

The November 1999 Cave Swallow Invasion in Ontario and Northeastern North America

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THE DISCOVERY

At around 1215h EST, on Tuesday, 2 November 1999, KM drove into the Point Pelee National Park Visitor Centre parking lot. It had been a rather slow morning of "car birding" in a steady rain, with the only highlight being a Merlin (*Falco columbarius*) which landed in one of the tall trees at the small parking lot on the west side of the tip. In fact, the most eventful item was the drastic change in the weather. The previous several days had been balmy with southwest winds, conditions so benign that KM had seen nine species of butterflies on Monday morning, 1 November, under sunny skies and a temperature of 16-18° C. Cloud cover had increased by Monday afternoon, followed by rain overnight, with the wind shifting to northeast, resulting in a drop in temperature to around 4° C.

Parking the car, KM immediately noticed a group of five chunky swallows flying low, approaching the car from the vicinity of the Visitor Centre. Little could be seen on the birds through the rain-splattered windshield. Thinking that they were probably Tree Swallows (*Tachycineta bicolor*), KM got out of the car for a better look. Noting the off-white underparts and

square-ended tails, he then realized that the birds had orange rumps, visible as they did a few ground level circuits of the parking lot. KM was enthused, not being able to remember having seen even one Cliff Swallow (*Petrochelidon pyrrhonota*) in Ontario as late as October, let alone five in early November. Something was wrong, however, for a brief look up through the rain had revealed what appeared to be a pale throat on one or two of the birds. No sooner had KM exclaimed to himself "Are these Cave Swallows?" than the birds disappeared somewhere behind the Visitor Centre. After failing to re-find the birds, KM decided to report the five as "*Petrochelidon*" swallows in the sightings book in the Centre, at the same time telling two staff members of his suspicions on the identity. He then returned to the parking lot to await the birds' return, seeking shelter in one of the transit cars which had been parked in the lot. After an hour and a half of fruitless watching, he drove north through the park, checking the Delaurier parking area and Northwest Beach, again with no success. Deciding around 1500h to check the West Beach parking lot, he found, towards the south end, five swallows foraging. The birds

flew past the car, quickly going inside one of the three picnic shelters bordering the parking lot, as if looking for a roosting site. They then disappeared, flying south, still not affording KM an identity-clinching view.

On Wednesday morning, 3 November, KM spent several hours on the sheltered east side of the tip, watching for migrants. The rain had ended overnight and the wind had shifted to northwest, blowing at near gale force, with the temperature around freezing. During this time, he saw several groups of swallows flying south off the Tip, adding up to at least 25 birds. All of the birds were “*Petrochelidons*”, and those that could be seen in brief frontal views, appeared to have pale throats. Once again, however, totally conclusive views could not be realized.

KM returned to the east side of the tip around 1400h, and at once found a swallow foraging low over the water very close to shore. Finally, the hoped for conditions were realized. The bird flew methodically about, only inches above the surface, and approached to within a few feet. All frustrations vanished, as it was definitely a Cave Swallow (*P. fulva*)! Moments later, two more Cave Swallows joined this bird, permitting leisurely studies. KM now realized that he was witnessing an unprecedented Ontario invasion of this species and that all the birds seen Wednesday morning and Tuesday afternoon were Cave Swallows. He

happily returned to the Visitor Centre, whereupon he contacted Tom Hince in Wheatley, who alerted ONTBIRDS (the Internet bird sightings listserv sponsored by the Ontario Field Ornithologists). Events proceeded quickly over the next several days, with Cave Swallows being found again at Point Pelee and elsewhere along the north shore of Lake Erie at Eriean, Port Burwell, Long Point and beyond.

DESCRIPTION OF POINT PELEE BIRDS

The field marks noted below are based on observations by KM on 2 to 5 November at Point Pelee. The study obtained at the south end of the Sanctuary Pond near the park entrance on 4 November involved a bird flying in the company of several Tree Swallows.

- Broad winged, husky swallow, slightly smaller than Tree Swallow.
- Pale orange throat and auriculars, which colour extended around the side of the head to the nape, and blended vaguely into the white breast.
- Chestnut patch on the forecrown, recalling Barn Swallow (*Hirundo rustica*). This patch was slightly contrasting with the slate colour of the top of the head, and contrasting more so with the pale orange throat.
- Dark line between the dark eye and black bill.
- Upperparts with broad dark gray

wings, slate-coloured back with several (3 or 4) white lines down the centre.

- Dull orange rump patch, perhaps best described as “burnt” orange, which seemed a bit darker orange than the throat.
- Underparts more off-white than Tree Swallow, not gleaming white, with a gray wash on the sides of the breast and belly.
- Tail dark gray or slate, at all times appearing essentially unforked or square-tipped.

THE ONTARIO STORY

Subsequent to the discovery and confirmation at Point Pelee, the next four days (Wednesday, 3 November to Saturday, 6 November) produced multiple sightings by many fortunate birders. In fact, so many observers were involved that we have decided to include names only for initial observations at a location and for the later observations, after the numbers of birds dropped off. Most of the information comes from ONT-BIRDS. It is pleasing to note that virtually all sightings have been supported by documentation submitted to the Ontario Bird Records Committee (OBRC), and that OBRC has accepted these records (Kayo Roy, pers. comm.).

3 November: There may have been as many as 32 birds at Point Pelee on Wednesday (Alan Wormington, pers. comm.). In addition to the

observation of 25 birds leaving the Tip in the morning by KM, followed by another three in the afternoon, Tom Hince found two going to roost at Sturgeon Creek and another two in an old Barn Swallow nest at the Visitor Centre. Away from Point Pelee, Jim Burk flushed three Cave Swallows from his garage at Erie Beach about 6 km west of Erieau in Kent County. Also on this date, four birds reported initially as Cliff Swallows at Long Point Tip were seen the next day and subsequently confirmed as Cave Swallows.

4 November: It is significant that all but one Cave Swallow observation from Ontario was from the north shore of Lake Erie. Long Point was the epicentre. After information about birds roosting under eaves in Barn Swallow nests was posted, Long Point Bird Observatory staff at the Tip found three roosting in nests at their cottage on Thursday morning, one of which was captured, banded and photographed (Christine Jamieson, pers. comm.). See Figures 1 and 2. Over the course of the day, observers totalled 13 at the Tip and 25 at Old Cut. Inasmuch as the birds at Old Cut were flying west and foraging as they went, it is impossible to say how many left the Long Point peninsula and how many of those seen the next day were new.

At Point Pelee, the two birds in the nest at the Visitor Centre were watched from dawn until one flew



Figure 1: Juvenile Cave Swallow (*P.f. pallida*), Long Point Tip, 4 November 1999. New remiges are P1 to P6, as well as S1 and S2 and some tertials, indicating that this bird was farther into first prebasic molt than the Point Pelee bird. Photo by *Christine Jamieson*.

out. Subsequently, the other was picked up in a very weakened condition (BC) and died (Figure 3). Elsewhere at Point Pelee, three others were seen foraging over Sanctuary Pond for most of the day (Matt Baker et al.).

At Erieau, six birds were seen in the pier area (Steve Charbonneau, ONTBIRDS) until almost dusk and almost certainly must have roosted there. Whether these included the three at Erie Beach the day previous is impossible to say, but likely those were different birds.

5 November: Approximately 24 were at Long Point; eight at the Tip and about 16 near the base. These latter

were enjoyed by a host of observers, as the birds foraged actively in the warm sun, mostly between the Provincial Park on the east and the Causeway on the west. Another three at Turkey Point (Jerry Guenther, ONTBIRDS) followed the shoreline in an easterly direction towards Port Dover. This observation indicates that all birds did not automatically fly west and further confounds attempts to estimate total numbers. This is the farthest east location in Ontario, except for a report of a Cliff Swallow just west of Port Dover by a casual observer (*vide* John Olmsted).

A day of diligent searching by seven observers was rewarded with



Figure 2: Long Point Tip bird. Note that the throat of this individual is barely perceptibly lighter in shade than the crown, and that the breast and flanks are greyish with *buff-orange tips*. These features are different from those shown on recently published photographs (see *Birders Journal* 8: 35 and 8: 267), and from what many observers noted in the field (e.g., see KM description above). Such differences likely pertain to known variation within the species, as well as varying light conditions (see Greg Lasley's comments in Wormington 1992:179). They illustrate the difficulty of sub-specific determination of birds in the field. Photo by *Christine Jamieson*.

one Cave Swallow at Port Burwell approximately 33 km west of Long Point. This bird was observed for about 45 minutes in late morning (Dave Martin, ONTBIRDS). It is likely that this, the first and only for Elgin County, was a bird moving west from Long Point. Meanwhile the six birds at Erieau remained all day. At Pelee, two birds were observed leaving the Tip in the early morning (KM et al.) and the three remained at Sanctuary Pond until late morning at least.

6 November: A *Petrochelidon*, almost certainly a Cave Swallow, was seen flying west over Long Point Provincial Park (Don Graham, Anthony Lang, ONTBIRDS) and a hirundine at Turkey Point was most likely also a Cave Swallow (Marcel Gahbauer, ONTBIRDS). At least six observers saw the six birds at Erieau until approximately 0900h. They presumably departed soon after as birders looked unsuccessfully from 1400h on.

The only Cave Swallow found in

Ontario away from Lake Erie was well studied by 18 people on a **6 November** Detroit Audubon Society trip at Gallimere Beach on the southeast shore of Lake Huron in Lambton County (Karl Overman, ONTBIRDS).

The final two Ontario sightings were of a bird seen at the Tip of Long Point on **10 November** (CJ) and the same or another at Old Cut the next day, **11 November** (Hilbran Verstraete *per* Jul Wojnowski, ONTBIRDS).

Thus, in Ontario, the Cave Swallow invasion of 1999 lasted for a total of 10 days, from 2-11 November. As stated, it is extremely difficult to calculate just how many birds were involved. Our estimates range from a minimum of about 90 to a high of approximately 110 birds. As always in such bird invasions, some birds went unseen but the predisposition of these birds to collect at peninsulas extending into Lake Erie suggests that most of the Cave Swallows that occurred, at least from 3 November on, were seen. Doubtless, however, others left the province, unseen.

ELSEWHERE IN THE NORTHEAST

Quebec

Given the total lack of reports from the north shore of Lake Ontario, it is somewhat surprising that two birds were found by Pierre Bannon,

Louise Simard and Guy Zenaitis on 6 November under a small bridge at Melocheville near Beauharnois (Bannon 2000). One bird remained until 11 November. An additional two birds were found by Michel Robert on 6-7 November at La Malbaie about 400 km northeast down the St. Lawrence River from Melocheville, and a buff-rumped swallow was reported on 6 November at Cap Tourmente down river from Quebec City. It is very interesting that these birds were not found until after most birds had disappeared from Ontario. This may have been a case of birders not discovering the birds until a weekend (Bannon 2000). Or, it is possible that some of the swallows upon attempting to reorient, left Ontario on a northeasterly bearing (i.e., 180 degrees in error) and flew down the St. Lawrence River to their demise.

Michigan

It was not until 13 November, after Ontario's last sighting, that Michigan's first ever Cave Swallow was found by almost the entire Michigan Bird Records Committee at Grand Haven, Ottawa County in the southwest of the state on the shore of Lake Michigan (Allen Chartier, ONTBIRDS). Sometimes meetings can be fun! Again, we are compelled to speculate that this may have been another bird attempting to reorient after having spent about ten days farther north and east than this.



Figure 3: Juvenile female Cave Swallow (*P. f. pallida*), Point Pelee, 4 November 1999 (ROM #66156). Note P1 and P2 are new, indicating that this is a HY bird, as adults will have completed their molt before this date. Photo by *Barry Cheriére*.

Northeastern USA

Many reports of Cave Swallows burned up the BIRDEAST hotlines. The first was a flyby at Cape May, New Jersey on 1 November. Between then and 1 December, Cape May totalled at least 35 birds, with 32 seen on 7 November and a single flock of 30 by Paul Lehman on 8 November. The large numbers first appeared there on 4 November. Elsewhere, the totals were as follows: elsewhere in New Jersey (2); New York (1); Connecticut (as many as 35) but some duplication may have been involved (Paul Lehman, pers. comm.); Rhode Island (4); western Pennsylvania (2 probables); Virginia (3); and North Carolina (5

or 6). As was the case in Ontario, concentrations occurred along the coast and at peninsulas on days with northwest winds.

In addition, some sightings occurred so much later and after intervening bouts of colder weather that they may represent different birds that wandered northeast (Paul Lehman, pers. comm.). Into this category fall birds on 11 December at Avalon, New Jersey and near Leipsic, Delaware (a first state record); three on 18 December at Hampton, Virginia, and one from 17 to 21 December at Cape May.

THE EFFECT OF WEATHER

The phenomenon of vagrant Cave

Swallows in the Northeast during the 1990s is more complex than an analysis of weather, but certainly the massive scale of this invasion must be attributable to weather events.

Over the period from 30 October to 4 November, weather events capable of displacing and concentrating the swallows developed. On Sunday, 31 October, a deep low pressure trough extended southwards from the Dakotas to Texas. To the east of this system, strong southwest winds blew from Texas to Ontario and the rest of the northeastern part of the continent during all of Sunday and Monday. Eventually, a large low pressure cell cut off from the trough and moved east-northeast very quickly, until by Tuesday, 2 November, it was centred over Tennessee. At about the same time, another low drifted eastward from western Canada, until by Tuesday, 2 November, it was centred over southern Hudson Bay. A strong, broad cold front extended between these two depressions. Rain ahead of the front extended to Ontario and strong northeast winds here blew towards the Tennessee low. By Wednesday, 3 November, the centre of this low had moved to north-central Pennsylvania, resulting in continued heavy precipitation from Lake Michigan to the Eastern Seaboard. Also, and more importantly, continued anti-cyclonic circulation around both lows and on the west side of the cold front now

produced strong northwest winds in Ontario.

Thus, it seems likely that the swallows drifted northeast on the favourable winds of 31 October and 1 November. Birds arriving on those days would have been widely dispersed and gone unnoticed until the northerly winds and precipitation caused them to attempt to reorient, and at the same time concentrate, at peninsulas along the shorelines. There is some evidence to support this interpretation. One Cave Swallow flew by the hawk-watch at Cape May, NJ on Monday, 1 November, but it was not until Wednesday, 3 November, that concentrations began there (Paul Lehman, BIRDEAST).

Perhaps many Cave Swallows left Ontario undetected on 2 November. And perhaps by 3 and 4 November, those that remained were too hungry and stressed by the cold to leave. The bird banded at Long Point Tip on 4 November had no fat (Jul Wojnowski, pers. comm.) and, of course, the Point Pelee bird died on the same morning. Examination of this bird at the Royal Ontario Museum revealed that it had died of starvation (Mark Peck, pers. comm.). Fortunately, for both the swallows and birders, the next few days saw the return of sunny and mild conditions and the birds, now concentrated, were feeding actively and seen by many. The circumstantial evidence suggests that these birds managed to restore

enough strength and, for the most part, departed south and west on Friday, 5 November, with a few remaining until the next morning. The stragglers seen at Long Point on 10 and 11 November, Michigan on 13 November, and western Pennsylvania on 26 November could have been reorienting after having moved, in error, northeast along the shores of the lower Great Lakes (viz., the Quebec birds, 6 to 11 November).

Regardless of the exact situation, the question remains as to why this was almost solely a Cave Swallow event and how it fits into the pattern of vagrancy exhibited by the species over at least the last decade (see Appendix). Swallows may be more prone to being displaced by strong winds but the only other swallows positively identified with the Cave Swallows were a few Tree Swallows and it is not particularly unusual for this species to linger into November or even December. While there were several other rare western birds in Ontario over the late fall and winter, we see no compelling reason to suggest that they were in any way related to this particular weather system.

SUBSPECIES AND ORIGIN

The question of which subspecies of Cave Swallow are involved, and therefore, whence they have originated, has been a controversial issue among observers, especially pertaining to the 1990s incursions (Paul

Lehman, pers. comm.; Wormington 1992, 1999). Observers have used field observations and circumstances to make a case for either West Indian or southwestern United States origin. There are six or seven currently recognized subspecies (Howard and Moore 1980, Turner and Rose 1989, Pyle 1997, Garrido et al. 1999). Of these, five occur in North America, although *citata* of the Yucatan Peninsula of Mexico is likely sedentary and not considered as a vagrant candidate to the north. The nominate subspecies *fulva* occurs in the Greater Antilles and now breeds in south Florida (West 1995). A poorly defined subspecies *cavicola* occurs in Cuba, and another has recently been described from Puerto Rico (Garrido et al. 1999). The "southwestern" subspecies *pallida* nests in southeast New Mexico, east to central Texas and locally south to coastal Texas and into northern Mexico (Turner and Rose 1989, West 1995).

The nomenclature of Cave Swallows is as dynamic as their breeding ranges (Michel Gosselin, pers. comm. to Ron Pittaway, 1999). The name *pelodoma* was created when the genus *Petrochelidon*, along with others, was lumped into *Hirundo*. Now that it has been teased out of *Hirundo* to its original generic name *Petrochelidon*, the correct appellation for the "Tex-Mex" subspecies is *pallida*.

In the field, these four subspecies are, with present knowl-

edge, impossible to determine with certainty. Moreover, for reasons of clarity here, it seems appropriate to lump the West Indian birds under the name *fulva*. Although some of the earlier Nova Scotia birds had been positively determined to be *fulva*, the balance of opinion, not without cogent opposition, pertaining to the 1990s records has been that most, and perhaps all, originated in the southwestern United States. Observers have noted subtle variations in colour and contrast and marshalled arguments using weather systems to support their contentions about origin and subspecies (Wormington 1992, 1999; Bannon 2000). Notwithstanding, what have been sorely needed are specimens or in-hand studies where morphometrics can be utilized to determine subspecies. We now have that information for the fall 1999 flight and for another eastern extralimital record. By inference, many of the intervening records in time and place are also likely from the same origins, although this cannot be proved.

The first specimen of Cave Swallow for South Carolina was picked up in a moribund condition on 31 October 1993 (McNair and Post 1999). Based upon measurements and coloration, and verification by Steve Cardiff and Van Remsen, this was the first specimen of *pallida* for eastern North America (McNair and Post 1999). In addition, we have one measure-

ment of the banded Long Point bird and morphometrics on the Point Pelee specimen (ROM # 66156). Table 1 presents a comparison of measurements among these specimens and series of measurements from the known breeding ranges (Pyle 1997). It is clear from these comparisons that both the Long Point bird and the Point Pelee specimen are attributable to the subspecies *pallida* of the southwestern United States. Finally, a specimen obtained in North Carolina in late fall 1999 has also been identified as *pallida* (Harry LeGrand, ID FRONTIERS).

Another interesting point is that the two specimens and the in-hand bird were all hatching year birds with incomplete molt to first basic plumage (see Figures 1 and 3).

CAVE SWALLOW POPULATION DYNAMICS

Since the 1970s, the Cave Swallow has been dramatically expanding its range. Nominate *fulva*, native to the Greater Antilles, now nests in south Florida (Smith et al. 1988). It seems likely that the Nova Scotia records were related to this expansion, although the dearth of records since 1982 is puzzling. Similarly, *pallida* has advanced aggressively and rapidly eastwards across Texas, apparently usurping sites and even nests from Barn Swallows (Palmer 1988). Wormington (1999) described the banding of several juvenile Cave Swallows in Nebraska, which were

Table 1: Length Comparisons of Cave Swallows

	<i>P. f. fulva</i> (Pyle)	<i>P.f. pelodoma</i> = <i>pallida</i> (Pyle)	ROM # 66156 Point Pelee	Long Point (band #1651- 05301)	S. Carolina specimen
WING	97 - 103	106 - 113	110*	104*	109.5*
TAIL	37 - 45	45 - 52	47		
TARSUS	11.1 - 11.9	12.1 - 13.0	12.9		

*Hatching year birds average 4–5 mm shorter in wing length (Pyle 1997).

presumed to have migrated north with Cliff Swallows. In the longer historical context, it is relevant to know that the first nest for Texas was not found until 1914 and the first for New Mexico was in 1930 (West 1995). So it is clear that this species has not yet stabilized its breeding range in North America.

One important factor affecting the range of swallows is the availability of suitable nest sites (Brewer 1987). As Cave Swallows are expanding along highways, adopting bridges and culverts for nesting (West 1995), there may be considerable range expansion yet to come. Palmer (1988) notes that in Texas, Cliff and Barn Swallows are losing ground to the Cave Swallow at these man-made nest sites. This expansion is somewhat akin to the rapid northeasterly range expansion of the Wild Indigo Dusky Wing (*Erynnis baptisiae*) along major highway systems. This butterfly now uses Crown Vetch (*Coronilla varia*), the pink ground cover planted along highways, as a larval food plant (Shapiro 1979).

Thus, we may be nowhere near the end of expansion of the Cave Swallow. We anticipate that Ontario will experience more April, and perhaps March, records (Wormington 1992) as weather conditions not unlike November 1999 are, if anything, more frequent in spring than in fall. In this regard, there is an intriguing report of a “Cliff Swallow” at Long Point on 8 March 1992. Moreover, Alan Wormington (pers. comm.) has observed two possible Cave Swallows (one in spring, the other in fall) leaving Point Pelee, much as McLaughlin did in fall 1999. As for the 1999 incursion, the Cave Swallow departure dates from the Carlsbad Caverns, New Mexico from 1981–1992 ranged from 28 October to 10 November (West 1995). While our birds are not necessarily from this precise location, it would appear that early November is a peak time for parties of this species to be migrating and hence vulnerable to displacement.

CONCLUSION

In summary, the late fall of 1999

witnessed a large movement of Cave Swallows into northeastern USA and Canada. Up to 110 birds were seen in Ontario and at least another 80 were elsewhere in northeastern North America. The precipitating factors were two intense low pressure systems and their accompanying wind vectors. While much more massive, this flight fits into a decade long pattern of increasing vagrancy to the northeast. Specimen evidence corroborates the postulation that the birds of the 1999 invasion (and likely many, if not most, of the other extralimital records) were *P.f. pallida* from the southwestern USA.

Clearly, these Cave Swallow extralimital occurrences are exciting in the short run and fascinating in the larger context. It may be that even the fall occurrences are part of the penchant of the species for expanding its range.

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Appendix: History of vagrant Cave Swallows in eastern North America

We thought that *Ontario Birds* readers would be interested in the full story of the vagrancy patterns of Cave Swallow. This list includes all those observations of vagrant Cave Swallows in northeastern North America that have been accepted or are thought to be valid.

It is interesting to revisit Alan Wormington's two papers in *Birders Journal* (Wormington 1992, 1999) in the light of these records below, together with the fall 1999 invasion. In 1992, he predicted that more Cave Swallows would occur north and east of Texas, including Ontario. Such occurrences, of course, happened virtually annually after the 1989 Point Pelee record. These extralimital incursions set the stage for the invasion in the fall of 1999.

At least five records, some of multiple birds, exist for Nova Scotia between 1968 and 1982 (Godfrey 1986: 379; Tufts 1986: 296). In the light of questions about subspecies involved, several points are of interest here:

1. The two Nova Scotia specimens that exist are referable to *P.f. fulva s.l.* (Godfrey 1986, American Ornithologists' Union 1998).
2. All these Nova Scotia records occurred before the recent spate of eastern North American records.
3. Dates for all of these birds ranged from May to July (i.e., none was in the late fall period when most have occurred in the 1990s).

Commencing in 1989, Cave Swallows have become virtually annual in the Northeast:

21 April 1989 – Point Pelee, Essex Co., ON (1); Wormington 1992

20 April to 5 June 1990 – Cape May, NJ (1); AB 44 (3): 404

23 May 1990 – Jamaica Bay, NY (1); AB 44 (3): 404

7 November 1992 (4), down to (1) 15 November 1992 – Cape May, NJ;
AB 47 (1): 73

31 October 1993 – Folly Beach, Charleston Co., SC (1); McNair and Post
1999

20 November 1993 – Cape May, NJ (1); AB 48 (1): 94

8 to 19 November 1994 – Cape May, NJ; Wildwood, NJ (3); FN 49 (1): 28-29

6 November and 30 November 1995 – Cape May, NJ (1); FN 50 (1): 29

3 November 1996 – Cape May, NJ (1); FN 51 (1): 32

7 November to 16 November 1997 – Cape May, NJ (up to 5); FN 52 (1): 37

9 November 1997 – East Point, Cumberland Co., NJ (2); Paul Lehman,
pers. comm.

4 November 1998 – Cape May, NJ (1 to 2); NAB 53 (1): 37

28 November 1998 – Long Island, NY (2); NAB 53 (1): 37

21 November to 13 December 1998 – Cape May, NJ (2); NAB 53 (2): 150

1 November 1998 – Fisherman I., VA (1); NAB 53 (1): 42

7 to 9 December 1998 – Point Pelee, Essex Co., ON (1); Wormington 1999

25 March 1999 – Cape May, NJ (1-2); NAB 53 (3): 263

Abbreviations: AB = *American Birds*
 FN = *Field Notes*
 NAB = *North American Birds*

Information Sources

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