

Herpetological Associates, Inc. - Environmental Consultants

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August 27, 1990

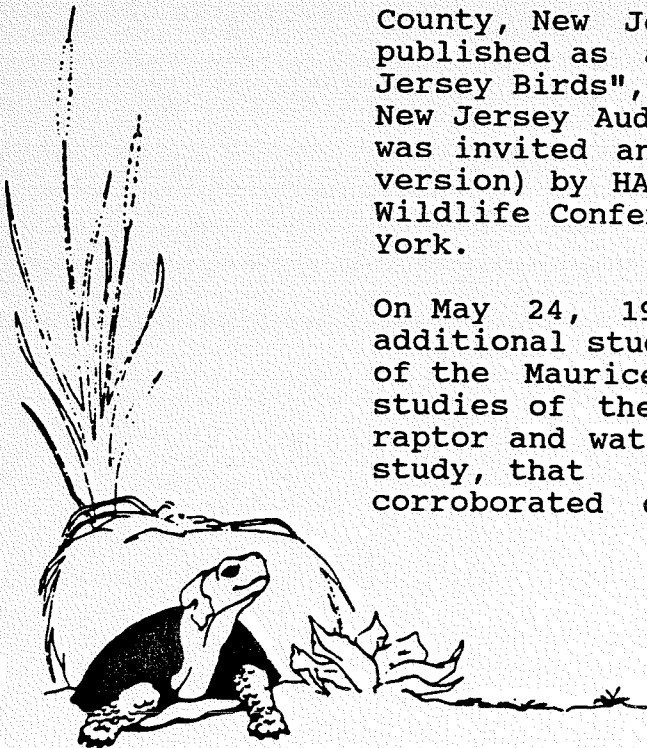
Mr. Keith Chain
President
Citizens United to Protect
the Maurice River and its Tributaries
P.O. Box 474
Millville, NJ 08332

Re: Ongoing Wildlife Survey of the Maurice River,
Cumberland County, New Jersey, Winter of 1989-
1990. HA File No. 90.01.

Dear Mr. Chain:

This letter form report will update and complete our raptor and waterfowl studies to date on the Maurice River. On March 30, 1989, Herpetological Associates, Inc. (HA) presented to Citizens United (CU) our report titled, "Wintering Raptors and Waterfowl along the Maurice River on the Delaware Bayshore, Cumberland County, New Jersey". This study was subsequently published as a featured paper in "Records of New Jersey Birds", Vol XIV, No. 3 (Autumn, 1988) of the New Jersey Audubon Society. In addition, this paper was invited and presented (in a revised and updated version) by HA at the 45th Annual Northeast Fish and Wildlife Conference on May 8, 1989 in Ellenville, New York.

On May 24, 1989, HA forwarded to Citizens United additional studies titled, "Ongoing Wildlife Surveys of the Maurice River", which summarized continuing studies of the river system. This report detailed raptor and waterfowl sightings for a second winter of study, that of 1988-1989, and augmented and corroborated our previous findings from 1987-1988.



Specializing in wetlands delineations and "endangered" and "threatened" plants
and wildlife, their ecology and environment.

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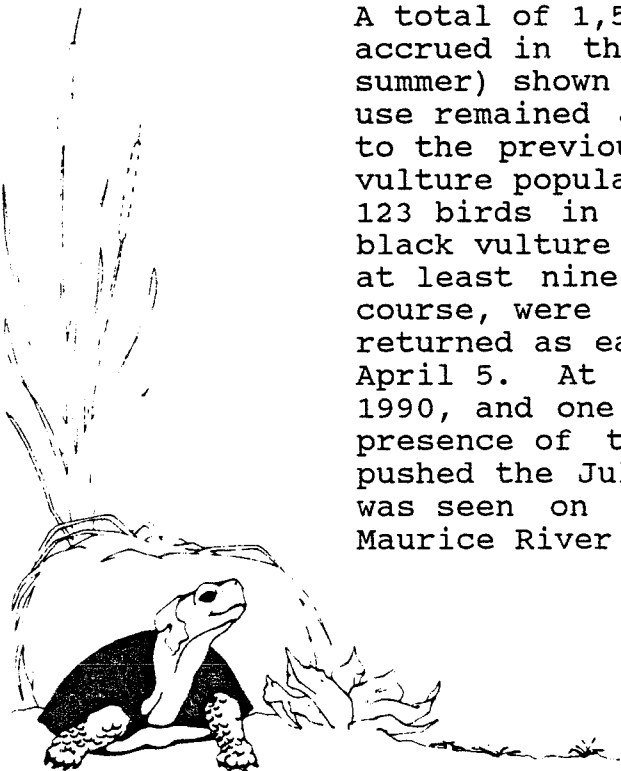
In October of 1989, CU contracted and authorized a third season of raptor/waterfowl studies with an emphasis on determining what trends may be occurring regarding wildlife use of the Maurice River drainage basin. This report presents the findings of that survey, and details raptor and waterfowl use for the winter of 1989-1990, as well as raptor migration witnessed during the autumn of 1989.

RAPTORS:

Ten full surveys were conducted during the winter season of 1989-1990. Survey dates ranged from November 30, 1989 to March 19, 1990. Attachment One details this Maurice River Raptor Survey for this period. Also included, for informational purposes, are three other survey dates, for spring and summer, which present ongoing and significant raptor use data but which bear no relation to the subject winter survey period.

The study area for this ongoing Maurice River research is as outlined in our March 30, 1988 submission to CU. Methodological approaches were the same as well, with 50 minute observation period occurring at seven stations along the 14 mile river study area. The results of these ongoing comparative studies as shown in Attachment 1, are as follows:

A total of 1,545 raptor sightings (of 15 species) were accrued in the 13 survey dates (winter, spring and summer) shown in Attachment 1, and therefore raptor use remained at significantly high levels comparable to the previous two study seasons. While the turkey vulture population remained average (with a peak of 123 birds in the Laurel Lake roost on February 28), black vulture sightings made a dramatic increase, with at least nine birds present in January. Osprey, of course, were not recorded during the winter, but returned as early as March 17, and 11 were sighted on April 5. At least five pairs bred along the river in 1990, and one more prospecting pair was present. The presence of these birds, plus their fledged young, pushed the July 24 total seen to 18 (and that number was seen on just half the river - all above the Maurice River bridge).



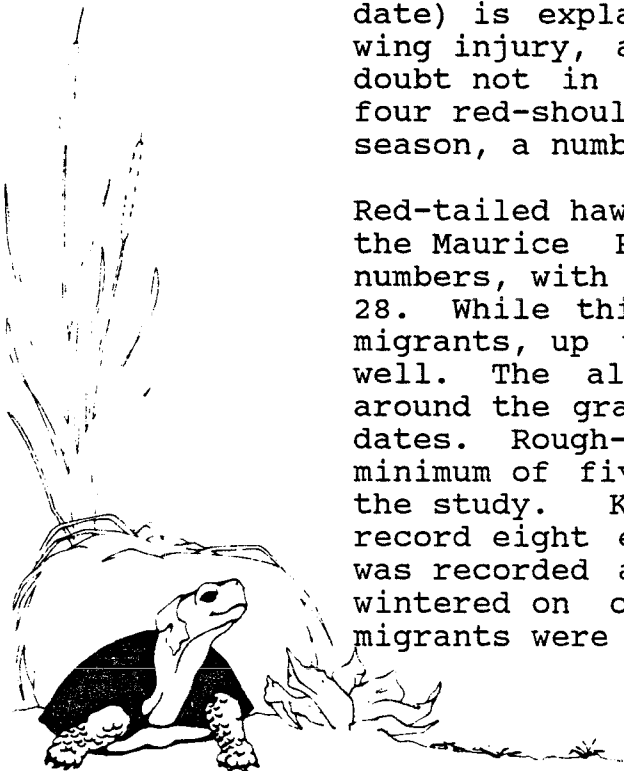
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Northern harrier numbers were remarkably steady, with a bare minimum of 24 individuals present. Northern harrier winter density remains a significant feature of the Maurice River. In addition to migratory and wintering birds, the Maurice River hosts breeding harriers as well. On March 19, two harriers were seen in courtship flight between East Point and Heislerville, and on April 4, two male harriers became involved in a territorial dispute at Robbinstown Road, just west of the Maurice River. Presumably these same two males were again seen on May 8 at East Point. In all probability, two pairs of harriers nested on the lower Maurice River in 1990.

Sharp-shinned hawk numbers were generally up and echoed a region-wide trend. Cooper's hawks were seen on seven of the ten winter surveys, with a minimum of six individuals deemed present. In addition, a Cooper's hawk was seen during the nesting season as well, when on July 24 an adult female was seen soaring near (just south of) the "grain elevator" site. This sighting confirmed the continued presence of Cooper's hawks in this area; an adult male was seen at the same site on June 27, 1989 as well.

Only one goshawk was seen, an immature female on February 28. One broad-winged hawk was seen on the very late date of November 30. The presence of this migratory species (normally in South America by that date) is explained by the fact that it had a severe wing injury, and although it could fly well, was no doubt not in shape for migratory flight. At least four red-shouldered hawks wintered in the region this season, a number higher than other study years.

Red-tailed hawks, one of the significant features of the Maurice River winter, were present in high numbers, with a record total of 59 counted on February 28. While this figure may have included some spring migrants, up to 43 were counted on other dates as well. The albino red-tail was once again present around the grain elevator and was seen on five survey dates. Rough-legs were numerous as well, with a minimum of five individuals seen over the course of the study. Kestrel numbers were up, with a winter record eight enumerated on December 31. One merlin was recorded and, for the first time, no peregrines wintered on or near the river (although numerous migrants were noted there during the fall).

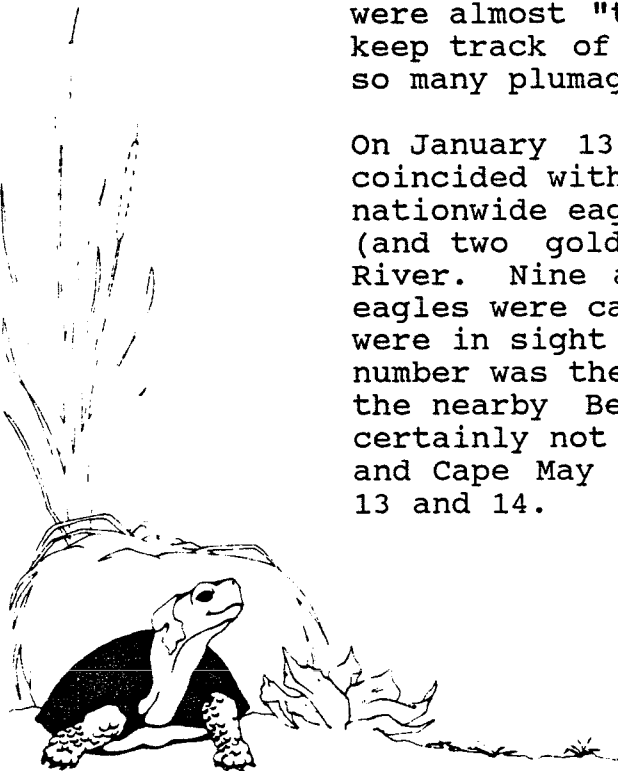


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Eagle numbers showed the most dramatic increase compared to past seasons. Unlike previous years, golden eagles were present throughout the winter season, with at least two and probably three immatures present. In fact for most of the study period and particularly in January, golden eagles could be seen virtually any day on the upper river. Two immatures were consistently (and almost constantly) seen between the "grain elevator" and the Burcham Farm. These birds spent much of the day aloft, hunting waterfowl and hurtling down in spectacular dives or "stoops". Their regularity in that area was a phenomenon unprecedented in New Jersey, and at no time in the author's 17 years of experience have golden eagles been so dependable and viewable in any place in New Jersey. These young birds had clearly found optimal winter hunting habitat along the Maurice River, and the scores of people who watched them hunting there will long remember it.

Bald eagle numbers showed a spectacular increase over previous seasons. Bald eagles were sighted on a full 100% of all winter and spring survey dates and numbers averaged significantly higher than during previous winters. A minimum of 20 individual eagles were present based on plumage differences, multiple and concurrent sightings (compared to 18 in 1987-1988 and 16 in 1988-1989). However, 20 is a conservative bare minimum, because in fact, on at least one date, eagles were almost "too numerous to count" and one can only keep track of so many plumage variations (i.e., only so many plumage variations exist).

On January 13, a day of northwest gale winds which coincided with the National Wildlife Federation's nationwide eagle census, an amazing 15 bald eagles (and two golden eagles) were seen on the Maurice River. Nine adult bald eagles and six immature bald eagles were carefully recorded, and twice seven eagles were in sight at once. Corroborating this exceptional number was the minimum total of 23 bald eagles seen in the nearby Bear Swamp roost (where most, although certainly not all Maurice River eagles roost) by HA and Cape May Bird Observatory researchers on January 13 and 14.

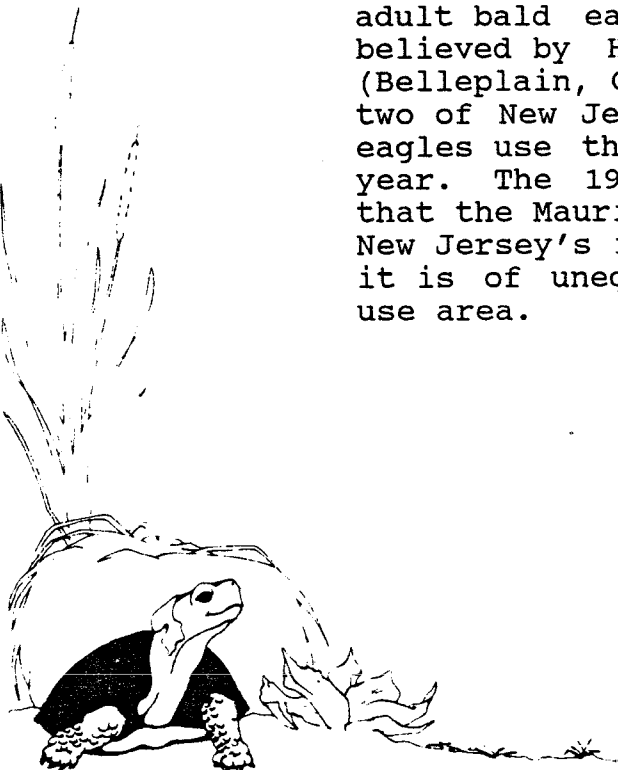


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These eagle numbers reflect a dramatic and heartening region-wide and nationwide trend, yet nonetheless establish the Maurice River as the top eagle use area in New Jersey. Nowhere else are such numbers reported, nor are sightings so consistent. And, in addition, as we have intimated, numbers using the Maurice and its tributaries over the course of the season are far higher than the mere 20 which could be separated.

Bald eagle use was not limited to the mainstem Maurice, and eagle sightings were consistently reported to HA from the Maurice River tributaries by competent observers. On February 18, three adult bald eagles were seen together (circling and "sparring" - a territorial dispute?) by HA over Waldeck Road on the northern Manumuskin River near Menantico Lake. This occurred in late afternoon, and two eagles headed off towards Lake Lenape, a known eagle use area. The third headed back downriver. Additional eagle use of the tributaries was observed by HA when on February 20, an immature golden eagle was seen heading to roost near Cumberland Pond following extensive soaring over the Holly Brook area of the Manumuskin.

Nesting bald eagles continue to use the Maurice River for hunting and feeding. Not only do the Bear Swamp birds (both nesting and wintering) hunt extensively over the river, but continual spring sightings of adult bald eagles at Leesburg and Heislerville are believed by HA to represent the known East Creek (Belleplain, Cape May County) nesting pair. In short, two of New Jersey's five known nesting pairs of bald eagles use the Maurice River daily for much of the year. The 1989 and 1990 findings continue to show that the Maurice River is of inestimable importance to New Jersey's resident eagle population. In addition, it is of unequalled importance as a wintering eagle use area.



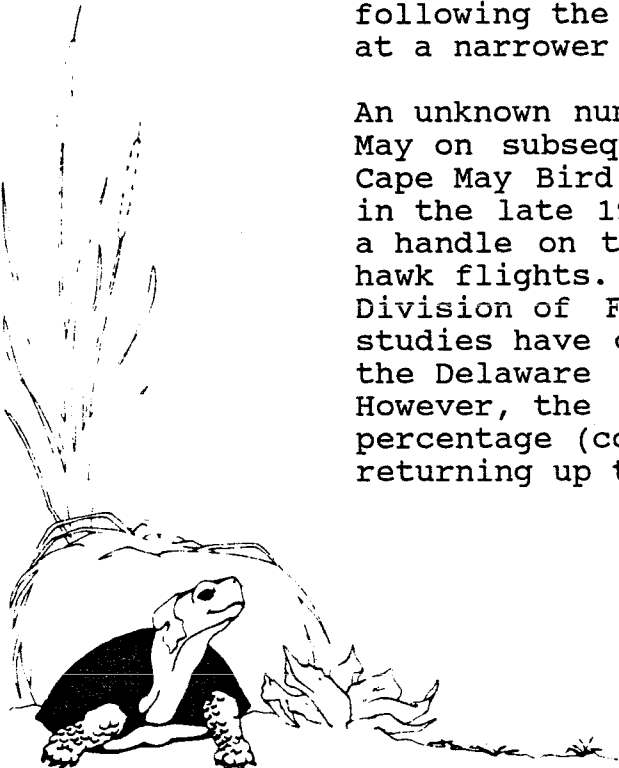
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In summary, raptor populations using the Maurice River during the winter of 1989-1990 were generally up, and this raptor data serves to complement, confirm and corroborate the findings of the previous two winter surveys conducted there by HA. Maurice River winter raptor populations continue to be of high statewide and mid-Atlantic regional significance. Raptor populations there particularly exhibit a year to year similarity, and populations of all wintering species appear steady and stable. A slow, upward trend has been noted for most species, and continued surveys are recommended to confirm and monitor this observed pattern.

In addition to the winter survey (and some spring observations) as noted above and in Attachment 1, HA conducted a preliminary, exploratory fall raptor migration study on the Maurice River as well. The results of this brief study are enticing at least, and point to a potential unrecognized and unexpected. Raptor use of the Maurice River in autumn eclipses even the spectacular levels noted in winter. The specifics and results of this fall study are outlined below.

For many years it has been anecdotally known that many raptors, particularly buteos, vultures, (and accipiters on strong winds), do not cross the Delaware Bay at Cape May Point, but return north and then west following the Delaware Bayshore, presumably to cross at a narrower point, perhaps in Salem County.

An unknown number of these birds may "return" to Cape May on subsequent days. Preliminary studies by the Cape May Bird Observatory (the "Expanded Hawk Watch", in the late 1970's and early 1980's) attempted to get a handle on the dynamics of the coastal plain autumn hawk flights. Recently, CMBO and particularly the Division of Fish, Game and Wildlife radio tracking studies have gained valuable insight on raptor use of the Delaware Bayshore area in Cape May County. However, the percentage of holdover birds and the percentage (compared to Cape May) of migrants returning up the Bayshore remains unknown.

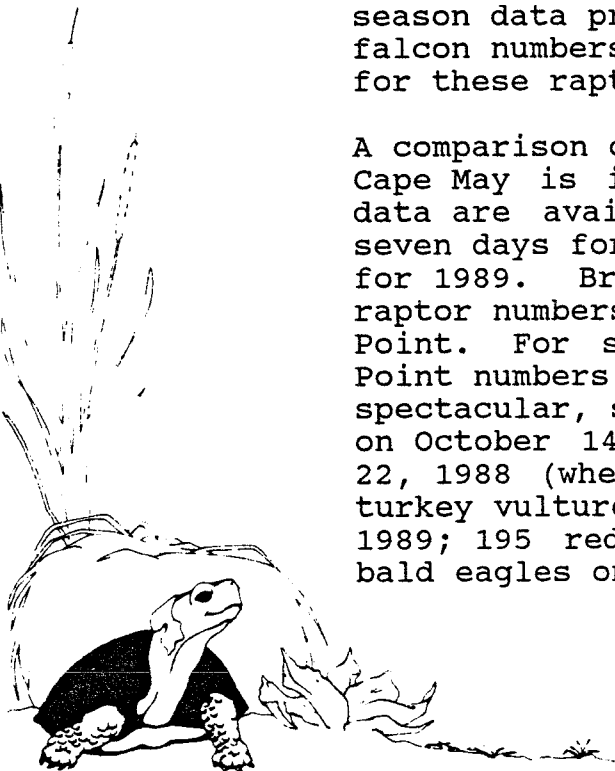


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In the fall of 1989, Herpetological Associates, Inc. (HA) in part as a component of our work for Citizens United to Protect the Maurice River (CU), conducted fixed point surveys of migratory raptors on the lower Maurice River. Attachment Two shows the results of 43 hours of observation over the 10 survey dates. This survey was essentially a hawk watch conducted at East Point and Heislerville. The Heislerville site was generally used later in the day when the flight line shifted inland, away from the actual beach and East Point Light. The East Point "peninsula" clearly functions as a "miniature Cape May", funnelling and concentrating raptors moving west along the treeline. A total of 1,789 raptors were seen in just 43 hours of observation, or about 43 hawks per hour. This HPH figure compares highly favorably with Cape May, whose hawk totals and yearly HPH figures are generally one of the highest in the nation.

The data speaks for itself. A major westward migration is occurring past East Point. The birds are easily countable due to true movement, and less of the milling often seen at Cape May. Some species are clearly more abundant here than at Cape May. Far more eagles are seen both daily and seasonally at East Point. Twice the number of rough-legged hawks were seen in just ten days at East Point than during the entire season at Cape May. Buteos and vultures may be much more numerous at East Point. Lack of early season data prevented a good sampling of accipiter and falcon numbers, yet October 11 hinted at the potential for these raptors as well.

A comparison of known historic data for East Point and Cape May is intriguing. Twenty days of comparative data are available as follows: one day for 1979, seven days for 1987, four days for 1988, and nine days for 1989. Briefly, for 20 days compared, 86% of the raptor numbers seen at Cape May were sighted at East Point. For some species, such as bald eagle, East Point numbers are much higher. Some numbers are spectacular, such as 192 sharp-shins and 419 kestrel on October 14, 1979; 2,000 broad-wings on September 22, 1988 (when only 134 were seen at Cape May); 105 turkey vultures and 21 Cooper's hawks on October 11, 1989; 195 red-tails on November 22, 1989; and nine bald eagles on October 23, 1989.

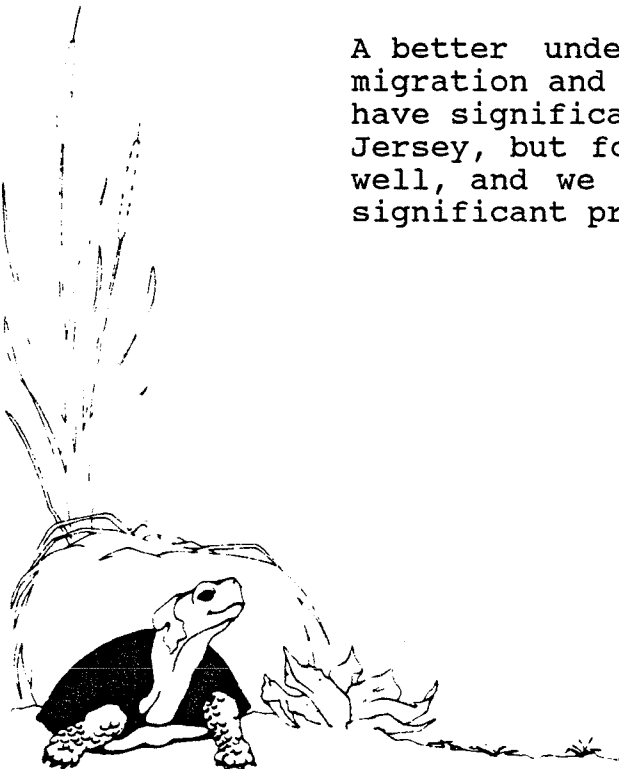


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More importantly, the 86% of Cape May raptors seen at East Point refer to comparative numbers only. An as yet unknown percentage of Cape May migrants eventually pass East Point. However, the 2,000 broad-wings, rough-leg and eagle numbers attest the number of raptors moving through southern New Jersey in autumn is far greater than those recorded at Cape May. Apparently, many raptors (buteos, vultures and eagles) may shortcut or bypass the Cape, and to some degree East Point sees a different flight. It is these dynamics which a full time East Point hawk migration study would hope to clarify, and thus is highly recommended for the future.

This preliminary hawk migration study at East Point in Cumberland County as outlined above, has allowed for a glimpse into the mysteries of the dynamics of coastal plain raptor migration. East Point has tremendous potential as a raptor migration concentration point - potential with conservation and even tourism implications. In just nine days of preliminary study in 1989, highly significant numbers of raptors were seen by HA. At one point, 55 buteos (red-tails and red-shoulders) were in sight at once. On another occasion, 21 red-tails were in a tight "kettle" over the East Point Lighthouse. On two different dates, a five bald eagle "kettle" (group) was seen (to my knowledge this has only occurred once in 14 years of study at Cape May).

A better understanding of Delaware Bayshore raptor migration and habitat use by migrating hawks would have significant conservation value, not just to New Jersey, but for northeastern United States raptors as well, and we recommend a follow-up of 1989's highly significant preliminary fall study.



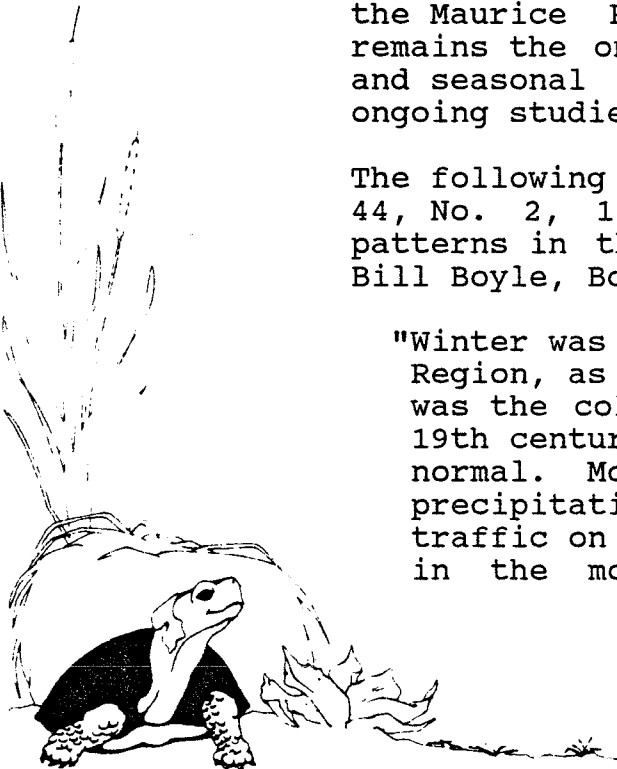
WATERFOWL:

Waterfowl numbers were up during the winter of 1989-1990 compared to previous year's totals. A minimum of 27,102 waterfowl of 25 species used the river during the study period - a figure achieved by simply adding the highest counts for each species together. (This method is highly conservation, as it does not allow for any seasonal turnover of birds. While respective turnover rates are unknown, it is safe to say that many more birds used the Maurice River marshes than mere peak numbers indicate). A total of 27,102 is higher, yet compares favorably with the 22, 244 total for 1987-1988 and the 17,445 recorded in 1988-1989. This increase is largely due to increased snow goose numbers recorded during the winter of 1989-1990.

Attachment Three presents waterfowl survey numbers by date as recorded by HA in 1989-1990. While the numbers are higher (due to snow geese), the levels of many species were actually lower than in previous years no doubt due in part to the continual and well-known flyway-wide and nationwide decline in waterfowl populations. However, the observed reduction in puddle duck numbers is better explained by 1989-1990 weather patterns. In 1989-1990, as in 1988-1989, winter weather patterns resulted in unusual migrations and resultant lack of normal late winter/early spring waterfowl build-up in southern New Jersey, including the Maurice River. (In this respect, 1987-1988 remains the only "normal" year for waterfowl numbers and seasonal distribution yet witnessed by HA's ongoing studies).

The following is excerpted from American Birds (Volume 44, No. 2, 1990) and discusses the winter weather patterns in the mid-Atlantic region in the words of Bill Boyle, Bob Paxton and Dave Cutler:

"Winter was a season of exceptional extremes in this Region, as it was over much of the East. December was the coldest since record keeping began in the 19th century, averaging about 15 degrees below normal. Most of the near-normal amount of precipitation fell as snow. Ice jams disrupted traffic on the Delaware River at Philadelphia late in the month, and the temperature of Lake Erie

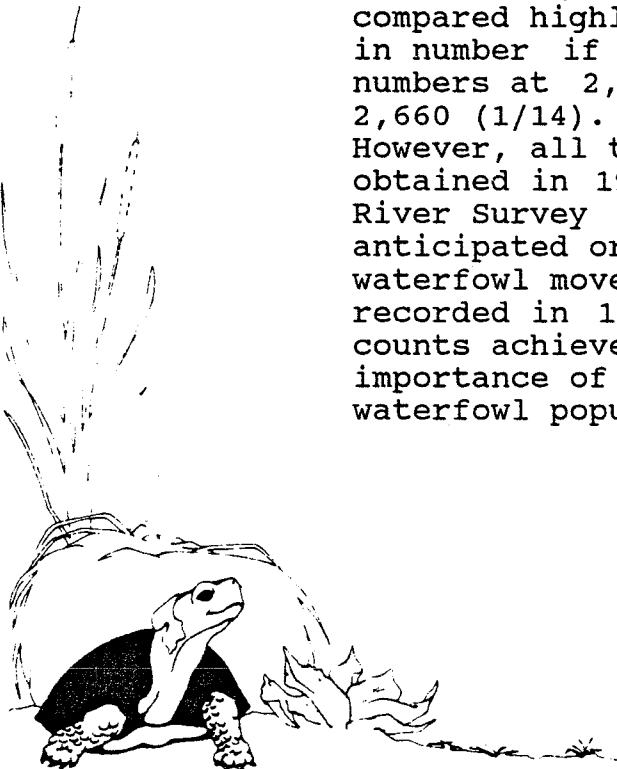


reached 32 degrees on December 19, seven weeks earlier than last year. The weather changed abruptly on New Year's Day, producing an exceptionally mild January that was the fourth warmest on record for New York State. This trend continued through most of February, with temperatures reaching the mid-eighties on several days in the southern part of the region. Only during the last week of the month did we return to normal winter weather, ushering a cooler than normal spring.

The extreme cold of December had a pronounced negative effect on the abundance of waterfowl and other water-associated birds, reducing some of the Christmas Bird Count totals that depend on these species."

In short, unusual weather reduced waterfowl numbers regionwide and in New Jersey anticipated numbers never materialized. On the Maurice River, early season (December) counts were higher than expected, as ducks fled the freezing conditions farther north. Yet, normal February and March build-ups and staging for migration farther north never occurred, possibly because high temperatures drove waterfowl farther north, and beyond New Jersey.

At 4,340 (November 30), black duck peak numbers compared highly favorably with 1988-1989's 4,470 (1/1) in number if not timing. Mallards showed in good numbers at 2,179 (12/11) similar to last seasons's 2,660 (1/14). Pintails numbers peak at 1,227 on 2/28. However, all these numbers remain far lower than those obtained in 1987-1988, the first year of the Maurice River Survey (and the only year which exhibited anticipated or "normal" weather patterns and resultant waterfowl movements). Nonetheless, waterfowl numbers recorded in 1989-1990 were still some of the higher counts achieved in the state and reflect the importance of Maurice River habitat to beleaguered waterfowl populations.

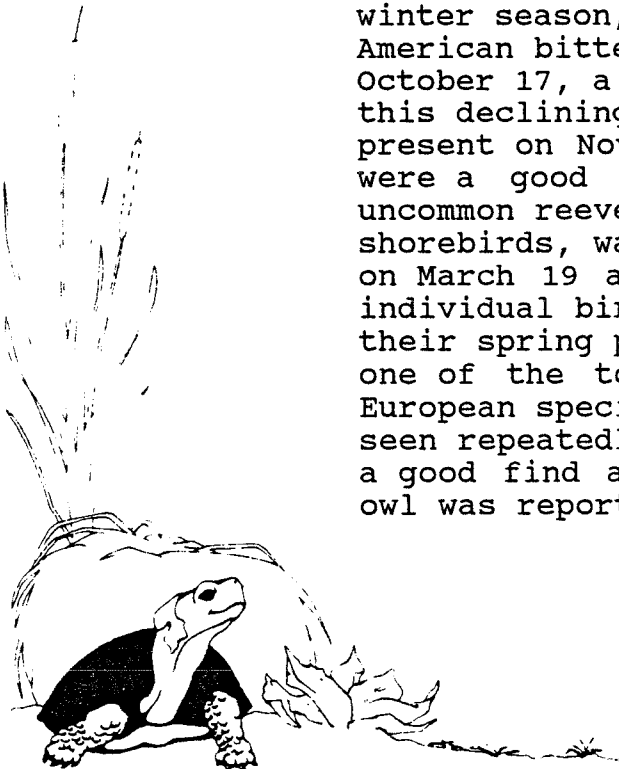


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Snow geese numbers were consistently higher this past winter, and up to 15,000 were continually present on the lower river below Heislerville. Green-winged teal counts were excellent in October. Diving duck numbers were good as well both in Maurice River Cove and in the Heislerville impoundments. Tundra swan were a welcome addition to the survey, seen on five dates with a peak of 14 migrating by East Point on February 28.

Waterfowl survey efforts were frustrated this season past by unusual weather patterns and resultant waterfowl distributions. We await another "normal" year on the Maurice to assess against the 1987-1988 baseline. Those numbers were excellent, and predictably achieved most years based on historical anecdotal information. We recommend a continuing yearly census to fully document regular Maurice River duck numbers, and predict that such effort will corroborate previous findings. The Maurice River remains one of New Jersey's most important habitats for waterfowl, yet we believe that the survey findings of the past two seasons have only hinted at the river's potential as the "waterfowl capitol" of New Jersey.

Other bird records were kept as an adjunct to the raptor/waterfowl survey and all information is on file. Great blue herons were present throughout the winter season, with a minimum of 12 present. One American bittern was seen on October 11, and two on October 17, a good total for anywhere in New Jersey of this declining species. One pied-billed grebe was present on November 13. Twenty-one savannah sparrows were a good spring total on April 5, 1990. The uncommon reeve (female ruff), one of our rarest shorebirds, was recorded twice along the river by HA, on March 19 and April 4. The presence of these two individual birds was part of a continuing pattern of their spring presence on the river, making the Maurice one of the top two spots in the state to see this European species. Great horned owls were heard and seen repeatedly during the survey, and a barn owl was a good find at East Point on December 11. A barred owl was reported to HA by reliable observers - heard

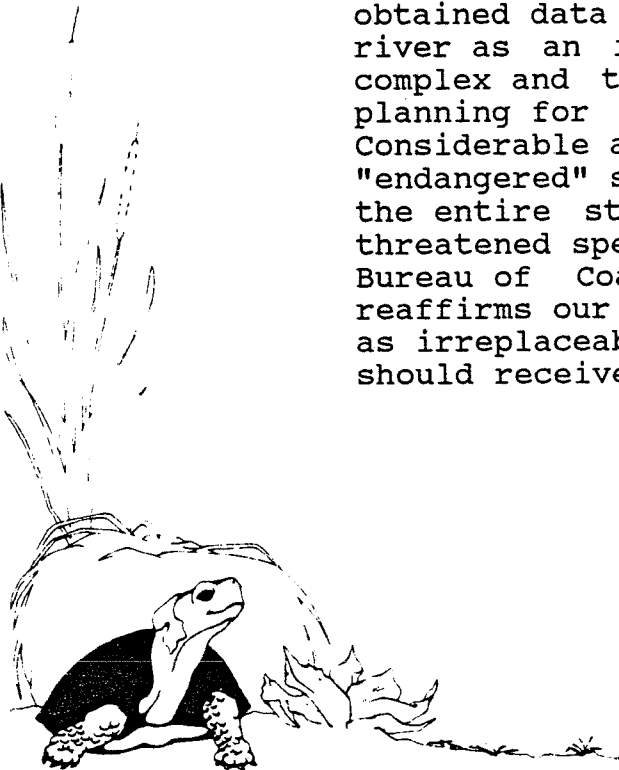


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calling near Laurel Lake (from the east bank of the river, north of the Burcham Farm), on May 7, 1990. Finally, the "endangered" short-eared owl was repeatedly seen near both East Point and Shellpile. Four short-eared owls were seen together by HA hunting the vast marshes near the river mouth (seen from Shellpile) at dusk on January 19. The river continues to provide excellent habitat for short-eared owls, and they have now been seen on the lower river during all years of this survey. Finally, over 2,000 sparrows (including two vesper sparrows and dozens of white-throated sparrows), thousands of robins, and hundreds of bluebirds were estimated at East Point on October 23, 1990 by HA, an indication of the potential of the lower Maurice River for migratory bird concentrations in the fall.

In summary, the Maurice River is critical bird habitat when compared to any other area on a statewide scale. The 1989-1990 survey by HA clearly shows that the Maurice River is a crucial part of the important Delaware Bay complex. It functionally serves as a major refuge for both waterfowl and raptors in the region, and is used by vast numbers of other migratory and breeding birds as well.

Our additional findings reinforce the results of HA's previous reports on the Maurice River. We have confirmed significant additional wildlife use and have obtained data to support both the consideration of the river as an integral part of the Delaware Bayshore complex and the need for the most careful regional planning for this unique wildlife resource. Considerable additional confirmed "threatened" and "endangered" species use strengthens the argument that the entire study area qualifies as "endangered and threatened species habitat" as defined by NJDEP, Bureau of Coastal Project Review (7:7E-3.36) and reaffirms our belief that the area should be regarded as irreplaceable critical wildlife habitat and as such should receive National Wildlife Refuge status.



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Our 1989-1990 field work confirms the conclusions and recommendations of our previous studies and emphasizes the status of the entire Maurice River system as one of the most critically important wildlife habitats remaining unprotected not only on the Delaware Bay, but in the entire state of New Jersey.

Thank you for the opportunity to work with Citizens United again. Please call should you have any questions or concerns regarding Herpetological Associates' raptor and waterfowl studies.

Sincerely,

HERPETOLOGICAL ASSOCIATES, INC.

Clay C. Sutton Jr.
Clay C. Sutton, Jr.
Southern Regional Management

Attachments

cc: Donald Fauerbach, CU
Jane Morton Galetto, CU
R.T. Zappalorti, HA
James Dowdell, HA
Robert Barber, HA
Larry Niles, ENGSP/DFGW



ATTACHMENT ONE

**MAURICE RIVER WINTER RAPTOR SURVEY, 1989-1990
(also shown are spring and summer sightings)**

	<u>11/30</u>	<u>12/11</u>	<u>12/31</u>	<u>1/12</u>	<u>1/13</u>	<u>1/19</u>	<u>1/27</u>	<u>2/20</u>	<u>2/28</u>	<u>3/19</u>	<u>4/5</u>	<u>5/8</u>	<u>7/24</u>
Black Vulture			9	9		2	2			2		2	
Turkey Vulture	43	29	65	72	37	74	50	43	123	44	72	21	11
Osprey											11	2	18
Bald Eagle	3	4	7	9	15	7	2	3	4	3	1	3	
Northern Harrier	21	21	22	21	13	18	12	18	22	13	18	4	
Sharp-shinned Hawk	2	5	4	4	1	2			3	2	4	1	
Cooper's Hawk	1	5		2	1		1	1	2			1	1
Northern Goshawk										1			
Red-shouldered Hawk		1	2			1							
Broad-winged Hawk	1												1
Red-tailed Hawk	38	43	29	40	16	40	40	39	59	35	33	8	8
Rough-legged Hawk	2	2		2	2	1	3	1	4	3	2		

ATTACHMENT ONE (CONTINUED)

	11/30	12/11	12/31	1/12	1/13	1/19	1/27	2/20	2/28	3/19	4/5	5/8	7/24
Golden Eagle				2	2	1		1	1	1			
American Kestrel	1	2	8	2	3	1	1	1	3	1	19		
Merlin									1		1		

NOTES: Full survey not conducted on 5/8 or 7/24; data shown for 5/8 is for three hours of observation only on lower half of river; data shown for 7/24 is for 4 hours of observation on upper half of river only (above Maurice River Causeway).

Additional non-survey data sightings:

- 2 Black Vultures seen on 3/17
- 1 Osprey seen on 3/17
- 3 Bald Eagles seen on Upper Manumuskinn on 2/18
- 4 Bald Eagles seen at Union Lake on 3/17
- 1 Golden Eagle seen on 12/3 and 12/26

ATTACHMENT TWO

MAURICE RIVER (EAST POINT) FALL MIGRATION RAPTOR SURVEY, 1989

	<u>10/11</u>	<u>10/17</u>	<u>10/23</u>	<u>11/2</u>	<u>11/5</u>	<u>11/13</u>	<u>11/18</u>	<u>11/22</u>	<u>11/27</u>	<u>12/22</u>	<u>TOTAL</u> <u>RAPTORS</u>
Black Vulture											
Turkey Vulture	105	2	72	51	40	51	22	80	33	46	502
Osprey	4	3	2	1	1						11
Bald Eagle	7	3	9	4	2	3	2	1	2		33
Northern Harrier	30	19	38	26	23	27	22	33	22	22	262
Sharp-shinned Hawk	155	29	30	5	3	14	1	7	3	2	249
Cooper's Hawk	21	3	16	2	2	13	1	5	4	2	69
Northern Goshawk											
Red-shouldered Hawk						10		10			20
Broad-winged Hawk	1		1								2
Red-tailed Hawk	43	2	24	23	20	165	12	195	34	28	546
Rough-legged Hawk				1		2	2	1	3	2	11
Golden Eagle						1				1	2
American Kestrel	42	5	6	2		3	1	2	1		62

ATTACHMENT TWO (CONTINUED)

	<u>10/11</u>	<u>10/17</u>	<u>10/23</u>	<u>11/2</u>	<u>11/5</u>	<u>11/13</u>	<u>11/18</u>	<u>11/22</u>	<u>11/27</u>	<u>12/22</u>	<u>TOTAL</u> <u>SPECIES</u>
Merlin	14								1		15
Peregrine		1		2					2		5
TOTAL EACH SPECIES:	422	67	198	119	91	289	63	335	105	103	1,789

NOTES: Total of 43 hours observation resulted in 1,789 raptors recorded, or about 42 hours per hour.
Hawk watch was conducted largely at East Point and Heislerville
therefore data not comparable to winter surveys, as only the lower
section of river was studied during fall migration counts).

ATTACHMENT THREE

MAURICE RIVER WINTER WATERFOWL SURVEY, 1989-1990

	<u>10/11</u>	<u>10/23</u>	<u>11/2*</u>	<u>11/5*</u>	<u>11/13*</u>	<u>11/22*</u>	<u>11/27*</u>	<u>11/30</u>	<u>12/2*</u>	<u>12/11</u>	<u>12/31</u>	<u>1/12</u>	<u>1/13</u>	<u>1/19</u>	<u>1/27</u>	<u>2/20</u>	<u>2/28</u>	<u>3/19</u>	<u>4/5</u>	<u>5/8*</u>
Tundra Swan							2	1			4						14			
Mute Swan	12	21	8		5	6	5	7	7			12	2	5	4	11	8	21	25	26
Snow Goose	932	200	40			6700	2000	6000	3000	20	14	1250	850	1150	14000	4500	5100	6100	760	
Brant			21																2	
Canada Goose	173	3	20		120	500	3		15	320	450	300			1	6	2	2		
Wood Duck	12															4		3		
Green-winged Teal	1790	1033			4	6	21	100	50	135					3	65	243	625	525	
Black Duck	280	234	411	950	470	760	1350	4340	575	4867	1533	2100	2160	879	1510	1390	2815	2515	1075	300
Mallard	171	10	7	9	2	450	425	900	20	2179	445	562	840	281	605	588	1557	292	150	2
Pintail	15	2			52		61	880		360	2	71	150	174	175	388	1227	57	4	
Blue-winged Teal																				3
Northern Shoveler																	1	2	1	
Gadwall										1				8		20			4	
American Widgeon	3														2	8	4		1	
Canvasback												6			6					

ATTACHMENT THREE (CONTINUED)

	<u>10/11</u>	<u>10/23</u>	<u>11/2*</u>	<u>11/5*</u>	<u>11/13*</u>	<u>11/22*</u>	<u>11/27*</u>	<u>11/30</u>	<u>12/2*</u>	<u>12/11</u>	<u>12/31</u>	<u>1/12</u>	<u>1/13</u>	<u>1/19</u>	<u>1/27</u>	<u>2/20</u>	<u>2/28</u>	<u>3/19</u>	<u>4/5</u>	<u>5/8*</u>
Ring-necked Duck	1									79						5		3	4	
Greater Scaup		30									1					15		266	32	
Lesser Scaup		10																	70	
Scaup (species)			18		20			20	30		12									
Common Goldeneye				4		2					36					18	2	2	2	
Bufflehead			4		30	2	1	30	150	5				9	60	125	42	62	63	
Hooded Merganser				2																
Common Merganser										9	4	51	8				3	3	1	
Red-breasted Merganser		3	5		40	10	3	15	25		2	6	6	1	104	150	31	23	43	1
Ruddy Duck		12																		

NOTES: For dates with asterisk (*), full survey not completed; survey covered lower river only, from East Point to the Maurice River Bridge.
 Additional non-survey date sightings:
 15,000 snow geese (+12" "blue geese") estimated by Robert Barber on 3/13.
 1,100 Canada Geese seen on 3/4
 6 Tundra Swan seen on 11/18
 2 Ruddy Ducks and 2 Lesser Scaup seen on 10/17