

REGULAR INSHORE OCCURRENCE OF NON-BREEDING ARCTIC TERNS (*Sterna paradisaea*) DURING SUMMER ON LONG ISLAND, NEW YORK

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Abstract—Forty-one New York State records of Arctic Tern, involving 57 individuals, are presented and analyzed with respect to historical, geographical, seasonal, and age/plumage criteria. The records show pronounced patterns with respect to all four criteria: all but three records are from 1975-2008; coastal Long Island records greatly outnumber those from the mainland and offshore waters combined; summer records from June and July greatly outnumber those from May and those from August–September combined; and immatures in their second or third calendar years of life greatly outnumber adults and juveniles combined. Thus, contrary to published summaries, non-breeding Arctic Terns appear to be regular summer visitors to coastal LI, whereas passage migrants remain poorly known anywhere in the state or its offshore waters. The abrupt recent increase in records of Arctic Tern in NYS is a consequence of a concurrent increase in deliberate searches for immature Arctic Terns around ocean inlets during June and July, a context historically regarded as unfavorable for this species. Moreover, recent, fully documented records of the species from New Jersey contain a higher proportion of June and July dates than do older, unreviewed sight reports, and specimen records from southeastern North America contain a higher proportion of second calendar year birds than do sight reports. These patterns suggest that summering non-breeders were overlooked in the past, and that the recent surge in records in NYS more likely reflects improved detection rather than a change in rate of occurrence.

Perhaps more than any other species, Arctic Tern (*S. paradisaea*) has frustrated the efforts of field observers seeking to understand its status in New York State and adjacent regions. An abundant circum-boreal breeder and trans-hemispheric migrant, it has been described as “accidental” along the United States’ Atlantic coast, west and south of its southernmost breeding sites in Massachusetts (American Ornithologists’ Union 1957), and as a “very rare vagrant” to NYS (Cooper 1998). As recently as 1974, Bull (1974) knew the species exclusively from three old specimens, two from Long Island dating back to 1884 and 1897, and one from Cayuga Lake, in central NYS, from 1916. No other long-distance migrant of comparable global abundance and distribution remained so poorly known for so long in NYS.

Although the example of Arctic Tern is undoubtedly extreme in this regard, the infrequency with which many tern species are detected during migration, and at even short distances from their actual breeding sites during spring and summer, has long attracted the attention of field ornithologists. For example, Roseate Terns (*Sterna dougallii*) are very infrequently observed from shore in the eastern United States anywhere between the Florida Keys and LI, at any season (Gochfeld *et al.* 1998). Gull-billed Tern (*Gelochelidon nilotica*) is very rare in spring even a few miles east of its northernmost breeding sites on LI (Mitra 2008), and Forster's Tern (*S. forsteri*), despite its regular northward movements in late summer and fall, is almost as rare during spring as Gull-billed Tern on eastern LI and in New England (Veit and Petersen 1993, R. Ferren in litt., pers. obs.). Even a species as abundant and widespread as Black Tern (*Chlidonias niger*) is notoriously difficult to detect over large portions of eastern North America during spring migration. In well-studied New Jersey and LI, a handful of records are the contemporary norm each May (*New Jersey Birds, The Kingbird*). A century ago, the presumably larger population of northbound migrants almost completely evaded the smaller number of observers of the time, as Stone (1908) knew of no spring records for NJ and Griscom (1923) cited only one May and two June records for LI.

Another interesting geographical attribute of some long-distance migrant tern species, especially Common (*S. hirundo*), Roseate, and Least (*Sterna antillarum*) Terns, is the relative scarcity of first-summer (= second calendar year) and second-summer (= third calendar year) individuals at the boreal breeding colonies. Most first-summer birds of these species are believed to remain on or near the wintering grounds, which in some cases are in the Southern Hemisphere (Nisbet 2002, Hays *et al.* 1997). Although small numbers of first-summer Arctic Terns are routinely seen around breeding sites (Hatch 2002), this author also states that many first-summer Arctic Terns probably spend the boreal summer far south of their ultimate breeding areas, and he describes large aggregations of such birds at specific sites, such as Sable Island, Nova Scotia and Monomoy, Massachusetts, that are far out of proportion to nearby breeding colonies. Notably, Hatch's authoritative work does not explicitly describe the summer status of first- and second-summer Arctic Terns in the middle latitudes of the western North Atlantic. It is worth noting here that Arctic Tern's "second-summer" plumage refers to an alternate plumage that differs from definitive alternate in several respects, such as lesser coverts dusky, black cap tinged brown, forehead white or flecked with white, throat and venter less extensively gray, tail streamers shorter, and bill or legs with dusky markings; some adults also fail to attain full breeding condition and can closely resemble third calendar year birds (Malling Olsen and Larsson 1995). This means that the second-summer category, as assessed via outward appearance, is necessarily imprecise. Even so, this category remains useful for field workers because birds of this appearance, like first-summer birds, are much more apt than adults in definitive alternate plumage to occur away from breeding areas during summer.

In the present paper, all documented, published records of Arctic Terns in NYS are reviewed and analyzed with respect to historical, geographical, seasonal, and age/plumage criteria, with three specific objectives: (1) reassessing the species' status in NYS and also more generally along the coast of the eastern United States, south of its breeding range; (2) evaluating the relative frequencies of passage migrants (breeders and juveniles en route to or from breeding areas) vs. non-breeders among Arctic Terns occurring in NYS; and (3) determining whether the increasing frequency of records in recent years reflects an actual change in the species' rate of occurrence, or whether it is a consequence of improved detection.

METHODS

An effort was made to find all records of Arctic Tern from NYS. Records were collected from published sources, including Cooper's (1998) statewide summary, the seasonal regional summaries published quarterly in *North American Birds* (and its antecedents) and *The Kingbird*, and the annual reports of the New York State Avian Records Committee (NYSARC). Because of the difficulties surrounding field identification of *Sterna* terns (Bull 1964, Paxton *et al.* 1976, Lee and Cardiff 1993), only those reports supported by specimens, identifiable photos, or written descriptions by field observers thoroughly familiar with this identification challenge were considered acceptable. Several sight records by P. A. Buckley or A. J. Lauro, published at the time of observation but otherwise lacking extant documentation, are included on the basis of correspondence with these experienced observers, both of whom have found other Arctic Terns in NYS that were photographed. To place the NYS records in better geographical context, they were compared with the best available data from NJ (*New Jersey Birds*, New Jersey Bird Records Committee, L. Larson, in litt.), NYS' neighbor to the south.

Age and plumage designations follow Malling Olsen and Larsson (1995). First-summer plumage was readily assigned to birds showing a stereotyped appearance, with almost no intermediates resembling the second-summer category. In contrast, the latter category was quite variable, including birds differing from definitive alternate in all of the respects described above and others that barely differed from definitive alternate. Operationally, birds showing two or more well-marked defects were regarded as second-summers, whereas those more closely resembling definitive alternate were regarded as adults.

RESULTS

New York State—Of 41 total NYS records of Arctic Tern, involving 57 individual birds, only three, involving three birds, were recorded prior to 1975; only five, involving five birds, were recorded from the mainland (i.e., NYS

exclusive of LI); and only three, involving three birds, were recorded from New York's offshore waters. The vast majority of records (33, involving 49 birds) were land-based observations from LI, and all but two of these date from 1975-2008 (Table 1).

In addition to the much greater absolute frequency of records from coastal LI compared to New York's mainland and its offshore waters, the relative proportions of individuals in first- and second-summer plumages, and of records from June and July, are strikingly higher on LI than in the other two geographic contexts: first- and second-summer birds account for 82% of LI records, compared to 0% of mainland records and 33% of pelagic records; and June/July records account for 84% of LI records, compared to 0% of mainland and 0% of pelagic records. Because of these correlations among the geographical, seasonal, and age/plumage trends, a clear majority of all statewide records (65%) refer to individuals along the LI coast, during June or July, and in first- or second-summer plumage. The discovery and identification of each of the 30 first-summer Arctic Terns individually documented from NYS is attributable, at least in part, to just five observers, P. A. Buckley, A. Guthrie, A. J. Lauro, P. J. Lindsay, and S. S. Mitra, all of whom have spent many years birding together and sharing information concerning the status and identification of this species, among others.

Whereas all mainland (five) and pelagic (three) records of Arctic Terns from NYS involved single individuals, no fewer than nine of 32 records from coastal LI involved more than one bird at a particular site on a given day. Although the birds involved in these multi-individual records sometimes interacted loosely with one another (e.g., brief associations between two birds on 14 Jun 2000 and 29 May 2006 and among three of five birds on 9 Jul 2006), equally often they remained spatially or temporally isolated from each other, as noted for two of five birds on 9 Jul 2006 and two birds on 16 Jun 2007 and 21 Jun 2008. Furthermore, all of the individuals noted above as associating with each other were also observed completely apart from each other at other times (S. Mitra, pers. obs.).

All of the NYS records presented here are supported by specimens (three), have been accepted by NYSARC (16), are supported by identifiable photos and detailed descriptions available upon request (14), or were identified and published at the time of the observations by Buckley or Lauro, observers with demonstrable familiarity with the species (eight).

New Jersey—Since its placement on the NJ review list in 1996, Arctic Tern has been documented in NJ on 14 occasions through 2006, with four earlier records also reviewed and accepted as of 2009 (NJBRC 2009). Dates range from an exceptionally early storm-related record on 28 April 2004 to 20 October 1999. Six (33%) of the documented records were from May, compared to six (33%) from June and July collectively. In contrast, of 49 historical records from prior to the inception of review, 23 (47%) were from May, and only seven (14%) were from June-July (J. Hanson, L. Larson, in litt.). Only two (11%) of the documented records were from offshore, one of which could arguably be

Table 1. Records of Arctic Tern from New York State, divided by region of occurrence: Long Island (33 total); pelagic waters (three total); and mainland exclusive of Long Island (five total).

Date	Site	County	#	Age/Plum	Obs	Doc	Source
Long Island							
18 Jul 1884	Cartwright Island	Suffolk	1	2S	Worthington	spec	AMNH #64696
7 Oct 1897	"Long Island"		1	J		spec	NYSM #1707
23-26 Nov 1975	Montauk	Suffolk	1	J	PAB, mob	ph	KB 26: 59
4-5 Jun 1981	Shinnecock Inlet	Suffolk	1	1S	PAB		KB 31: 267
23 Jun 1982	Shinnecock Inlet	Suffolk	4	All 1S	PAB		KB 32: 303
7-9 Jun 1984	Fire I Inlet	Suffolk	1	1S	PAB, AJL		KB 34: 272
13 Jun 1984	Shinnecock Inlet	Suffolk	5	All 1S	PAB		KB 34: 272
21 Sep 1984	Sagaponack Pd	Suffolk	2	Both J	PAB		KB 35: 71
7 Jul 1995	Fire I Inlet	Suffolk	1	1S	PAB, F. G. Buckley		KB 45:332
16 Jun 1996	Shinnecock Bay	Suffolk	1	Ad	E. Salzman	doc	ARC #1996-48
13 Jun 1999	Sagaponack Pd	Suffolk	1	Ad ¹	AJL		KB 49: 376-8
13 Jun 1999	Fire I Inlet	Suffolk	1	1S	SSM	doc	ARC #1999-80
10 Jun 2000	Fire I Inlet	Suffolk	1	1S	AJL, AG	ph	KB 50: 444-6
13 Jun 2000	Fire I Inlet	Suffolk	2	1S, 2S	SSM, PJL	doc	ARC #2000-64
14 Jun 2000	Fire I Inlet	Suffolk	2	1S, 2S	SSM	doc	ARC #2000-64
28 May 2004	Mecox Bay	Suffolk	1	2S	SSM, mob	doc, ph	ARC #2004-30
21 May 2005	Jamaica Bay WR	Queens	1	2S	J. Yrizarry, mob	doc, ph	pers. comm.
3-12 Jul 2005	Moriches Inlet	Suffolk	1 ²	1S	SSM, mob	doc, ph	ARC #2005-40
29 May 2006	Moriches Inlet	Suffolk	2	2S, Ad ¹	SSM, PJL	doc, ph ³	ARC #2006-70-71
2 Jul 2006	Moriches Inlet	Suffolk	1	1S	SSM, S. Blodgett, mob	doc, ph ³	ARC #2006-26
8-16 Jul 2006	Moriches Inlet	Suffolk	1 ⁴	1S	S. Blodgett, SSM, mob	doc, ph ³	ARC #2006-74
9 Jul 2006	Moriches Inlet	Suffolk	5	4 1S, 2S	SSM, PJL, mob	doc, ph ³	ARC #2006-72-76
10 Jun 2007	Moriches Inlet	Suffolk	1	1S	SSM, PJL	doc, ph ³	ARC, <i>in review</i>
16 Jun 2007	Moriches Inlet	Suffolk	2	Both 1S	K. O'Leary, SSM	doc, ph ³	ARC, <i>in review</i>
17-30 Jun 2007	Moriches Inlet	Suffolk	1 ²	2S	T. W. Burke, AG, mob	doc, ph	ARC, <i>in review</i>

8 Jun 2008	Moriches Inlet	Suffolk	1	Ad ¹	SSM, PJJ, A. Baldelli	doc, ph ³	ARC, <i>in review</i>
14 Jun 2008	Moriches Inlet	Suffolk	1	1S	SSM, TWB, mob	doc, ph	ARC, <i>in review</i>
21 Jun 2008	Moriches Inlet	Suffolk	2	1S, 2S	SSM, PJJ, TWB, mob	doc, ph ³	ARC, <i>in review</i>
27 Jun 2008	Moriches Inlet	Suffolk	1	1S	S. Whittle, SSM, mob	doc, ph	ARC, <i>in review</i>
11 Jul 2008	Moriches Inlet	Suffolk	1	Ad	SSM, PJJ	doc, ph ³	ARC, <i>in review</i>
12 Jul 2008	Moriches Inlet	Suffolk	1	2S	S. Ausubel <i>et al.</i>	doc, ph	ARC, <i>in review</i>
13 Jul 2008	Moriches Inlet	Suffolk	1	1S	SSM, PJJ	doc, ph ³	ARC, <i>in review</i>
20 Jul 2008	Moriches Inlet	Suffolk	1	1S	SSM, PJJ	doc, ph	ARC, <i>in review</i>
Pelagic							
13 Aug 1980	13 mi sw Montauk Pt	Suffolk	1	Ad	D. Crumb, B. Spencer	doc	ARC #1980-20
23 Aug 1980	8 mi s Montauk Pt	Suffolk	1	Ad	D. Crumb, B. Spencer	doc	ARC #1980-20
31 May 1997	Block Canyon	Suffolk	1	1S	PAB, M. Cooper, mob	doc, vid	KB 47: 249
Mainland							
20 May 1916	Cayuga L	Tompkins	1	Ad	L. Griscom	spec	CUM 2754
12-19 Nov 1989	Niagara R	Erie	1	J	M. Galas, mob	doc	ARC #1989-7
10 May 1999	Chazy Riverlands	Clinton	1	Ad	W. Krueger	doc	ARC #1999-14
5 Oct 1999	Hamlin Beach	Monroe	1	J	B. Ewald	doc	ARC #1999-69
19 Sep 2003	Cayuga L	Tompkins	1	Ad	P. Hosner, C. Marantz	doc	ARC #2003-42

1S—first-summer; 2S—second-summer; Ad—adult; AG—Andrew Guthrie; AJL—Anthony J. Lauro; AMNH—American Museum of Natural History accession number; ARC—New York State Avian Records Committee record number; CUM—Cornell University Museum accession number; Doc—documentation; J—juvenile; KB—*The Kingbird*; NYSM—New York State Museum accession number; PAB—P. A. Buckley; ph—photograph; PJJ—Patricia J. Lindsay; SSM—Shaibal S. Mitra; vid—videotape.

1 Reported as adults, each showed at least one defect in definitive alternate plumage and/or soft parts coloration.

2 Reports on dates subsequent to initial discovery were consistent with original bird, but individual identity not assessed critically or documented.

3 See Figs. H-Q, pp. 56-58, for photographs of these birds.

4 This individual was unique in verifiably persisting across a range of dates. Present on 8, 9, & 16 Jul, it is counted only once in summary totals.

attributed to NYS' pelagic waters (15 birds near Hudson Canyon 26 May 2003). Excluding two pelagic and six storm-related records, six of ten documented NJ records (60%) involved first- or second-summer birds during June or July.

DISCUSSION

The historical circumstances and contemporary perceptions accompanying NYS' earliest records of Arctic Tern are of sufficient interest to warrant detailed discussion. "The one that started it all" was a juvenile Arctic Tern found and photographed by P. A. Buckley *et al.* at Montauk Point, LI, on the remarkable date of 23 Nov 1975. Prior to this, more than a century of ornithological work had produced just two LI records, both specimens: 18 July 1884, Cartwright Island; and 7 October 1897, "Long Island" (no locality specified). The only other NYS record to date was Griscom's specimen of 20 May 1916, from Cayuga Lake, in central NYS. Against this scant and heterogeneous backdrop, the November record from Montauk did little to clarify the species' mode of occurrence in the state, but it elevated birders' awareness of and interest in the species. Griscom (1916) interpreted his specimen as a long sought clue regarding the timing and route of the species' northbound migration in eastern North America. Griscom's hypothesis that Arctic Terns migrate to breeding colonies in the Gulf of Maine and the Canadian Arctic during late May, both far offshore from and high above NYS, was prescient in a general way (Hatch 2002 presents extensive data supporting both routes), but it has not yielded any subsequent pattern of spring records from either mainland NYS (just one adult 10 May 1999) or the state's offshore waters (just one first-summer 31 May 1997, identified by P. A. Buckley, among others). Including fall records, only three pelagic records and four mainland records have been documented since 1975.

The next phase in the ornithological history of Arctic Terns in NYS occurred between 1981 and 1984, along LI's south shore inlets. During this period, P. A. Buckley produced five additional records, involving 13 individuals, most of which were discovered in the course of systematic surveys of colonial waterbirds on LI, and at least one of which was co-found with A. J. Lauro. All of these birds were found at coastal inlets on the south shore of LI, and, with the exception of two September juveniles, all involved first-summer birds during June. The pattern evident in these records furnished a model by which A. J. Lauro and three students of Buckley and Lauro, A. Guthrie, P. J. Lindsay, and S. S. Mitra, recorded 29 additional Arctic Terns from LI's south shore inlets from 1999-2008, all during the period 28 May-20 Jul, and all but one lacking definitive breeding aspect.

In view of the frequency with which non-breeding Arctic Terns have been documented from LI's south shore inlets during June and July, this species should not be regarded as accidental, nor even as particularly rare, in this context. Unlike true vagrants, the vast majority of which are detected as single individuals, or sometimes as discrete family groups or flocks, there are

numerous examples of multiple, apparently independent, Arctic Terns occurring at the same coastal LI sites on the same days. These Arctic Terns associate with loafing flocks that typically also include one- and two-year-olds of various other larid species, some of which are regionally or seasonally notable in their own right: e.g., first-summer Common, Forster's, Roseate, Least, Black, Royal (*Thalasseus maximus*), and Sandwich (*T. sandvicensis*) Terns, and first-summer gulls such as Bonaparte's (*Chroicocephalus philadelphia*), Black-headed (*C. ridibundus*), Little (*Hydrocoloeus minutus*), and Laughing (*Leucophaeus atricilla*). Careful daily scrutiny and photography of these birds, many of which are individually recognizable by virtue of head pattern, soft parts coloration, and rectrix length, indicate a great deal of turn-over among individuals within and between days (S. Mitra, unpubl. data). Especially among Arctic Terns, individuals have almost never persisted across multiple dates, perhaps because they spend much of their time at sea and visit the inlets only at intervals. Instead, observers seeking recently reported Arctic Terns have much more frequently found completely new individuals.

In contrast to the remarkably predictable pattern of occurrence among non-breeding Arctic Terns on LI, authentic passage migrants (adults during May and adults or juveniles during August-September) remain very poorly known anywhere in NYS. Recent records of Arctic Terns from NJ appear to include more migrants, both northbound and southbound, than are evident in the New York data, but most of these involve either offshore or storm-related observations. Among recent land-based NJ records not directly associated with storms, most were summering non-breeders, just as on LI. Of six juvenile Arctic Terns ever recorded in NYS, no fewer than four occurred at decidedly abnormal dates during October-November, when the species is extremely rare anywhere in North America. This fact, plus the statewide paucity of records of full adults at any season, casts doubt on the longtime hope that increased field work during late May and late August-early September might yield a pattern of regular occurrence in NYS' pelagic waters similar to those known from the waters off Cape Hatteras (Lee and Cardiff 1993, B. Patteson, pers. comm.), Cape Cod (Veit and Petersen 1993, *North American Birds*), and, to a lesser extent, NJ.

The regular presence of non-breeding Arctic Terns during June and July in the middle latitudes of the coastal western North Atlantic is supported not only by the present study and by Hatch's (2002) general review of the species' migratory dynamics, but also by a modest set of similar inshore records from the Southeast and the Gulf of Mexico (Lee and Cardiff 1993). Regarded by these authors as plausibly referable to late migrants, "stragglers, birds trapped in the Gulf of Mexico, or loitering non-breeders," these records seem most readily explained as a still more southerly extension of the LI pattern described in the present paper. At least equally relevant is the regional precedent afforded by a long series of records of first-summer Arctic Terns from Massachusetts, from at least 1938 (Veit and Petersen 1993) through the present time (B. Nikula, pers. comm.). As many as 800+ first-summer birds were recorded at Monomoy, Cape Cod during June and early July between 1975 and 1980 (Veit and Petersen 1993). These observations, and many others of smaller numbers of first-summer

birds, from Massachusetts sites both north and south of Cape Cod, illustrate the scale at which this age class sometimes occurs in the western North Atlantic, even south of major breeding stations (Veit and Petersen 1993). Note that the period of greatest abundance of non-breeders at Monomoy (1975-1980) entirely precedes the abrupt increases in such records on LI (1981-1984 and 1999-2008) and in NJ (1995-2006).

The historical spikes in the frequency of LI records during 1981-1984 and 1999-2008, when Arctic Tern was deliberately sought by observers familiar with its first- and second-summer plumages, suggests that the species was likely overlooked prior to 1981 and from 1985-1998. The preponderance of first-summer individuals among the birds identified 1981-1984 and 1999-2008, in contrast to the complete absence of this age class prior to 1981, is strongly suggestive of a detection bias. Similarly, the disparity in the proportions of presumed migrants vs. summer non-breeders in NJ, before and after the inception of review, suggests that birds of the former kind were previously over-reported. Finally, among Arctic Tern records from the southeastern United States, Lee and Cardiff (1993) noted a higher proportion of first-summer birds among specimens than among sight records and attributed this disparity to problems in field identification. Although the recent increases in records of summer non-breeders in NJ and on LI conceivably could be construed as reflecting an actual increase in the frequency of occurrence of such birds, the disparity in age-class frequencies between specimens and sight records cited by Lee and Cardiff (1993) cannot be explained in this way, nor can the fact that all 30 LI records of first-summer birds are attributable to just five observers. Considering all these sources of evidence, it seems simplest to attribute the recent increases in records of Arctic Terns on LI and elsewhere to improved detection and identification.

Reasons that Arctic Terns were likely under-detected in the past include a paucity of readily available, detailed identification information, especially for first- and second-summer plumages, prior to Kaufman (1991), and misconceptions about where, when, and what to look for—e.g., an over-emphasis on offshore adult migrants, which in practice have proven extremely difficult to detect over LI's relatively broad and recessed shelf waters. The paucity of documented pelagic migrant Arctic Terns offshore from LI compared to Cape Hatteras and Cape Cod is analogous to the example provided by Leach's Storm-Petrel, large numbers of which undoubtedly migrate far offshore from LI while remaining almost entirely unrepresented by actual records.

In summary, the data presented here support several generalizations concerning the occurrence of Arctic Terns in NYS: the species should be regarded as rare to uncommon, but regular (certainly not casual); coastal LI records greatly outnumber pelagic and inland records; birds in first- and second-summer plumage greatly outnumber adults and juveniles; and seasonal occurrence extends from late May through mid July, with a peak during mid June. Moreover, similar patterns are discernible along the immediate coast, both north and south of LI, although passage-migrant adults are more regularly encountered off easterly projecting capes such as Cape Cod and Cape Hatteras.

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