peak is much more strongly defined and could very well be due to juveniles undertaking a later migration than adults. It is possible that the September records represent predominantly adult birds while the October records (especially those in late October) refer primarily to juveniles, although we have limited supporting data. The five fall records with ageing information are juveniles 4 October to 25 November. Given that 8 out of 11 inland records occurred after 21 October (and 10 of 11 fall after 29 September)—and that juveniles are well known for making the more egregious navigational errors—it seems likely that these late-season inland birds are predominantly juveniles. Observers of Gray Kingbirds out of range can help to clarify this suspicion by ageing the birds they find.

### Regional examinations

When the records are examined regionally, some significant departures from the overall pattern are apparent. Figure 7 shows records from Louisiana and Texas, Figure 8 shows records from North and South Carolina, and Figure 9 shows records from the East Coast and inland areas. The majority of the spring records hail from the Gulf Coast (Figure 7), while most fall records (Figure 9) are from the East Coast or inland. The Carolinas show a pattern most closely matched by the Gulf Coast, with predominantly spring records but significant fall vagrancy as well.

Of 23 records from Louisiana and Texas, 20 are from the spring (10 April to 30 May). There are just three fall records (31 August, 23 October, 7 November to 5 December). There are no Gulf Coast records for mid-summer west of Mississippi. The spring records peak from late April to late May and mirror the bimodal peak shown by the overall pattern, with a primary peak in late April and early May, a nadir in mid-May, and a secondary peak in late May (Figure 7).

The 72 records from the coastal Carolinas include 10 records of birds that we considered nesters, or probable nesters, which were excluded from the analysis. These include three records from Fort Caswell, NC (1996, 1997, 1999), five records from Southport/Battery Island, NC (1957, 1958, 1959, 1962, 1995), and one from Debidue Beach, SC (1993). One of the remaining records (Fripp Island, SC, in 1984) involved a pair and may have pertained to nesting birds but is considered here with the migrant birds. The remaining 62 records include 45 from spring (12 March to 7 June). These spring records sug-



**Figure 6.** Temporal distribution of records of vagrant Gray Kingbirds, graphed by thirds of months. Each month is separated into three periods (date ranges 1-10, 11-20, and 21 to month's end), and records are arranged by date of first appearance. (Birds remaining for extended periods are graphed only on the date of first appearance.)



gest the bimodal peak noticed in other regions, but the pattern is less pronounced, perhaps because the vagrant records are obscured by occasional rare breeders. The 10 mid-summer records between 13 June and 7 August may represent nesting birds, unpaired breeding birds, or simply wandering birds. Surely the species breeds in the Carolinas more frequently than has been noted, and we suspect that numerous nestings by this species have gone undetected in these states, especially given the relative inaccessibility of some of the barrier islands that provide the most favorable breeding habitat. It may be, however, that some proportion of these mid-summer records represent wandering summer birds, especially given the far-flung vagrants that have occurred at those seasons in Virginia, Maryland, and Ontario. Still, we feel that these mid-summer records are better considered members of a very low-density breeding population unless it can be shown that they represent summer wanderers. The 12 fall records peak much earlier than those from farther north along the Atlantic Coast, with five records from 22 September through 5 October, and just two later records. It is notable that North Carolina's Outer Banks region does not have more records from late October and early November, especially given the four records from coastal Virginia during this same period; this may be an artifact of differences in observer coverage.

There are 36 records along the Atlantic Coast north of the Carolinas. Just six records are from spring, and these fall in a somewhat narrower window from 28 April to 7 June. Even this small sample suggests the bimodal spring peaks, though, with half of the records 28 April–3 May and the other three 18 May–7 June. Four are from mid-summer, including, curiously, three of Maryland's four records (14 June, 20 June, 22 July) and one just to the south in Chincoteague, VA (2 July). These records, combined with the anomalous 26 July record from Ontario, suggest that Gray Kingbirds continue to wander even outside of their primary migration seasons.

Away from the Atlantic and Gulf coasts, there has been a total of 18 records, though only eight have been away from the southeastern United States (Georgia, South Carolina, and North Carolina). The two spring records include one 16 April in Wake County, NC and one 15 May in Clinton County, IL. Three anomalous summer records hail from Point Pelee, ON 26 July, Berkeley County, SC 7 August, and Wilkes County, NC 5 August. Most inland records come from the fall (mostly the late fall), with 13 records spanning 18 September–19 November. Of those, all are in October except for singles in Aiken County, SC and British Columbia. The October records all fall between 14 and 31 October, with seven occurring in the 11-day

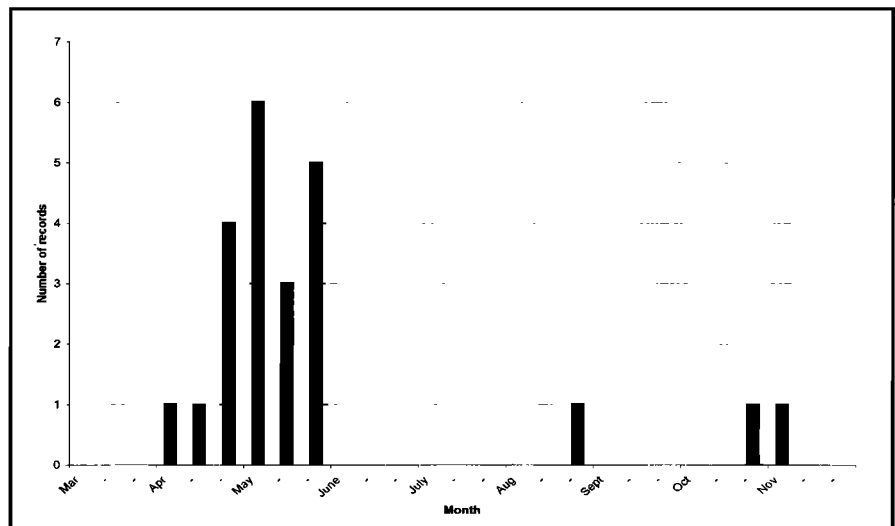


Figure 7. Temporal distribution of records of vagrant Gray Kingbirds along the western Gulf Coast (Louisiana and Texas).

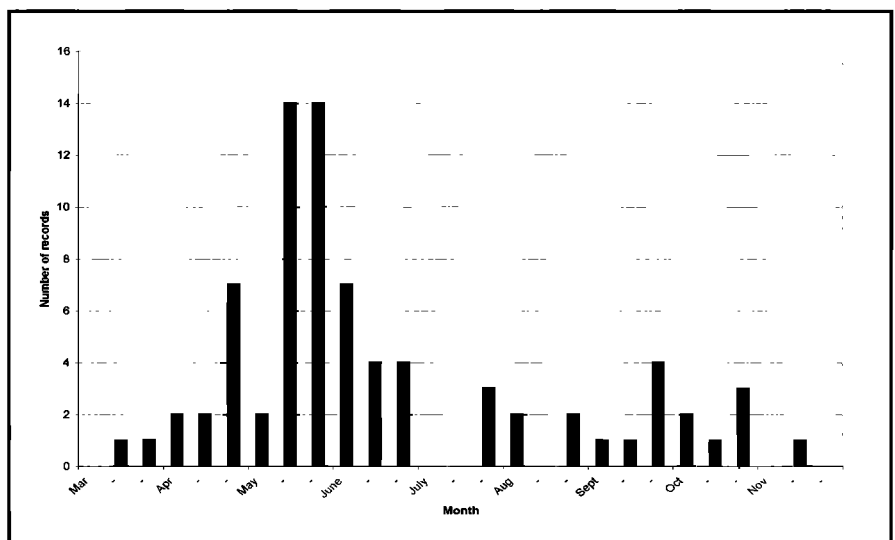


Figure 8. Temporal distribution of records of vagrant Gray Kingbirds in coastal North and South Carolina.

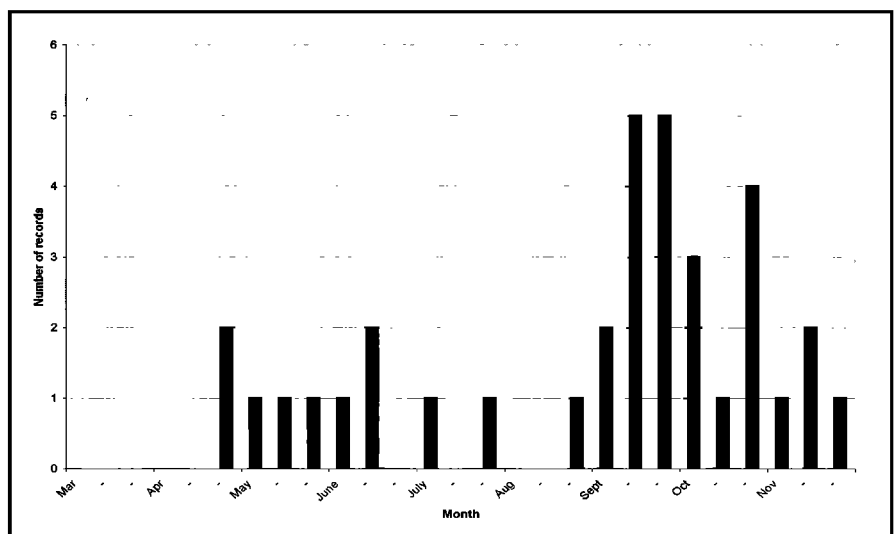


Figure 9. Temporal distribution of vagrant Gray Kingbirds along the East Coast north of North Carolina.



period 21-31 October. Three of the October records are from the southeastern states, but others are among the farthest-flung Gray Kingbirds ever recorded: one in Oceana County, Michigan, 14-18 October 1984; singles in upstate New York at Tomhannock Reservoir 28 October to 4 November 1992 and Seneca County 31 October to 4 November 1987; and four of Ontario's five records.

One record that stands alone—and is far and away the most remarkable episode of vagrancy in Gray Kingbird—involves the lone individual that has reached the West Coast, collected at Cape Beal, Vancouver Island, British Columbia 29 September 1889 (Fannin 1891, Brooks and Swarth 1925, Campbell et al. 1997). As Mlodinow (2000) points out, this individual, “was 3800 km from [its] usual range [and] about 3200 km from the next nearest record.” This is a monumental navigational error. Late September corresponds well with the fall vagrancy peak shown elsewhere, primarily along the East Coast of North America (Table 2; Figure 8).

### CAUSES OF VAGRANCY

The Gray Kingbird peaks above match two well-known causes of vagrancy: spring overshooting and autumn 180° misorientation. Interestingly, these same patterns are seen in Tropical Kingbird, which occurs on the Gulf Coast primarily as a spring overshoot and on the Pacific Coast (and to a lesser extent, the Atlantic Coast) almost exclusively from mid-September to mid-November (Mlodinow 1998) as a result of 180° misorientation.

### Spring

The majority of records along the Gulf Coast (Louisiana and Texas) and the coastal Carolinas occur in spring, and these records undoubtedly are the result of spring overshooting. Spring overshooting is a recognized and well-documented pattern of vagrancy in landbirds and is especially well documented in the British Isles (Vinicombe and Cottridge 1996). In discussing spring overshooting in Britain, Vinicombe and Cottridge (1996) consider short-range overshooting and long-range overshooting separately. They consider short-range overshooters to be birds that miss their breeding grounds by a small margin, usually because of following winds. They believe these birds are usually second-calendar-year birds on their first northward migration. In contrast, long-range overshooters involve much greater distances (up to 1500 km) beyond their breeding range, clearly the result of a physiological malfunction, perhaps failure to “turn off” the migratory impulse at the proper time. Interestingly, they note that such birds are most often males. Along the East Coast, some of the better examples of spring overshooting involve Indigo Bunting

(*Passerina cyanea*), Blue Grosbeak (*P. caerulea*), and, rarely, Painted Bunting (*P. ciris*). The former two species turn up annually well north of their breeding range in New England and Atlantic Canada, especially along the coast and on offshore islands, where favorable conditions occasionally produce fallouts of these species (Veit and Petersen 1993). The extent to which weather patterns are responsible for such fallouts is unclear; a number of species of wood-warblers, vireos, and flycatchers share this pattern. Coastal individuals may turn up far to the north by reorienting themselves incorrectly after drifting offshore overnight. Similarly, both Mississippi Kite (*Ictinia mississippiensis*) and Swallow-tailed Kite (*Elanoides forficatus*) have a long history as spring overshoots along the Atlantic Coast, especially at coastal areas and promontories that face north (e. g., Fort Smallwood Park, Anne Arundel County, MD), east (e. g., Cape Hatteras, NC), or south (e. g., Cape May, NJ).

Unfortunately, comparatively little is known about the migratory pathways of Gray Kingbird, which could shed considerable light on the episodes of spring overshooting outlined above. It is believed that most Gray Kingbirds move east-southeast along the Caribbean island chain during the fall and return west-northwest toward Cuba, Jamaica, the Bahamas, and Florida via the same route. It is unknown if breeders in northern Florida, Georgia, and the Carolinas fly over water from the Lesser Antilles or fly to the Florida coast and thence move up the coast to their breeding areas. The west-northwesterly trajectory in the spring might bring an individual to the Carolina coast should it stray slightly north of its course. Spring overshooting along the Atlantic Coast is consistent with this pattern. The vast majority of Atlantic Coast records in spring (n=45) hail from the Carolinas, which are only slightly beyond the breeding grounds for this species and only slightly off-course for a bird on a west-northwesterly course from a Puerto Rican stopover site to Florida breeding grounds. The predominant weather pattern in spring and summer is a stable high-pressure feature over the Sargasso Sea area (“Bermuda High”), which produces southerly or southeasterly winds in this area. Such winds might steer an off-course kingbird towards the Carolina coast.

The six spring records from farther up the Atlantic Coast, including two from Virginia, one from Maryland, one from New Jersey, and two from Long Island, NY, show that on rare occasion this species can turn up even farther out of range in spring. Similarly, a bird that misses its target while heading to Florida from Honduras might make its next landfall in eastern Louisiana. If some proportion of Cuban breeders moves along the east coast of

Central America and the Yucatan, those birds too may account for some proportion of the spring records along the Gulf Coast. It is not known if nesters along the Florida Gulf Coast transect the Florida peninsula, encircle the tip of Florida, or originate from populations that winter in the western Caribbean and move northward along the coast of Central America and the Yucatan to their breeding areas. Indeed, it may be that these western Caribbean birds produce the majority of records along the Gulf Coast. Such a bird that misses its target and finds itself over the open water of the Gulf of Mexico may be likely to fly downwind until it makes landfall, and some proportion of birds that reorient in this manner would then undoubtedly appear in Louisiana and/or Texas. This is a question in need of study; our speculations might be strengthened by migration data from western Cuba or banding recoveries that indicate where the various island populations of Gray Kingbird migrate or spend the winter.

The strong coastal affinities of this bird as a breeder probably account for the scarcity of inland records at this season. The most exceptional records of this group involve single inland individuals in Wake County, NC 16 April 1959 and in Clinton County, IL 15 May 1999. The latter record may be an extreme example of one of the western Caribbean wintering birds that began migration on favorable southerly winds but missed its breeding grounds (in Cuba?) and continued flying downwind over the Gulf of Mexico, eventually being transported well inland in the process. It is possible that cloudy and/or rainy conditions prevailed when the bird neared the coast, as this might cause it to continue with its migration into inland Illinois rather than setting down at a coastal site

### Fall

Veit and Petersen (1993) summarize work by DeSante (1973, 1983), which distinguishes between disoriented birds and misoriented birds. Disoriented birds are those that have failed to inherit any means of navigation and tend to disperse in random directions. Misoriented birds are those that have inherited faulty navigational systems, for example birds that confuse east with west or north with south. DeSante (1973) and Roberson (1980) stress that mirror-image misorientation which involves birds confusing east and west compass bearings, is a major factor in passerine vagrancy to the West Coast. North American passerines that fly north during fall migration and turn up north of their breeding range are believed to be birds affected by 180° misorientation. What is loosely termed “reverse migration” (various kinds of movement in the direction opposite that of the primary migrational direction of the species) is



well documented in a number of species of landbirds (McLaren 1981, Roberson 1980, Cottridge and Vinicombe 1996, Mlodinow 1998, Lockwood 1999); we use the term "180° misorientation" to refer specifically to the movement of migrant passerines in the fall and follow DeSante (1973, 1983) in assuming that the causes for this misorientation lie in the bird's navigational system.

Flycatchers in particular seem to be especially prone to 180° misorientation. Tropical Kingbird shows a well-defined pattern of this type of misorientation along the Pacific Coast (and to a lesser extent along the Atlantic Coast; Mlodinow 1998). Other southern flycatchers that match this pattern in fall include: Greater Pewee (*Contopus pertinax*: 34 California records of migrant or wintering birds, all 11 September–10 April); Sulphur-bellied Flycatcher (13 California records, 12 from 13 September–20 October; five East Coast records 21 September–13 November); Vermilion Flycatcher (*Pyrocephalus rubinus*: 11 East Coast records of migrants from 24 September–25 October); Dusky-capped Flycatcher (*Myiarchus tuberculifer*: 60 California records of wintering and migrant birds 4 November–20 May); and Thick-billed Kingbird (*Tyrannus crassirostris*: 15 California records, 14 from 19 October–10 May). Instances of this 180° misorientation are believed to primarily involve hatch-year individuals. In California, however, a significant proportion of tyrannids has wintered successfully, and some birds have returned for subsequent years (e. g., four records of returning Thick-billed Kingbirds, five records of returning Greater Pewees). The pattern shown by the most famous reverse migrant, Fork-tailed Flycatcher, is somewhat more complex. Individuals of this species that reach North America in fall, presumed to be largely representatives of the nominate South American subspecies (Lockwood 1999), clearly seem to be misoriented towards the north instead of the south. However, given that a number of adult birds are involved, and given that these birds will have already (presumably) successfully migrated north to spend the austral summer in northern South America, this pattern does not fit well with the 180° misorientation discussed above.

The pattern shown by Gray Kingbird in fall is more consistent with 180° misorientation. During the fall migration period, Gray Kingbirds have appeared along the length of the Atlantic Coast as well as far inland. It is primarily these misoriented fall individuals that turn up in the more remote localities: Virginia, New Jersey, Long Island in New York, Connecticut, Massachusetts, Nova Scotia, inland to upstate New York, Ontario, and Michigan, and once to British Columbia. The slightly bimodal peak (Figure 2) during this period may distinguish between differing

types of misorientations. The early-season vagrants (mid-August to late September) may refer to adults displaced along their normal migration route by wind or a slightly erroneous navigational system. The late-fall vagrants (late September to late November) almost surely refer primarily to juveniles (especially after mid-October) with 180° misorientations. Few age data exist for vagrant records of Gray Kingbird, but of the individuals that have been aged as juveniles five of six have occurred in the late-fall period from 5 October to 25 November (North Carolina, Virginia, Connecticut, and Ontario), suggesting that inexperienced hatch-year birds are the ones making these navigational errors.

It is noteworthy that a 180° misorientation for a Gray Kingbird that would normally take an east-southeasterly track would lead the misoriented bird to the interior southeastern United States, rather than along the Atlantic Coast. Note, however, that a bird that confuses north with south could perhaps still correctly orient itself along the east-west axis. If this is the case, Gray Kingbirds that would normally fly southeastward in fall may occasionally misorient toward the northeast, towards the Atlantic Coast as far north as Massachusetts. It is not clear at all that this phenomenon accounts for any East Coast records, however, as the much stronger pattern suggested by Tropical Kingbird on the West Coast (Mlodinow 1998) suggests a true 180° misorientation. It is possible instead that a 180°-misoriented Gray Kingbird would still utilize the coast as a leading line in its migration.

If Gulf Coast records indeed pertain to western Caribbean (Cuban and Jamaican) breeders, then it may be that the eight interior records 14-31 October represent these birds as well. A Florida breeder meant to migrate to the south-southeast might misorient to the west-northwest, bringing it on a vector well south of the extreme northern records in Michigan, Ontario, and upstate New York. Perhaps these birds represent Cuban breeders that might head due south but instead have misoriented in a northerly direction and flown to the Great Lakes region.

The exceptional record from British Columbia is especially interesting. The distance from the Florida panhandle (the most northwesterly regular breeding area) to Trinidad (the most southeasterly regular breeding area) is about 3840 km, a shorter distance than that from Florida to Vancouver Island. If this bird was misoriented to head to the northwest instead of to the southeast, its track would lead essentially straight from Florida to Vancouver Island. Although some kinds of storm systems are known to transport seabirds and other species great distances in the fall, it is essentially inconceivable that any storm track would move from Florida to

British Columbia at this season, and the distance involved is so great that weather-related vagrancy would appear extremely unlikely.

### Midsummer records

The several mid-summer records of Gray Kingbird described above do not fit any obvious pattern of dispersal or vagrancy. Other species of flycatcher (e. g., Tropical Kingbird, Western Kingbird [*Tyrannus verticalis*], and Scissor-tailed Flycatcher [*Tyrannus forficatus*]) show similar tendencies to wander, on a very limited basis, during this same mid-June to mid-August period. These records primarily involve adults, perhaps failed nesters. The Point Pelee record was reported as an "immature," which may indicate a post-fledging dispersal if it was in fact a hatch-year bird, though this is rarely a cause for long-distance vagrancy in passerines. It would be especially helpful if observers in the Carolinas kept careful data on whether birds seen in this period were behaving as migrants or potential breeders, and what age classes they represented.

### The importance of weather

The degree to which weather influences vagrancy has been the subject of considerable debate. In some instances, the influence of weather patterns with arrivals of vagrant landbirds has been very well demonstrated (Elkins 1979, Heil 1981, McLaren 1981, McLaughlin and Curry 2000). Most cases, however, are not nearly as clear-cut. It seems likely that a certain percentage of migrants is misoriented as described above and that the influence of weather is more a secondary factor that does not carry aimless birds out of range but rather aids or guides already misoriented birds in their travels. One record in particular was noted as possibly being the result of the passage of a hurricane: one at Westhampton Beach, Long Island, Suffolk County, NY 18-19 September 1960. Hurricanes are well known for their propensity to displace seabirds but have been implicated in comparatively few instances of landbird vagrancy. Nonetheless, Bull (1964, 1974) suggested that this record may have been the result of storm displacement, as Hurricane Donna passed offshore of Long Island 12-13 September 1960 (Buckley 1960).

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