RAPTORS AND WATERBIRDS

ON THE GREAT EGG HARBOR RIVER

ATLANTIC COUNTY, NJ

WINTER, 2004-2005

The Second Season of a Systematic Study
of an Important Avian Wintering Area

and including Key Comparisons to the MULLICA RIVER

Submitted to: The Great Egg Harbor Watershed Association

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Submitted to:

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On the Cover:

Perhaps no raptor is more iconic of the Great Egg Harbor River than the *Northern Harrier*. Found throughout the length and breadth of the study area, from Mays Landing east to the Longport sod banks, the harrier or "Marsh Hawk" is a common sight from early fall through late spring. A few pairs remain to breed in the vast wetlands of the Egg Harbor estuary. Gracing even the coldest and dreariest of winter days, the Northern Harrier may reach a maximum possible wintering density along the river - a daily average of 36 harriers were seen during winter surveys in 2004-2005.

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EXECUTIVE SUMMARY:

In an effort to establish baseline data on raptor and waterbird use of the lower Great Egg Harbor River watershed, information which can be used to determine status and trends in avian populations and use, a systematic study was established during the winter of 2003-2004. This study was continued during the winter season of 2004-2005. As in the inaugural survey, data was gathered at nine sites, for forty-five minutes per site, at a rate of approximately every two weeks during the period (from December 13, 2004 to March 30, 2005) in order to assess winter populations and distribution of birds, primarily raptors and waterfowl.

Substantial use of the Great Egg Harbor River system was again proven. Systematic sampling determined raptor use of the Great Egg River and estuary to be substantial and on par not only with the lower Maurice River (the only other southern New Jersey system for which substantial systematic data exists), but also with the Mullica River, a well-known and excellent winter area for birds. Raptor, waterfowl and waterbird use of the system was found to be well higher than that indicated by both previous anecdotal accounts and 2003-2004 findings. This was particularly noteworthy on Great Egg Harbor Bay, where winter Brant and diving duck numbers were found in concentrations higher than previously reported, and in numbers highly significant for the region.

In 2004-2005, Great Egg Harbor River winter raptors and waterfowl were again documented in numbers judged to be substantial and regionally significant to New Jersey and in the Mid-Atlantic states.

GREAT EGG HARBOR WINTER RAPTORS AND WATERBIRDS

INTRODUCTION:

The Great Egg Harbor River, including its important Tuckahoe River tributary, is one of New Jersey's great river and bay systems. The Great Egg easily rivals the Mullica / Wading River complex, the Maurice River, and the Cohansey River as one of the largest and most important river and estuary systems in southern New Jersey. Despite a long history of settlement in the areas surrounding the river, and despite recent and substantial regional growth and development, much of the Great Egg Harbor River remains wild and scenic, and many areas would yet qualify as pristine under many standards of review. The Great Egg is certainly one of South Jersey's gems - in scenic vistas, natural resources, wildlife use, and recreation and ecotourism opportunities.

Despite a well-established reputation for substantial wildlife populations and avian-use prior to 2003-2004, surprisingly little systematic ornithological data had been gathered on the Great Egg Harbor or Tuckahoe Rivers. Most published avian use data was anecdotal at best -- chance sightings or non-systematic surveys (such as Christmas Bird Counts). Such records hinted at exceptional bird use of the area, but unfortunately offered biologists or planners little definitive data for resource management, land use planning options, decision-making, and protection strategies.

Compared to the long-term in-depth studies on the Cumberland County's Maurice River, and to lesser yet substantial data on the Cohansey River, little was known of raptor (hawk and eagle), waterbird, and shorebird use of the Great Egg system. (Herein waterbirds are defined largely as waterfowl - ducks and geese, and wading birds - herons, egrets, and ibis). The Maurice and the Cohansey have been intensively studied as compared to the Great Egg Harbor and Tuckahoe River system.

In winter, 2003-2004, a systematic survey of Great Egg Harbor River avian resources was initiated. While ornithological findings for that season were important in their own right, most importantly the establishment of a systematic survey methodology, route, and data collection mechanism could allow for comparisons over time. Because this single-season effort did not allow for assessment of long term status and trends, a second winter season study was continued in 2004-2005. Although the first season's effort provided an excellent baseline for future, identical systematic studies, there was no way of knowing whether the first season's results were truly representative, or whether they represented an average, "good," or even "bad" year for winter bird-use. These questions were in-part substantially answered in 2004-2005.

GOALS AND OBJECTIVES:

In winter 2003-2004, a winter raptor and waterbird survey was funded and initiated by the Great Egg Harbor Watershed Association. These studies were continued in winter 2004-2005, and reported on herein. In the mid-Atlantic region, winter is an exceptional time for bird-use, particularly raptor and waterfowl use of regional river and coastal wetlands habitats. Vast river and bay systems attract and support both a variety and large numbers of winter birds - birds which have migrated in autumn from regions farther north and west, including high Arctic regions, to feed in ice-free river and bay habitats. Winter is key time of bird-use in southern New Jersey and a crucial time in the life cycle and survival of all Mid-Atlantic hawks, eagles, and waterfowl.

Although important avian use of the Great Egg occurs on a year-bound basis, the suspected importance of the area as a key wintering area called for systematic surveys to be conducted during the highly important winter season - at a time when raptor and waterfowl numbers are at their seasonal highest in the region. The goals of this Great Egg Harbor raptor and waterfowl survey, as determined in concert with the Great Egg Harbor Watershed Association, are as follows:

1. The establishment of an avian data base which, over time, can be used to determine status and trends in bird populations and bird use - such baseline data would be of particular importance as land use changes accelerate in the watershed.

2. The determination of key use areas by birds - possible eventual habitat rankings could be of real value in directing resource protection and acquisition prioritization.

3. Submission of rare, threatened and endangered species records to the Endangered and Nongame Species Project of the DFW, NJDEP. By submission of a copy of this report, including mapping, findings of this study will supplement and aid ENSP's Landscape Project, proposed habitat rules, and other Department programs in protecting key Great Egg region habitats.

4. Bring recognition and publicity to the considerable avian resources of the Great Egg watershed. While there is much anecdotal information on the area's bird life, no systematic raptor or waterbird studies had been carried out prior to 2003-2004 on the Great Egg (excepting the DFW's twice-annual waterfowl counts). The lack of Great Egg data on winter raptors, a hallmark feature of South Jersey river systems, was at the time noteworthy in its absence - far less was known about the Great Egg Harbor River than is known about the Maurice, Cohansey, or even the nearby Mullica River to the north.

5. The key objective of the survey efforts is to discover and provide cornerstone avian resource data to be used in river management and protection. Baseline knowledge backed by strong systematic data can play a crucial role in decision making, land-use planning, and resource management on the great Egg Harbor River. Long-term monitoring, leading to a true understanding of avian status and trends over time (and in relation to a rapidly changing landscape), should play an important part in planning and protection for the Scenic and Recreational Great Egg Harbor River.

METHODOLOGY:

As in the inaugural 2003-2004 study, the winter 2004-2005 season raptor and waterbird survey on the Great Egg Harbor River was conducted systematically between the second week of December and the fourth week of March. Nine surveys were conducted, at roughly the rate of once every two weeks during the winter period. It should be noted that the December period sees some late "fall" migration into the South Jersey region, and that March is a time of substantial spring migration build-up, particularly in waterfowl numbers. Ten winter surveys had been planned, but due to a combination of snow, ice, and scheduling conflicts, only nine were carried out.

Two observers, Sutton and Dowdell, spent 45 minutes apiece at each of nine sampling sites. All raptors and waterbirds were tallied at each site, whether in flight or sitting (perched or on the water). All hawks and eagles were searched for in accordance with Sutton and Sutton (1996). Raptors were identified, aged, and sexed in accordance with Dunne, Sibley, and Sutton (1986), Clark and Wheeler (1987), and Wheeler and Clark (1995). Waterbirds were found and identified in accordance with Sibley (2000), Sutton, *et al.*, (2004), and, of course, the two authors' many years of extensive experience in Southern New Jersey and elsewhere. (Clay Sutton's resume is found at the end of this report).

Additional birds, most often raptors, observed *between* official count sites were recorded if and only if the observers were confident it had not previously counted. For example, a low-flying Cooper's Hawk dashing across the road would be added to the count if it had not been observed at the previous site. While the nine sampling sites were generally far enough apart to preclude "double-counting," the observers used extreme care to avoid recounting the same bird or birds. For example, eagles range widely up and down the river; a Bald Eagle roosting at Lake Lenape may range east to Tuckahoe WMA or farther. A "new" eagle would only be counted when direction of flight, age, plumage, or circumstance would allow the observers to confidently assess that it could not possibly have been already counted. Due to such constraints, counts of raptors, particularly eagles, are thought to be conservative. As discussed below, the Great Egg basin is a very large area, extremely wide in the lower portions.

The nine count locations, the official sampling sites, are shown on **Map 1**. Some sites did have supplemental count locations (labeled A, B, and C on our field maps, but not on Map 1) to allow for all areas to be seen and thereby all birds counted. For example, the Tuckahoe WMA site, Site 9, southeast of Tuckahoe has three impoundment pools, and not all pools can be viewed or counted from the same location. Therefore, the Site 9 count is a composite of tallies taken at three separate locations, but only one final tally is given for the site on the daily and summary data sheets. In this case, the 45 minutes are expended at the three stops put together. Only by using such alternate viewing locations could all birds, particularly waterbirds, be reasonably and reliably tallied.

In order to avoid bias in the sampling technique, the route was reversed each subsequent sampling date, run "upriver" and then "downriver" on alternate sampling days. The nine sites ultimately settled upon as a reasonable and doable sampling route are as follows, (starting on the lower estuary and working upriver):

(1) Longport Bridge Fishing Pier. This site allowed counting of the lower portion of Great Egg Harbor Bay and the Rainbow Channel/Rainbow Island area.

(2) John F. Kennedy park in Somers Point. Allowed counting of the bay east of the Garden State parkway Bridge. An alternate site was employed here; the foot of the Route 9 Bridge over Great Egg Harbor bay (north end) allowed the bay west of the bridges to be seen and censused.

(3) Jeffers Landing, including alternate sites on Job's Point Road and Jeffers Landing Road.

(4) English Creek Landing, at Wharf Road.

(5) The "Upper" tidal river. The principal count location was from the Shady River Marina on Route 559. A supplemental site used was "the bulkhead" in Mays Landing just south of Route 40.

(6) Lake Lenape. Observations were conducted from the spillway in Mays Landing.

(7) Gibson Landing, at the end of Gibson's Creek Road in the Corbin City unit of Tuckahoe WMA.

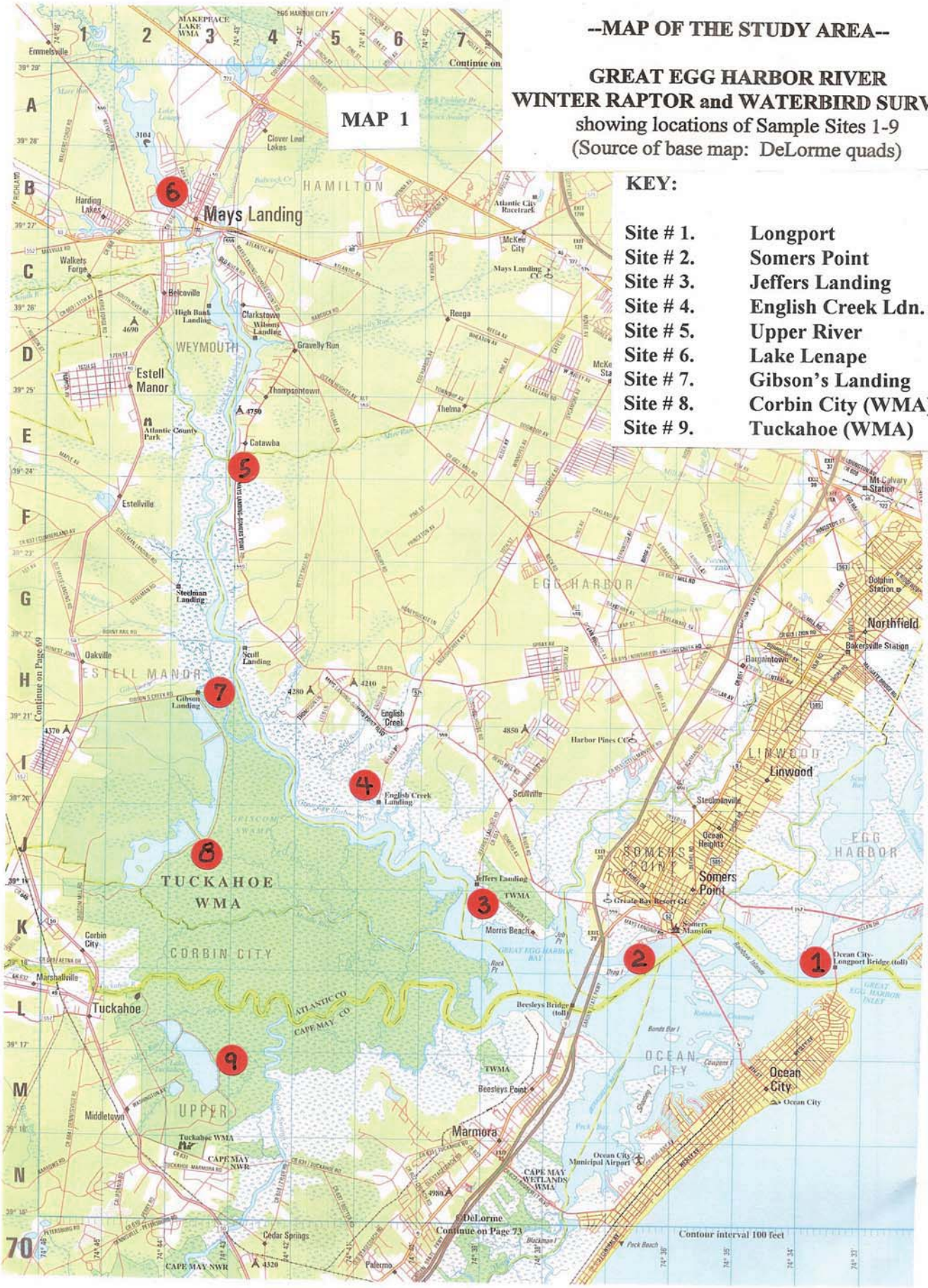
(8) The observation tower on the dikes of the Corbin City unit of the Tuckahoe WMA. Here supplemental observation points were used in order to observe all of the various nooks and crannies of the several impoundments.

(9) The Tuckahoe unit of the Tuckahoe WMA, including three supplemental stops which allowed all three impoundments to be viewed and counted. Particularly Site 9 allowed those raptors and waterfowl using the lower Tuckahoe River tributary to the Lower Great Egg Harbor River basin area to be included in survey results. This site was in Cape May County; all others were in Atlantic County, NJ.

To the greatest extent practicable, all counts were conducted in good weather. The observers carefully selected sampling days which were sunny and breezy, conditions which readily facilitate raptor hunting and movement along the river. Such conditions particularly allow for the best raptor counts (on cloudy, windless days raptors often spend much of their time perched, and therefore often are out of sight).

--MAP OF THE STUDY AREA--

GREAT EGG HARBOR RIVER
WINTER RAPTOR and WATERBIRD SURVEY
showing locations of Sample Sites 1-9
(Source of base map: DeLorme quads)



KEY:

Site # 1.	Longport	(LP)
Site # 2.	Somers Point	(SP)
Site # 3.	Jeffers Landing	(JF)
Site # 4.	English Creek Ldn.	(EC)
Site # 5.	Upper River	(UP)
Site # 6.	Lake Lenape	(LL)
Site # 7.	Gibson's Landing	(GB)
Site # 8.	Corbin City (WMA)	(CC)
Site # 9.	Tuckahoe (WMA)	(TK)

FINDINGS:

The results of the Great Egg Harbor River Winter Raptor and Waterbird Survey for winter 2004-2005 are shown in **Table 1**. Nine full surveys were carried out in the time period between December 13, 2004 and March 30, 2005.

Table 1 also shows the average (mean) count for key species, and peak daily high counts are shown in **boldface**. While average counts are of value in comparing data from year to year, and in part reflect the amount of time over the season which birds spend on the river (as well as the inevitable impacts of both daily and prolonged weather conditions upon count results), the peak count for many species far better reflects the true numbers present. For example, the peak of 1,238 American Black Ducks recorded on February 1 far better reflects the number present than the mere 248 counted 12 days earlier. Weather, ice, cloud conditions, and access can greatly vary and alter the results of any given survey. This is why a minimum of 8-10 surveys are required to truly assess bird populations present in the system.

WINTER RAPTORS:

Fifteen species of diurnal raptors were recorded over the course of the survey period representing excellent winter diversity for the mid-Atlantic region. Beyond variety, hawk and eagle numbers were again found to be high as well.

Black Vulture

Black Vultures continue to expand their range and numbers in New Jersey. Although few winter in the Great Egg area, a high of 5 was seen on January 7, and an average of 3.2 per visit was counted.

Turkey Vulture

Turkey Vultures are far more common on the river in winter than Black Vultures. Seventy-six were seen on average and a high count of 110 was estimated on March 30, 2005.

Osprey

Osprey are not an expected wintering bird in New Jersey or in the mid-Atlantic. The five Osprey counted on March 16 represent returning spring migrants (breeding birds) to the Great Egg. Forty-five Osprey, a combination of local breeders and northbound migrants, were tallied on March 30, 2005.

Bald Eagle

Bald Eagles are a hallmark of the Great Egg in winter. A high count of 11 was seen on February 2, 2005 when ice, snow, and harsh conditions to the north of New Jersey drove many birds south to our region. An excellent average of 7.3 Bald Eagles were seen on the official surveys. The Great Egg complex is one of the best and most reliable places in coastal southern New Jersey to see Bald Eagles. On the Atlantic coast of New Jersey, only the Mullica River/Wading River complex rivals the Great Egg for numbers of wintering eagles. At least three pairs of Bald Eagles nest along the Great Egg and Tuckahoe rivers: at Lake Lenape, on the Upper Tuckahoe, and near Scull Landing. Two adult Bald Eagles seen copulating on January 21 on an Osprey nest just west of the marina (Site 5) led to speculation of an additional nesting pair - possibly in the South River/Atlantic County park area.

Golden Eagle

The Great Egg is one of the top areas in New Jersey and the mid-Atlantic to see wintering Golden Eagles and is rivaled only by the Mullica River system. Seven Golden Eagle sightings were accrued, including two on December 13 and two on December 28. A minimum of three individuals were noted (based on age and plumage differences).

Northern Harrier

Northern Harriers of "Marsh Hawks" are another hallmark species on the Great Egg winter marshes. Harriers wintered in large numbers - 47 were counted on January 7 and again on February 2, and an average of 36 was accrued - excellent totals for New Jersey and particularly for the Atlantic coastal marshes.

Sharp-shinned Hawk

This small accipiter was present in significant numbers. An excellent peak of seven were counted on February 2, yet Sharp-shins averaged only 1.7 per survey. Secretive in winter, no doubt far more were present than tallied (as the peak clearly suggests).

Cooper's Hawk

Coopers, although also retiring in winter, were more conspicuous than Sharp-shins along the Great Egg. A peak of five were tallied on January 7 and an average of 1.9 was achieved. No doubt a number of Cooper's Hawks remain along the Great Egg to breed, in part attested by a territorial chase witnessed on the (early!) date of January 7 at Tuckahoe WMA. Two adult male Coopers engaged in a lengthy territorial chase, followed by the "victor's" full display flight - probably over a watching female. Cooper's breeding was also confirmed in the area by a DOR (dead-on-road) road-killed freshly-fledged juvenile Cooper's Hawk found at mile marker 26.9 on the Garden State parkway on July 29, 2004 (by Sutton).

Northern Goshawk

Goshawks are rare in winter anywhere in New Jersey. In 2004-2005, only one was seen near English Creek Landing on January 21.

Red-shouldered Hawk

Another inconspicuous, shy species in winter, Red-shoulders averaged .6 birds per survey - buoyed by the peak three individuals seen on February 2, 2004. Due to widely varying localities, probably at least five wintered in the lower Great Egg study area.

Red-tailed Hawk

Red-tails are the most obvious and conspicuous of all our wintering raptors, and were present along the length of the Great Egg in excellent numbers - attracted by the bounty and feeding opportunities provided by the vast salt marshes. A peak of 56 were seen on January 20, and an average of 44.8 were seen per survey. These are significant numbers for anywhere in New Jersey.

Rough-legged Hawk

Even prior to these studies, the Tuckahoe/Corbin City/Great Egg complex was widely known to be virtually the best place to see Rough-legs in New Jersey. The second year of survey efforts only confirmed and corroborated this reputation. 4.6 Rough-legs were seen per survey and an excellent peak of ten were tallied on February 2. During each winter season, the vast marshes of the lower river attract good numbers of this charismatic and irruptive winter visitor from the high Arctic regions.

American Kestrel

Once again, no American Kestrel wintered in the study area. The three seen on March 30 were all spring migrants - seen high overhead heading north. The American Kestrel, once common in the general area, has virtually disappeared as a wintering bird throughout southern New Jersey.

Merlin

Merlin winter in only small numbers on the mid-Atlantic Coast. Three individuals were seen, with a very good two individuals noted on December 28.

Peregrine Falcon

At least three or four Peregrines spent the winter in the Great Egg Region. This includes the nesting pair from the Tuckahoe WMA hack tower "eyrie" (maintained by ENSP) and one or two other Peregrines as well. Peregrines averaged an excellent 1.6 per survey, peaking at three on both December 13 and February 2. The Beesley's Point power plant cooling tower was found to be a popular Peregrine winter roost site.

Short-eared Owl

Crepuscular if not truly diurnal in its habits, the Short-eared Owl is the one owl which can be adequately censused during daylight hours (and using the methodology of this study). As with Rough-legged Hawk, the great Egg Harbor River area, specifically the dikes at Tuckahoe WMA (both the Corbin City and Tuckahoe sides), have long been known to be one of the best and most reliable places in all of New Jersey to find and enjoy Short-eared Owls. Thirteen Short-eared Owls were seen on five dates; a peak of seven Short-ears were seen during the December 28 survey, all from Site 9. At least another ten were known to be on the Corbin City side (Sites 7 and 8) in winter 2004-2005 – often reported by others, particularly and reliable by Karen and Brian Johnson. A targeted effort (at dusk) would have undoubtedly revealed additional Short-ears, but it can be conservatively reported that at least 17-20 Short-eared Owls wintered on the lower Great Egg. Accordingly, the Great Egg again amply maintained its reputation for hosting some of the highest regional numbers of this always exciting wetland / open country owl species.

WINTER WATERFOWL AND WATERBIRDS:

Great Egg Harbor Bay was again found to be an excellent wintering area for waterbirds. Good numbers of Common and Red-throated Loons and Grebes use the lower bay in winter. The Great Egg Harbor Bay area is unique in southern New Jersey in having a substantial population of wintering Double-crested Cormorants. A winter high of 69 was tallied on February 16; the 464 counted on March 30 included many northbound spring migrants.

Nine species of shorebirds were found by survey efforts. Winter is not a time of substantial shorebird use in the mid-Atlantic, yet shorebirds were again found to use Great Egg Harbor Bay mudflats in some numbers - mostly east of the Garden State Parkway Bridge. 450 Dunlin were counted on January 21, and at least 52 American Oystercatchers wintered or attempted to winter. A targeted shorebird survey in spring and fall on the bay mudflats would undoubtedly document major shorebird use during the migration season.

Waterfowl use of the Great Egg Harbor River and Bay system was again found to be substantial and highly significant in the region and in New Jersey. Twenty-eight species of waterfowl were found by 2004-2005 survey efforts, and high regional concentrations were again documented for a number of key species.

Canada Goose

The average of 359 per survey for the route were augmented by the peak count of 906 on February 21. While some Canadas were "local" geese, the high mid-winter counts included wild migrant Canadas driven to the region by snow and ice conditions farther north.

Brant

Among waterfowl, Brant are a hallmark species of Great Egg Harbor Bay, attracted in vast flocks to the area's rich shallow water bays and mudflats. The peak count of 5,440 on January **7** is regionally significant, and better and more accurately reflects Great Egg usage than the slightly more modest average of 3,1125.

American Black Duck

Likewise, the peak of 1,115 Black Ducks better reflects known use than the lower average of 647. Rather than driven to the region by the harsh conditions of winter 2004-2005, there is some evidence that Black Ducks were driven *from* the area. During most years, Black Ducks and to a lesser degree **Mallards** should use the entire system in substantial numbers in winter. The peak of 1,115 Black Ducks on March 16 represents northbound migrant spring "staging" on the Great Egg estuary.

Northern Pintail

The peak of 796 on December 13 was a surprise - Pintails are better-known for spring "staging" in our region in early March on their return journey north. The "spring peak" was a notable 643 Pintail. It is known that ice conditions effected timing and duration of Pintail (and Mallard) migration in the region in late winter/early spring 2004-2005. A seasonal average of 364 Pintail was noted.

Green-winged Teal

Teal numbers, although peaking at a good 859 on March 16 averaged only 229 per survey in 2004-2005. Most teal, (as well as Pintails), were recorded in Tuckahoe WMA impoundments. Of note in 2004-2005 was the presence of 3 male Common Teal (sometimes called "Eurasian Green-winged Teal") at Tuckahoe (2) and Corbin City (1) during the period (see Table 1). The three individuals recorded on March 16 and March 30 ties the known maxima for New Jersey (which was also at Tuckahoe on April 2, 1982). Of particular note is that one bird apparently truly "wintered" here (first noted January 7 and subsequently). This to our knowledge is the first record of a Common Teal wintering in New Jersey. The origin of these vagrants, as the name suggests, is Europe and Asia. **Corrigendum to 2003-2004 Report:** One Common Teal was seen at Corbin City during our 2003-2004 survey efforts, on March 3, 2004, and subsequently seen by others until March 21. We somehow failed to note this significant find in our previous report!

Diving Ducks

The vast rafts of diving ducks found on Great Egg Harbor Bay were again a delight and a key finding of the study. Anecdotally, the Great Egg Harbor Bay had long been known to support a huge concentration of diving ducks in winter, but to our knowledge it had never been quantified. In winter 2004-2005, the bay supported a flock of over 4,300 scaup and high numbers of other divers as well.

Typically, **Greater Scaup** outnumber **Lesser Scaup** by about a 10:1 ratio in salt water in winter (Walsh, et al, 1999). Therefore Great Egg Harbor Bay "scaup" are mostly Greater Scaup, yet both species were clearly present. On March 6, a peak of 4,300 scaup were tallied. This is highly significant count for southern New Jersey. In New Jersey only Raritan Bay and Sandy Hook typically have higher counts. The Great Egg Harbor Bay is an important wintering area for scaup.

Red-breasted Merganser (peak 180) and **Bufflehead** were more scattered but present in high numbers too. Bufflehead were widely spread from near Job Point to Great Egg Inlet, an active and attractive icon of Great Egg Harbor Bay in winter. A peak 599 were tallied on March 16, and Bufflehead averaged 343 per survey in 2004-2005.

Scoter were present in respectable numbers on the lower bay in 2004-2005. Over 300 **Black Scoter and Surf Scoters** were reliable found near Longport Bridge in late winter. The 415 **Long-tailed Ducks** counted on March 3 on the lower bay were a highly significant regional concentration of this handsome winter visitor.

One significant Great Egg waterbird record occurred just one day after our January 7 survey. On the following day, January 8 (and again on January 9) Karen and Brian Johnson observed an American White Pelican soaring over the river basin. One of a growing number of regional sightings of this western bird, it is none-the-less a remarkable record for mid-winter.

One non-raptor/waterbird record is included at the end of Table 1. On January 21, we watched two Red-headed Woodpeckers (1 adult/1 juvenile) at the Green Tree Golf Course (adjacent to Site #5, along Route 559 (see Appendix 1 for exact location). These birds are almost certainly local breeders - yet a significant winter record for this state-listed threatened species. On February 2, another adult Red-headed Woodpecker was observed on the survey route - along Route 50 in Upper Township, Cape May County (see Appendix 1).

Interesting non-avian sightings in winter 2004-2005 included a Red Fox hunting in daylight on the salt marsh near Longport Bridge. On March 30, an adult Harbor Seal was in Longport Inlet, west of the bridge, and a dead juvenile seal was observed the same day at the tideline on Drag Island - being fed upon by Great Black-backed Gulls. A pale, heavily spotted seal, seen close and well but briefly at Kennedy Park in Somers Point on March 16 may well have been a Harp Seal, but identification was unfortunately unconfirmed (seals are very hard to differentiate through brief sightings....). As usual, it was an interesting winter for not only birds but all of nature on the Great Egg in 2004-2005.

TABLE 1
GREAT EGG HARBOR WINTER RAPTOR AND WATERBIRD SURVEY
WINTER 2004-2005

	12/13/04	12/28/04	1/7/05	1/21/05	2/2/05	2/16/05	3/3/05	3/16/05	3/30/05	Avg.
Red-throated Loon	2	2		1			2		**7**	
Common Loon	12	10	7	2	16	8	**27**	16	23	
Pied-billed Grebe						1				
Horned Grebe	3	1	3	4	13	9	6	21	**27**	
Red-necked Grebe						1	1			
Double-cr Cormorant	67	52	65	12	39	69	10	105	**464**	
Great Cormorant		1	1	1			1	1	**3**	
American Bittern	1									
Great Blue Heron	14	**29**	28	10	13	18	15	26	6	
Great Egret	2	2	2					1	**21**	
Black Vulture		3	**5**	4	3	4	**5**	2	3	3.2
Turkey Vulture	64	64	85	38	69	102	54	101	**110**	76
Snow Goose	40			**70**						
Canada Goose	101	321	286	**906**	383	290	534	274	139	359
Brant	2,625	4,460	**5,440**	2,985	3,125	1,880	2,570	2,420	2,620	3,125
Mute Swan	37	56	62	46	40	51	62	**84**	72	
Tundra Swan	6	10	**38**	36	4	13	14	29	1	
Wood Duck								**6**	1	
Gadwall	4				2			**12**		
American Wigeon	6		12		3	27	7	**114**	2	
American Black Duck	745	998	651	365	388	412	819	**1,115**	327	647
Mallard	77	**172**	84	50	20	65	55	115	32	74
Blue-winged Teal								1	**9**	
Northern Pintail	25	21	20		31	224	347	**484**	65	132
Green-winged Teal			13	21	1	154	375	**859**	637	229
Common Teal (Eur. Gr-w. Teal)			1	1		1	1	**3**	**3**	
Canvasback		**8**	2							
Ring-necked Duck		**7**	1				1			
Greater Scaup	1	8	8	1	1	**75**		50	60	
Lesser Scaup		1				1				
scaup (spp.)		125			900	**4,300**	200	1,950	622	
Surf Scoter	12	1	2		**150**		6	10	70	
White-winged Scoter			2							
Black Scoter	4		1		**50**		20	6	25	
scoter (spp.)				30		150	**300**	60	120	
Long-tailed Duck	28	60	81	20	200	232	**415**	204	160	156
Bufflehead	214	245	397	420	280	267	201	**599**	468	343
Common Goldeneye	**22**	4	4	2	15	2	6	**22**	2	
Hooded Merganser	5	19	63	7	15	78	92	**138**	7	
Common Merganser		1		129	**205**	101	151	60	22	
Red-br Merganser	17	28	**180**	75	58	112	58	148	155	92
Ruddy Duck					**6**					

NOTE:
Peak Winter Counts are **bold faced.** Averages shown for key species.

TABLE 1
GREAT EGG HARBOR WINTER RAPTOR AND WATERBIRD SURVEY
WINTER 2004-2005

	12/13/04	12/28/04	1/7/05	1/21/05	2/2/05	2/16/05	3/3/05	3/16/05	3/30/05	Avg.
Osprey								5	**45**	
Bald Eagle	7	10	5	8	**11**	3	8	7	7	7.3
Northern Harrier	32	35	**47**	33	**47**	31	33	46	24	36
Sharp-shinned Hawk	2	1	2	1	**7**		2			1.7
Cooper's Hawk	1	1	**5**	2	3		2		3	1.9
Northern Goshawk				1						
Red-shouldered Hawk			1	1	**3**					0.6
Red-tailed Hawk	38	41	52	50	**56**	37	44	44	41	45
Rough-legged Hawk	2	5	4	8	**10**	2	5	2	3	4.6
Golden Eagle	**2**	**2**		1		1	1			0.8
American Kestrel									**3**	0.3
Merlin		**2**			1					0.3
Peregrine Falcon	**3**	2	1		**3**	1	1	2	1	1.6
Black-bellied Plover		2		**6**						
Killdeer							2		**3**	
Am Oystercatcher	**52**	17	28	16	10	19	29	8	21	
Greater Yellowlegs	1	5	5	1			3	9	**13**	
Lesser Yellowlegs				1						
Sanderling	**20**	**20**								
Dunlin	42	218	15	**450**	9	4				
Wilson's Snipe		2		2	**5**	2				
American Woodcock				**3**						
Laughing Gull									**500**	
Bonaparte's Gull	**400**	75	4							
Ring-billed Gull	200	**300**	✓	✓	✓	✓	✓	✓		
Herring Gull	250	**600**	✓	✓	✓	✓	✓	✓		
Gt Bl-backed Gull	100	**200**	✓	✓	✓	✓	✓	✓		
Forster's Tern	2									
Short-eared Owl		1	**7**	2		1		2		
Belted Kingfisher	2	**7**	2	3	1	1		2	2	
Red-hd Woodpecker				**2**	1					

NOTE:
Peak Winter Counts are **bold faced**. Averages shown are for key species.

COMPARISONS TO PREVIOUS SEASON'S FINDINGS:

The purpose of any long-term study is to discover true status and trends over time. While trends take time to elucidate, status can be understood on a shorter term basis. Sampling over a five-year period, for example, can eliminate peaks and valleys in the data -- changes which come from a particularly "good year" (for a given species) and a particularly "bad" one. Only through repeated efforts over several seasons can we determine what really constitutes an "average year".

Based on long-term regional experience and considerable anecdotal evidence over-time, at the end of 2003-2004 we felt that perhaps that season may have been a below average year for many species on the Great Egg Harbor River. Accordingly, we looked forward to 2004-2005 in regards to learning what might be likely or possible for the avian ecovalues of the system.

Table 2 shows a comparison between 2003-2004 and 2004-2005 for key species of wintering raptors and waterfowl on the Great Egg Harbor River. Peaks and averages are shown. Bearing out our expectations, the averages for 16 of the 18 key species shown were higher in the second winter season of study. Only Bufflehead (343 versus 467) and Bald Eagle (7.3 versus 8.25) showed a lower average in 2004-2005 than in winter 2003-2004.

Eleven of the eighteen key species showed higher daily peaks in 2004-2005 than in the previous year. Of the seven species which showed lower peaks in the second season, most show insignificant changes or drops. Only Bufflehead shows a significant change - its 2004-2005 peak was barely half of its previous high (which significantly was the all-time maxima for New Jersey). This lower peak certainly helped bring the average down too.

Particularly important was the much higher peak and average for Brant in 2004-2005. These substantial numbers certainly confirm and corroborate our previous experience and expectation of the Great Egg's potential for this hallmark species. It is however unknown why numbers would be so much higher in 2004-2005. Both study seasons were similarly cold and harsh, with similar duration and coverage of freeze-up conditions. Northern Pintail also showed a dramatic increase in 2004-2005, buoyed by the seasonally-unusual count of 796 on December 13.

Bald Eagle, with an average 7.3 and peak 11 birds in 2004-2005 are indeed quite similar to 2003-2004's average 8.25 and peak 14. Adult numbers were judged similar, but fewer immatures seemed to be present in the second season than during the first. Mainly the 2004-2005 average suffered from the very poor count of 3 on February 16. Due to weather conditions, and resultant little raptor activity (flying and soaring) <u>all</u> raptor species totals suffered that day. In short, beyond seasonality aspects, this is why we need to carry out 8 to 10 surveys each winter - to iron out the peaks and valleys.

It is significant though that all-in-all, 2004-2005 turned out to be a much better season overall for almost all species than the previous season. Only Scaup seemed to buck that trend, the peak of 4,300 was notably fewer than the 7,050 found in 2003-2004. Even here though, 4,300 is a very good concentration for Southern New Jersey. Also logistically, the tight scaup rafts can be hard to locate on the vast lower bay. They can be very distant, hidden behind marsh islands, and very hard to find and count in rough water conditions. Scaup too is a great example of why we need to count repeatedly over the course of a winter season, as well as over several winter seasons, in trying to learn the true status and distribution of waterfowl in the Great Egg estuary.

TABLE 2

Comparison of Winter Raptor/Waterfowl Totals

Great Egg Harbor River
2003-2004 and 2004-2005

	2003-2004		2004-2005	
	Peak	**Avg.**	**Peak**	**Avg.**
Canada Goose	764	322	906	359
Brant	2,425	985	5,440	3,125
Am. Black Duck	1,238	365	1,115	647
Mallard	220	73	172	74
Northern Pintail	497	106	484	132
Green-winged Teal	1,032	172	859	229
Bufflehead	1,168	467	599	343
Red-breasted Merganser	172	86	180	92
Black Vulture	5	1.5	5	3.2
Turkey Vulture	120	61	110	76
Bald Eagle	14	8.25	11	7.3
Northern Harrier	41	31	47	36
Sharp-shinned Hawk	3	0.88	7	1.7
Cooper's Hawk	3	1.13	5	1.9
Red-tailed Hawk	57	40	56	45
Rough-legged Hawk	9	3.38	10	4.6
Golden Eagle	1	0.38	2	0.8
Am. Kestrel	0	0	3	0.3
Merlin	1	0.11	2	0.3
Peregrine Falcon	3	1.38	3	1.6

COMPARISONS TO THE MULLICA RIVER:

In 2003-2004, in evaluating our findings on the Great Egg Harbor River, we made many comparisons to the well-studied and comparatively much-better known Maurice River in Cumberland County. While such comparisons yielded perspective and value to the Great Egg findings, we lamented to some degree that we were inevitably comparing "apples and oranges" when comparing/contrasting an Atlantic River to a Delaware Bay tributary.

Accordingly, in 2004-2005, the Great Egg Harbor Watershed Association authorized comparative studies on the nearby Mullica River, also an Atlantic tributary. In an effort to put the Great Egg's avian ecovalues in true perspective, five comparative surveys were carried out in winter 2004-2005 on the Mullica River.

The Mullica River study area and sample locations are shown on **Map 2.** The methodology used on the Mullica was designed to be identical to that used on the Great Egg: Nine sample locations were established on the Mullica between Green Bank in the west and on downriver to Great Bay Boulevard near Little Egg Inlet. Each site was visited for approximately 45 minutes each during a given survey. Sampling direction was reversed every other survey to avoid time-of-day bias. There is some difference in the geographical scope of the study areas. The Great Egg River, from Lake Lenape east to the Longport Bridge constitutes about 12 linear miles (direct miles, not accounting for turns on the river). The Mullica River, on the other hand, is about 15.6 linear miles in length from Green Bank east to the landing at the foot of Great Bay Boulevard (Seven Bridges Road). While it bears noting that the study area on the Mullica is longer, no attempt has been made (as yet) to compare width or acreage (or habitat types) of the comparative study areas. This can be carried out in future years as part of future in-depth comparisons.

Winter 2004-2005 winter raptor, waterfowl, and waterbird surveys of the Mullica River are shown in **Table 3**. The results of five winter survey dates are shown, and peaks for all species and averages for key species are also shown in Table 3. The comparison between the winter raptor and waterfowl populations of the Great Egg Harbor River and Mullica River for winter 2004-2005 is shown in **Table 4**. Peaks and averages are shown for key species.

Despite the Mullica's slightly longer length (of the study area), the two rivers show many ornithological similarities, and a few major differences, in winter. Vulture populations are remarkably similar, as are numbers of most raptors. Northern Harrier peaks and averages were similar for the Mullica and Great Egg, as were Sharp-shinned Hawk and Cooper's Hawk numbers - although the Great Egg bests the Mullica for all three. Red-tailed Hawk numbers however were consistently lower on the Mullica, and for unknown reasons (this anomaly is born out by historical data too - see below).

Rough-legged Hawks were seemingly twice as common on the Mullica, yet the Mullica average for Rough-legged is substantially boosted by the peak of 21 individuals seen on January 25. This amazing number - a very high count for New Jersey - resulted from a major incursion to the region which occurred on and just before the January 25 survey date - as large numbers were pushed into the South Jersey region by major snow falls to the north in upstate New York and the northeast states. This was a temporary incursion - lasting only about two weeks - but on January 25 we really "hit the peak" of this remarkable movement. We feel we didn't quite hit this key peak time on the Great Egg, although we did record an excellent ten Rough-legs on the Great Egg on February 2.

Similarly, the extraordinary 20 Bald Eagles seen on January 25 on the Mullica were also no doubt a result of birds pushed to the region by ice conditions to the north - a well-known phenomenon which occurs in cold winters. This peak of 20 Balds clearly boosted the average, and the Mullica's 10.8 bested the Great Egg's 7.3 Bald Eagle average as a result. Golden Eagle numbers were exactly the same on both rivers - a peak of 2 and an average of 0.8 per survey. Boosted by numerous active artificial eyries (hack-towers), the Mullica's 4.0 average of Peregrine Falcons was notably higher than the Great Egg's 1.6.

While many strong comparisons can be made between the Great Egg and Mullica for raptors, there are some notable contrasts regarding waterfowl. Canada Geese were far more numerous on the Great Egg, but Snow Geese more prevalent on the Mullica (averages clearly boosted by the large flocks attracted to Forsythe NWR - see below). Brant averaged far fewer on the Mullica - although whether this is true over time remains to be learned.

Black Ducks were more prevalent on the Great Egg, but Mallards far more common on the Mullica. Inexplicably (based on Mallard - the two species are usually found together...), Northern Pintails were virtually absent on the Mullica in 2004-2005. Similarly, Green-winged Teal were scarce on the Mullica. Strange contrasts continued for diving ducks. Scaup were uncommon on the bays of the lower Mullica, and Bufflehead far less common than on the Great Egg. Conversely, Mullica Red-breasted Merganser edged the Great Egg numbers - an average boosted by the amazing peak of 410 recorded on the lower Mullica on March 25.

Interesting sightings along the Mullica River in winter 2004-2005 included an amazing 1,075 Boat-tailed Grackles counted as they headed west over Amassas Landing (Site #3) on their way to a roost farther up the Mullica. Boat-tails are known to flock in winter, yet 1,075 is a very high count for anywhere in New Jersey. Three Red-headed Woodpeckers were seen at Batsto, near Site #7, on March 4, 2005. This is a known nesting locality for this threatened species, yet a good record for winter. An Orange-crowned Warbler at Gravelling Point on May 4 was also a good find for this rare wintering species.

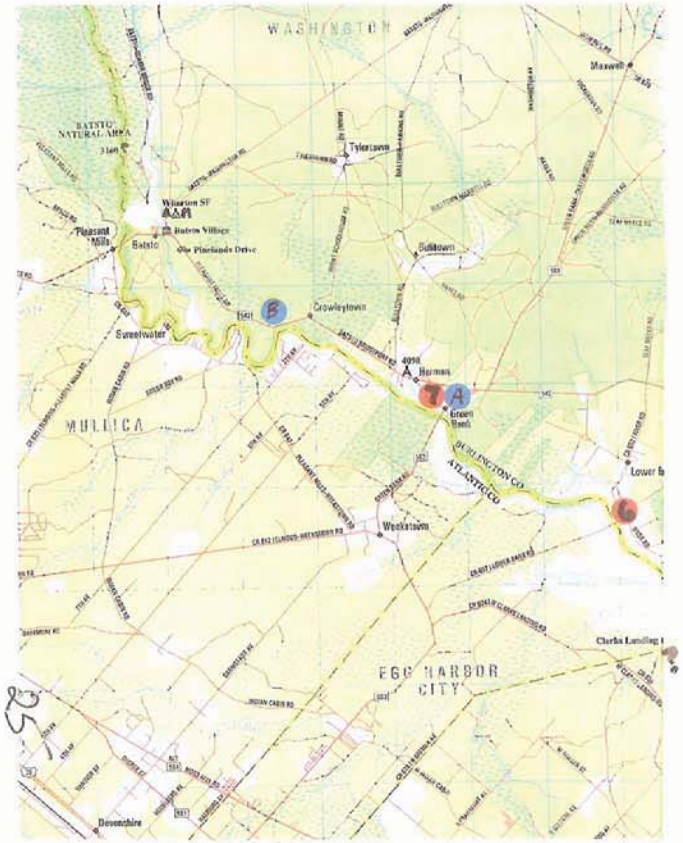
Non-avian sightings on the Mullica Estuary included a River Otter at Lower Bank on January 25, and another at the Wading River Bridge on March 25. Also on March 25, a hunting Mink was watched at length on Great Bay Boulevard, one of few we have ever been privileged to see in Southern New Jersey. Finally, Harbor Seals were relatively common on the Mullica - or at

least more so than on the Great Egg. One was seen February 11, an amazing eight on March 4, two on March 25, and six were still present on April 5. The February 11 seal was a big male - probably the largest we had ever encountered in New Jersey waters.

Any avian discussion of the Mullica River complex and Great Bay must include discussion of Forsythe National Wildlife Refuge, a.k.a. "Brigantine." While not technically/geographically in the study area, it exerts a tremendous influence on the birds of the region - particularly waterfowl. Just as the quality impoundments at Corbin City and Tuckahoe WMAs attract and concentrate ducks and geese (and as the Bivalve EEP does on the Maurice River), Brigantine by its sheer size and quality of habitat (vast impoundments) attracts and concentrates vast numbers of Mullica River region waterfowl. But where Corbin/Tuckahoe can be counted because they are "within" the study area, the impoundments at Brig are adjacent to Reeds Bay, Little Bay, and Brigantine Inlet - and are not really a part of Great Bay or the Mullica River system.

None-the-less, Forsythe exerts a massive influence on Mullica waterfowl. Because of the size and high quality of the impoundments, as well as the relative safety from hunting pressure, the NWR clearly pulls in birds from the Mullica. As one person aptly put it, "Brigantine simply 'sucks in' most of the area's waterfowl." And while many return to the nearby Mullica River to feed at night, by day they are safely back at the refuge, sanctuary, and feeding station that is Forsythe NWR.

While one could make a case to include this site and its birds in a Mullica count, to do so would bias the count to such a degree that comparisons to the Great Egg and/or other rivers would be moot and meaningless. For example, few Green-winged Teal and virtually no Pintails were counted on Mullica surveys, but at the same time, just two miles away, perhaps 10,000 teal and 10,000 pintails were known present. It is a dilemma with no real answer - to count Brig birds would be to bias the count beyond comparability (plus it would take 6-8 hours each survey to truly census the Refuge...) But, at the same time, to not count Brigantine waterfowl will forever undercount (and so bias) any Mullica survey efforts. Such are the issues with Forsythe NWR, one of the premier refuges in the country, and the implications when attempting hard comparisons to the Great Egg Harbor River.



KEY:

Site # 1.	Leed's Point	(LD)
Site # 2.	GSP Bridge	(BR)
Site # 3.	Amassas Landing	(AM)
Site # 4.	Wading River Bridge	(WD)
Site # 5.	Swan Bay WMA	(SW)
Site # 6.	Lower Bank	(LB)
Site # 7.	Green Bank	(GB)
Site # 8.	Graveling Point	(GP)
Site # 9.	Seven Bridges Road (Great Bay Blvd. WMA)	(SB)

MAP 2

--MAP OF THE STUDY AREA--

MULLICA RIVER
WINTER RAPTOR and WATERBIRD SURVEY
showing locations of Sample Sites 1-9
(Source of base map: DeLorme quads)

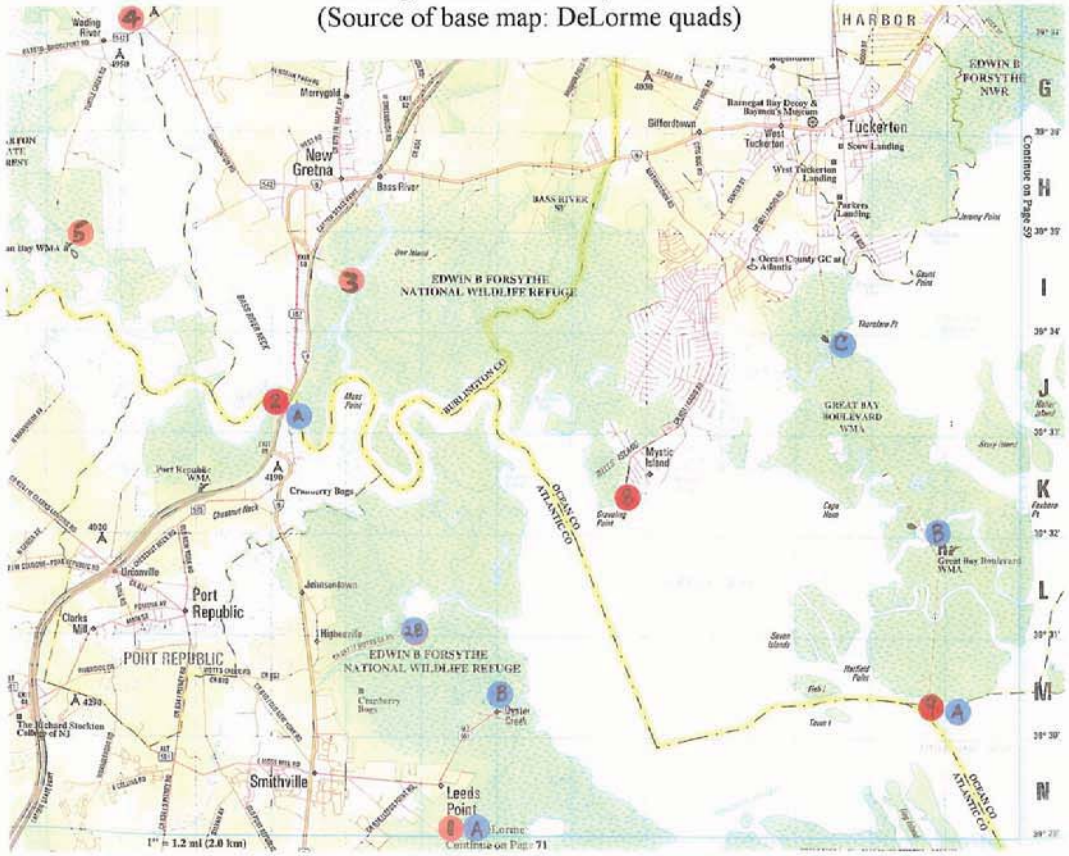


TABLE 3
MILLICA RIVER
WINTER RAPTOR AND WATERBIRD SURVEY
WINTER 2004-2005

	1/25/05	**2/11/05**	**3/4/05**	**3/25/05**	**4/5/05**
Red-throated Loon		3	4	**18**	13
Common Loon		4	2	**15**	5
Pied-billed Grebe				1	
Horned Grebe		4	3	**11**	
Double-cr Cormorant				14	**220**
American Bittern					1
Great Blue Heron	5	9	9	**12**	1
Great Egret				18	**60**
Snowy Egret					6
Glossy Ibis					1
Black Vulture	2	7	8		**9**
Turkey Vulture	45	65	63	60	**119**
Snow Goose	75	20		800	**850**
Canada Goose	**366**	158	145	149	52
Brant	750	525	120	**1,421**	1,150
Mute Swan			**6**	3	3
Tundra Swan	**55**				
Wood Duck			**26**	2	
American Black Duck	178	298	**530**	442	113
Mallard	**365**	135	338	92	50
Northern Shoveler			1		
Northern Pintail	1				
Green-winged Teal		4	5	**22**	11
Ring-necked Duck				40	
Greater Scaup	25				
scaup (spp.)	**400**		10	150	
Surf Scoter		1		**52**	40
scoter (spp.)				100	**254**
Long-tailed Duck		18	30	40	**84**
Bufflehead	**150**	16	75	90	4
Common Goldeneye			6		
Hooded Merganser	2	40	**93**	52	4
Common Merganser	**245**	10	9	5	
Red-br Merganser	20	39	60	**410**	49

NOTE:
Peak Winter Counts are **bold faced.**

TABLE 3
MILLICA RIVER
WINTER RAPTOR AND WATERBIRD SURVEY
WINTER 2004-2005

	1/25/05	2/11/05	3/4/05	3/25/05	4/5/05
Osprey				8	**24**
Bald Eagle	**20**	15	7	3	9
Northern Harrier	**42**	33	36	23	22
Sharp-shinned Hawk	1	1	1		**2**
Cooper's Hawk	**3**	2		1	2
Northern Goshawk	1				
Red-shouldered Hawk		1	**3**		
Red-tailed Hawk	28	**39**	36	12	38
Rough-legged Hawk	**21**	18	8	4	2
Golden Eagle	1	**2**			
American Kestrel	1	1			**2**
Merlin	2				
Peregrine Falcon	**5**	3	**5**	4	3
Ring-necked Pheasant	2				
Black-bellied Plover					1
Killdeer				**2**	1
Am Oystercatcher			4	**20**	**20**
Greater Yellowlegs				3	5
Sanderling				40	**100**
Dunlin				8	**30**
Laughing Gull				1	✓
Ring-billed Gull	✓	✓	✓	✓	✓
Herring Gull	✓	✓	✓	✓	✓
Gt Bl-backed Gull	✓	✓	✓	✓	✓
Forster's Tern					1
Short-eared Owl	1			**2**	**2**
Belted Kingfisher				2	
Red-hd Woodpecker			3		

NOTE:
Peak Winter Counts are **bold faced.**

TABLE 4

Comparison of Winter 2004-2005 Raptor and Waterfowl Totals

Great Egg Harbor River and Mullica River

	Great Egg		Mullica	
	Peak	**Average**	**Peak**	**Average**
Canada Goose	906	359	366	174
Brant	5,440	3,125	1,421	793
Am. Black Duck	1,115	647	530	312
Mallard	172	74	365	196
Northern Pintail	484	132	-	-
Green-winged Teal	859	229	22	8
Bufflehead	599	343	150	67
Red-breasted Merganser	180	92	410	116
Black Vulture	5	3.2	9	5.2
Turkey Vulture	110	76	119	70
Bald Eagle	11	7.3	20	10.8
Northern Harrier	47	36	42	31
Sharp-shinned Hawk	7	1.7	2	1.2
Cooper's Hawk	5	1.9	3	1.6
Red-tailed Hawk	56	45	39	31
Rough-legged Hawk	10	4.6	21	10.6
Golden Eagle	2	0.8	2	0.8
Am. Kestrel	3	0.3	2	0.8
Merlin	2	0.3	2	0.4
Peregrine Falcon	3	1.6	5	4.0

COMPARISONS TO MULLICA RIVER HISTORICAL DATA:

When reviewing 2004-2005 Mullica River data and assessing its relevance to current Great Egg Harbor River studies, it is important to consider whether this one year data set is applicable and consistent with expected and true status. As with the review of Great Egg studies, we need to ask if the findings are truly representative of the avian values of the Mullica.

While one year's data can say nothing of trends, and little as to long-term status, we can augment the data (and its relevance) by reviewing it in light of known past historical findings. Virtually all historic Mullica River ornithological information is of an anecdotal, non-standardized sort. While considerable reference to the Mullica can be found in the literature (and over decades), little of it is systematic or standardized. That said, one old non-published data set stands out - Clay Sutton's own field notes relating to raptor studies conducted along the Mullica dating back to 1974.

Table 5 shows the results of raptor surveys along the Mullica River between December 11, 1974 and December 9, 1984. This data set summarizes 37 surveys conducted over eleven winter seasons on the Mullica. While non-standardized as to route and methodology, these informal counts none-the-less covered roughly the same geographical area as the current Mullica Survey Route -- and were conducted by one of the current study's counters! In a broad-brush approach, these historical surveys offer some comparison over time -- and insight into the applicability and relevance of today's counts. They also offer poignant evidence of the changes in the abundance of some raptors over time.

Table 6 compares historical Mullica River winter raptor data to that gathered during this 2004-2005 winter survey. Between 1974 and 1984, Mullica Bald Eagles peaked at a mere 6 and averaged only 1.8 birds per survey. When these meager numbers are compared to current numbers we can see stunning proof of the recovery of Bald Eagles in New Jersey and in the east. So too, Sharp-shinned Hawk and Cooper's Hawk numbers clearly reflect known recoveries of these species from both DDT and shooting. Peregrine Falcon recovery can be seen not only in the comparison but even in the clear trend visible in the 1974-1984 data.

Northern Harrier populations -- a key feature of the Mullica -- as well as Northern Goshawk, Red-shouldered Hawk and Merlin show similar numbers in both the historical and current numbers. Historical Rough-leg peaks (20 birds achieved twice) and today's 21 are almost identical, and Golden Eagle status and use appears consistent over time.

The Red-tail Hawk trend is curious. Historical counts confirm that Red-tails were never numerous on the Mullica (at least compared to the Great Egg and the Maurice), but they have clearly become more numerous over time - as attested to by historical averages compared to the present. Interestingly, in the 1970s and 1980s Rough-legs actually were slightly more numerous than Red-tails on the Mullica in winter. Red-tail is well-known to have experienced an on-going population increase over time throughout the northeast.

The most dramatic trends are seen in Turkey Vulture and American Kestrel. Turkey Vultures (and Black Vulture were almost non-existent in winter in the 1970s and 1980s. Reflecting a known region-wide trend, vulture populations have exploded in recent years. The other trend is more sobering. American Kestrel averaged 2.24 per survey in historical surveys with a peak of 10 in 1976. In 2004-2005, only .8 were averaged per survey, with the peak a mere two. These "two," seen on April 5, were both spring migrants - seen in flight high and heading north. Only *one* Kestrel was actually known to have wintered along the vast Mullica. (In essence, both Merlin and Peregrine were more common than Kestrel on both the Mullica and the Great Egg in 2004-2005, stark evidence of the need for endangered species status for the beleaguered and plummeting American Kestrel).

In summary, although non-standardized, available historical Mullica River data offers good perspective on 2004-2005 findings. Clear trends are discernable over time, and historical numbers confirm and corroborate current findings regarding key species such as Northern Harrier, Rough-legged Hawk, and Golden Eagle. Not only important in its own right as it relates to and highlights the Mullica River's stellar status over time as one of New Jersey's most important river systems, Mullica winter raptor data also serves to place current and on-going Great Egg Harbor River studies into a proper and regional perspective. Put simply, any river that can stand up to the Mullica as well as the Great Egg has done in this comparison, is a worthy river in and of itself!

TABLE 5

Historical Mullica River Winter Raptor Surveys
1974 - 1984

Species	12/11/74	1/5/75	1/4/76	1/23/76	2/7/76	2/16/76	2/28/76	12/5/76	12/22/76	12/27/76
Turkey Vulture										
Bald Eagle	3	1	3	1	1	2	1	1		1
Northern Harrier	35	6	**50**	15	25	20	4	12	12	15
Sharp-sh Hawk	1	1	2	1					1	
Coopers Hawk					1			**2**		
Northern Goshawk										
Red-sh Hawk					1	**3**				
Red-tailed Hawk	8	12	5	8	5	**20**	10	3	6	2
Rough-leg. Hawk	8		3	10	15	10	4	1	4	1
Golden Eagle	1		2	1	**3**	1		1	**3**	2
American Kestrel	8	1	3	4	3	**10**	6	1	2	
Merlin	**1**		**1**						**1**	
Peregrine Falcon										
Unidentified eagle									2	

Species	1/1/77	1/19/77	3/17/77	12/26/77	12/28/77	1/2/78	1/15/78	1/28/78	3/5/78	12/17/78
Turkey Vulture										
Bald Eagle	1	1	1	2	1	2	1	1	2	3
Northern Harrier	20	8	12	10	6	10	12	25	10	4
Sharp-sh Hawk	2	1		3				3	1	
Coopers Hawk										
Northern Goshawk										**1**
Red-sh Hawk										
Red-tailed Hawk	4	2	15	8	2	3	2	10	6	
Rough-leg. Hawk	4	4	1	1	2	3	**20**	8	10	
Golden Eagle	1	1	1	**3**	2	**3**	**3**	2		
American Kestrel	2	2	2	6		2	2	2	2	
Merlin										
Peregrine Falcon						1				2
Unidentified eagle	2						1	1		2

Note:
Peak daily counts shown in **bold face.**

TABLE 5 (continued)

Historical Mullica River Winter Raptor Surveys
1974 - 1984

Species	12/22/78	12/27/78	1/15/79	1/27/79	12/2/79	2/2/80	2/23/80	3/1/80	12/20/80	12/21/81
Turkey Vulture							6			
Bald Eagle	1	2	2	3		**6**	2	1	1	1
Northern Harrier	6	10	10	12	25	8	2	2	12	15
Sharp-sh Hawk	1	1	1		**4**				1	
Coopers Hawk		1						1		
Northern Goshawk			**1**							
Red-sh Hawk										
Red-tailed Hawk	2	4	2	6	8	4	5	3	2	3
Rough-leg. Hawk	2	6	4	**20**	4	5	2	6	4	5
Golden Eagle	1	2		2		1			1	2
American Kestrel	1	1	1	2	4	1	1		1	2
Merlin										
Peregrine Falcon					**3**				1	1
Unidentified eagle		2	1	2						

Species	1/8/82	2/21/82	12/18/82	1/1/83	1/1/84	1/22/84	12/9/84	Avg. (N)
Turkey Vulture		4					1	.3
Bald Eagle	4	2	4	1		2	5	1.8
Northern Harrier	18	3	20	10	20	8	30	14.1
Sharp-sh Hawk	1					1	2	.76
Coopers Hawk								.14
Northern Goshawk								.05
Red-sh Hawk	1				1	1		.19
Red-tailed Hawk	8	10	10	10	5	6	6	6.14
Rough-leg. Hawk	12	3	**20**	10	6	2	6	6.22
Golden Eagle	1	2	2	1			2	1.32
American Kestrel	12	2		2	2	1	2	2.24
Merlin					**1**		**1**	.14
Peregrine Falcon	2	2	2	1		2	2	.54
Unidentified eagle								.35

N = 37 Surveys over 11 Winter Seasons
Peak daily counts shown in **bold face.**

Other Sightings of Note
Snowy Owl - 1/5/75
Barn Owl (4) - 3/1/80
Long-eared Owl (2) - 3/1/80
Northern Shrike 12/22/78 & 1/15/79
White Pelican 12/17/78 & 12/27/78
White Pelican (2) 1/1/83
Tundra Swan (500) 12/26/77
Tundra Swan (250) 12/17/78
Tundra Swan (200) 2/2/80
Tundra Swan (750) – 12/18/82
Com. Goldeneye (50) -3/1/80 (at Wading River Bridge)
"Peale's" Peregrine Falcon 12/17/78 (Cornell Release)
Golden Eagle predation on Great Blue Heron – 12/27/76

TABLE 6

Comparison of Raptor Numbers

Historical Mullica River Data to Present 2004-2005 Mullica River Survey

	1974-1984		2004-2005	
	Peak	**Avg.**	**Peak**	**Avg.**
Black Vulture	0	0	9	5.2
Turkey Vulture	6	0.3	119	70
Bald Eagle	6	1.8	20	10.8
Northern Harrier	50	14.1	42	31
Sharp-shinned Hawk	4	0.76	2	1.2
Cooper's Hawk	2	0.14	3	1.6
Northern Goshawk	1	na	1	na
Red-shouldered Hawk	3	na	3	na
Red-tailed Hawk	20	6.14	39	31
Rough-legged Hawk	20	6.22	21	10.6
Golden Eagle	3	1.32	2	0.8
American Kestrel	10	2.24	2	0.8
Merlin	1	na	2	na
Peregrine Falcon	3	0.54	5	4.0
unidentified eagle	2	0.35	na	na

DISCUSSION:

As detailed above, the systematic surveys carried out on the Great Egg Harbor River in winter 2004-2005 confirmed and corroborated that information gathered in the 2003-2004 season. Focused systematic survey efforts over two seasons have clearly determined the Great Egg Harbor River system to be an important area in New Jersey for wintering raptors (both diversity and numbers), and waterbirds -- principally waterfowl, and most notably Brant, American Black Ducks, scaup, Bufflehead and Red-breasted Merganser.

An important aspect of the 2004-2005 project was the determination of specific use areas frequented by rare, threatened, and endangered species. Because the area was divided into nine count sites, locational or site-specific sightings information was accrued, maintained and documented. During each survey, all rare, threatened and endangered species sighted were mapped (onto the grid system of DeLorme quads) as to where they were sighted and where specific movements were noted.

All threatened and endangered species mapping is included here as **Appendix 1**. These date and site-specific maps, backed by this report, should suffice to meet DFW, ENSP documentation requirements for RTE reporting. By copy of this report, all documentation and mapping should be forwarded to the ENSP in order to realize the full value of these survey efforts as they relate to RTE species protection and, in turn, appropriate land-use planning. New Jersey-listed threatened and endangered species encountered during this study included Bald Eagle, Northern Harrier, Northern Goshawk, Red-shouldered Hawk, Peregrine Falcon, Osprey, Cooper's Hawk, Short-eared Owl, and Red-headed Woodpecker.

While the state list sometimes differentiates between *breeding* and *non-breeding* populations, a winter period survey can not often ascertain into which group an individual bird falls. For example, many of our Bald Eagles are true *wintering* birds from farther north, but our *resident* adult eagles, being non-migratory, are therefore present in winter too. This is true also, if to a lesser extent, with all other raptor species. (This is not only generally and widely known, but clearly borne out by our extensive, comparative, Maurice River experience and observations). In addition, the time period that we normally consider to be "winter" is in fact nesting season for Bald eagles (our earliest-nesting diurnal raptor), and our late winter period is easily the courtship, mating, and nest-building season for many resident and early arrival hawk species such as Red-tails, Red-shoulders, Harriers, Cooper's Hawks, and Peregrines.

CONCLUSIONS AND RECOMMENDATIONS:

Targeted and systematic studies on the great Egg Harbor River in Winter 2004-2005 again revealed that substantial numbers and variety of raptors and waterbirds are dependent on the river and bay during the winter season. Regionally significant numbers of raptors and waterfowl were recorded, important baseline data which confirms, corroborates, expands and develops the extent of the avian ecovalues which had first been hinted at in previous anecdotal and non-systematic reports, and documented by inaugural, pioneering studies in 2003-2004. Raptor and waterfowl numbers are similarly high, significant and substantial when compared to all other regional barometers, including preliminary, similar studies on the nearby and highly-regarded Mullica River.

Sometimes however, information and answers only beget more questions. As detailed above, it is inherently difficult to fully evaluate one year of data or even two. We do not as yet know what constitutes an "average" winter on the Great Egg, or on the Mullica, the river to which we are comparing the Great Egg. While many apt comparisons can be made, some contrasts remain substantial.

To gain a better picture of the true regional importance and significance of the Great Egg System, the following recommendations are offered and suggested:

1. **The Great Egg Winter Survey should be carried out for at least three more years**, using the same methodology as employed in 2003-2004 and 2004-2005. A five-year average would be the ideal to create a true baseline of what constitutes a normal "average" winter for the Great Egg. A more long-term study would more adequately elucidate the true avian ecovalues of the system. Based on many of the thoughts and comments above, it is still possible that expected long-term averages of raptors and waterfowl may be higher than those numbers observed in 2003-2004 and 2004-2005.

2. **We urge and recommend that comparative studies be continued on the Mullica River**. The Mullica River is another system for which, prior to 2004-2005, only anecdotal and non-standardized ornithological data exists. To learn the Great Egg's true importance on the Atlantic Coast of New Jersey, it would be interesting to compare and contrast over time its avian ecovalues to those of the Mullica. These two rivers are similar in length and scope; continuing data on the Mullica would be of great value in determining the relative role and importance of the Great Egg. We do not believe the Mullica needs to be sampled as often as the Great Egg; if the Great Egg is monitored 8-10 times, a schedule of 4-6 visits on the Mullica should allow for a valid comparison. By comparing and contrasting Great Egg findings to a second similar Atlantic Coast river system, we should be better able to put Great Egg raptor and waterfowl ecovalues in better regional and statewide perspective.

Nevertheless, even if no additional studies are done, or if studies on the Great Egg are not continued, two seasons of surveys have clearly indicated that the Great Egg Harbor River and Bay are truly a "harbor" for substantial and significant populations of raptors and waterfowl in winter, and these concentrations have now been systematically documented to be regionally important and significant in both New Jersey and the entire mid-Atlantic Coastal region. Not surprisingly to those who know the wonders of the river in winter, the Great Egg Harbor River has, as expected, again been found to be "great" indeed.

ACKNOWLEDGMENTS:

We thank all those friends of the Great Egg Harbor River for their encouragement and support during this project. We thank Pat Sutton and Gail Dwyer for their generous assistance with data charts and report writing, and we particularly thank Doyle Dowdell for assistance in the field on several surveys. We heartily thank Karen and Brian Johnson for sharing so many Great Egg sightings with us, and for showing such great interest in the study. Capt. Jim Watson took a major interest in the project, and offered great logistical insight and field assistance. Mike Shapiro shared many interesting sightings and offered considerable insight and knowledge of the Mullica River's resources. Thank you all; your enthusiasm and love of the river and its resources are infectious.

We sincerely thank *all* of the officers and members of the Great Egg Harbor Watershed Association for their interest, support, and great enthusiasm for this winter study. We particularly thank Fred and Julie Akers for the advocacy for the study, and for their knowledge and assistance in the planning and preparation for the field work. We had some fun in the field, too! Thanks, Fred, for nurturing a tiny idea into a landmark and ongoing study, and thanks for your always friendly encouragement and optimistic outlook. Keep up all your good work on the Great Egg.

Finally, we thank the U.S. Department of the Interior's National Park Service, Wild and Scenic Rivers Program for their assistance to the Great Egg Harbor Watershed Association. The award of a Wild and Scenic River Partnership Grant enabled this survey to be conducted and the report compiled. Thank you for your visions of a wild and scenic Great Egg and Southern New Jersey.

It was a pleasure and privilege working with you all, named and unnamed, on this important study aimed at keeping the Great Egg healthy, protected, and available to the myriad of birds and other wildlife so dependent upon it. We look forward to seeing you in the field.

We dedicate this study season and report to the memory of Lynne Ward, who passed away this past winter while the study was underway. From her hospice bed, she indicated she would like to have her estate fund the Mullica River comparison studies, and a bequest to the Great Egg Harbor Watershed Association made it so. Lynne was the daughter of the late James Akers, a titan in South Jersey ornithological and conservation history. Her gift was inspired by her father, and we can only hope our humble work here has been a fitting tribute to both of their lives.

– Clay Sutton

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All comparative Maurice River ornithological studies referenced and discussed throughout this report and the previous 2003-2004 Great Egg Report have been directed and co-authored by Clay Sutton, either as an independent contractor or formerly as staff ornithologist of Herpetological Associates, Inc., Plant and Wildlife Consultants. (Cohansey River studies are embedded within the Maurice River annual reports). Principal publications resulting (either wholly or in part) from these studies (and either funded or co-funded by Citizens United to Project the Maurice River and its tributaries, Inc.) are as follows:

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APPENDIX 1.

GREAT EGG HARBOR RIVER

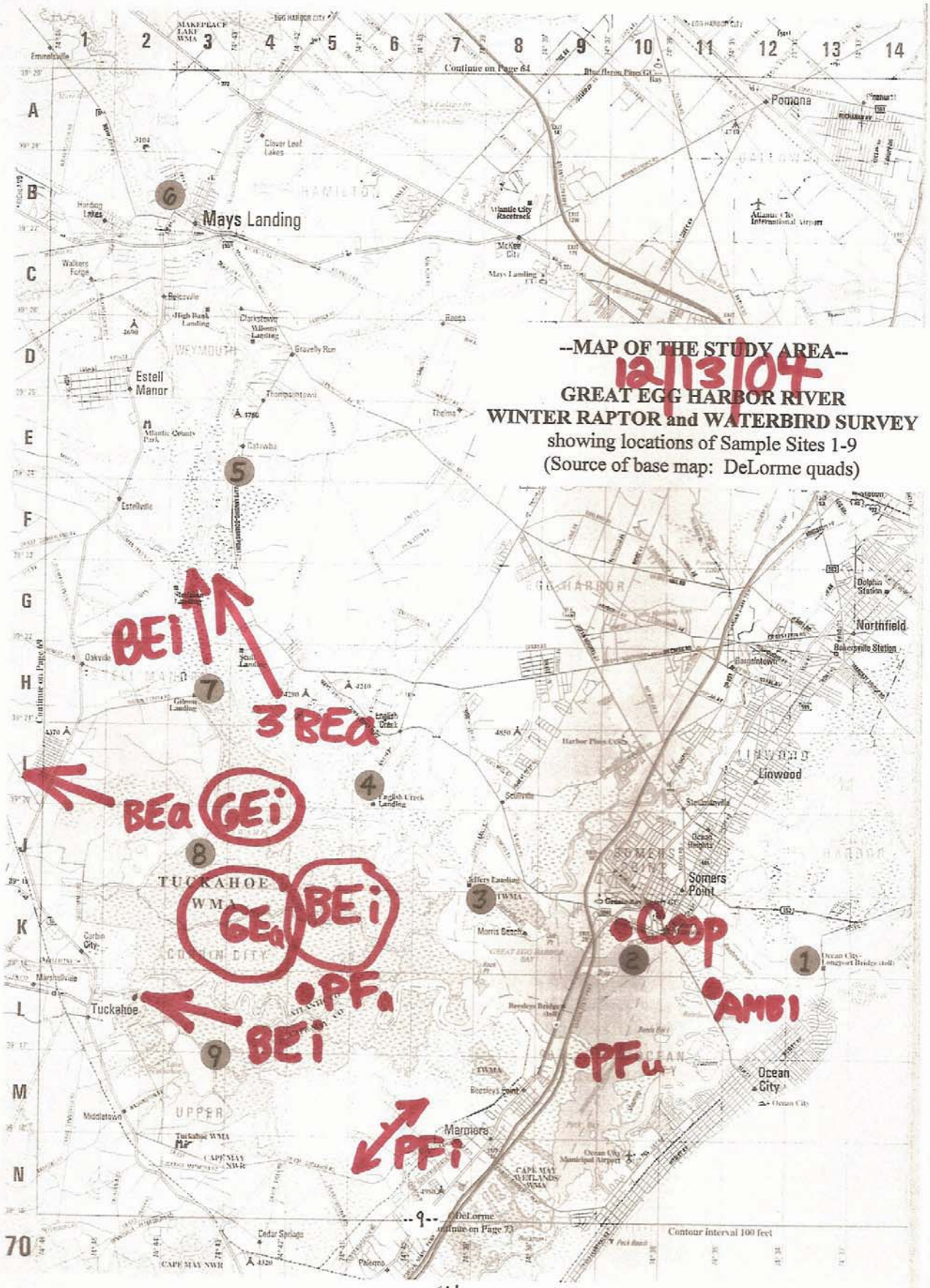
Rare, Threatened, and Endangered Species Locations

FIELD MAPS

Winter 2004-2005

KEY:

BE	**Bald Eagle**
NH	**Northern Harrier**
CP	**Cooper's Hawk (also: Coop.)**
NG	**Northern Goshawk**
RS	**Red-shouldered Hawk**
GE	**Golden Eagle**
PG	**Peregrine Falcon**
SE	**Short-eared Owl**
AB	**American Bittern**
RH	**Red-headed Woodpecker**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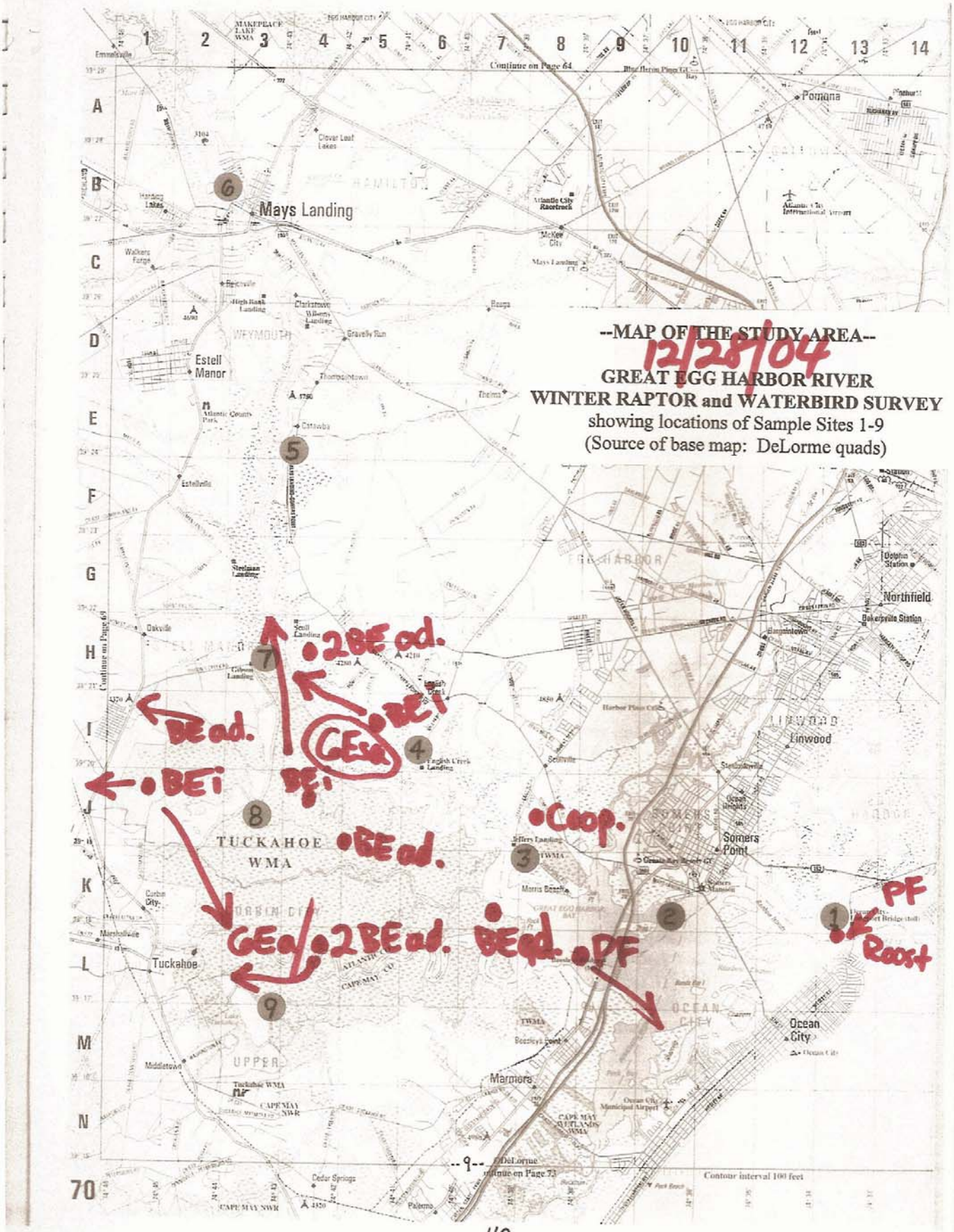
12/13/04
GREAT EGG HARBOR RIVER
WINTER RAPTOR and WATERBIRD SURVEY
showing locations of Sample Sites 1-9
(Source of base map: DeLorme quads)
Mays Landing
Pomona
Estell Manor
Northfield
Linwood
Somers Point
Ocean City
Tuckahoe
TUCKAHOE WMA
Marmora
BEi
3 BEa
BEa GEi
GEa BEi
PFa
BEi
Coop
AMBI
PFu
PFi
Contour interval 100 feet
41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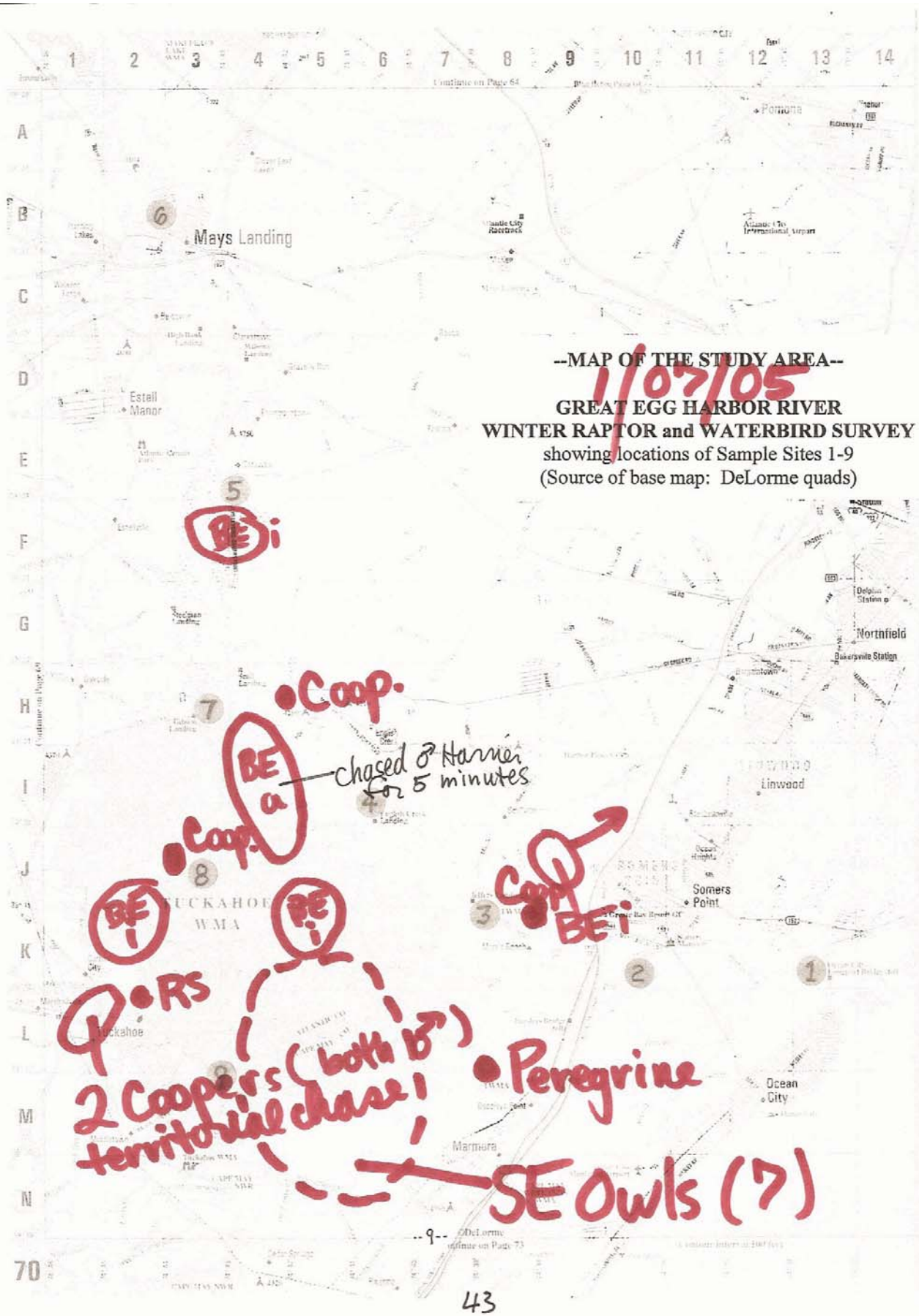
12/28/04
GREAT EGG HARBOR RIVER
WINTER RAPTOR and WATERBIRD SURVEY
showing locations of Sample Sites 1-9
(Source of base map: DeLorme quads)
Mays Landing
Estell Manor
Pomona
Northfield
Linwood
Somers Point
Ocean City
Tuckahoe
TUCKAHOE WMA
Marmora
Continue on Page 64
Continue on Page 69
Contour interval 100 feet
2BE ad.
BE i
BE ad.
BE i
GE ad
BE i
Coop.
BE ad.
GE ad/2BE ad.
BE ad.
DF
PF
Roost

42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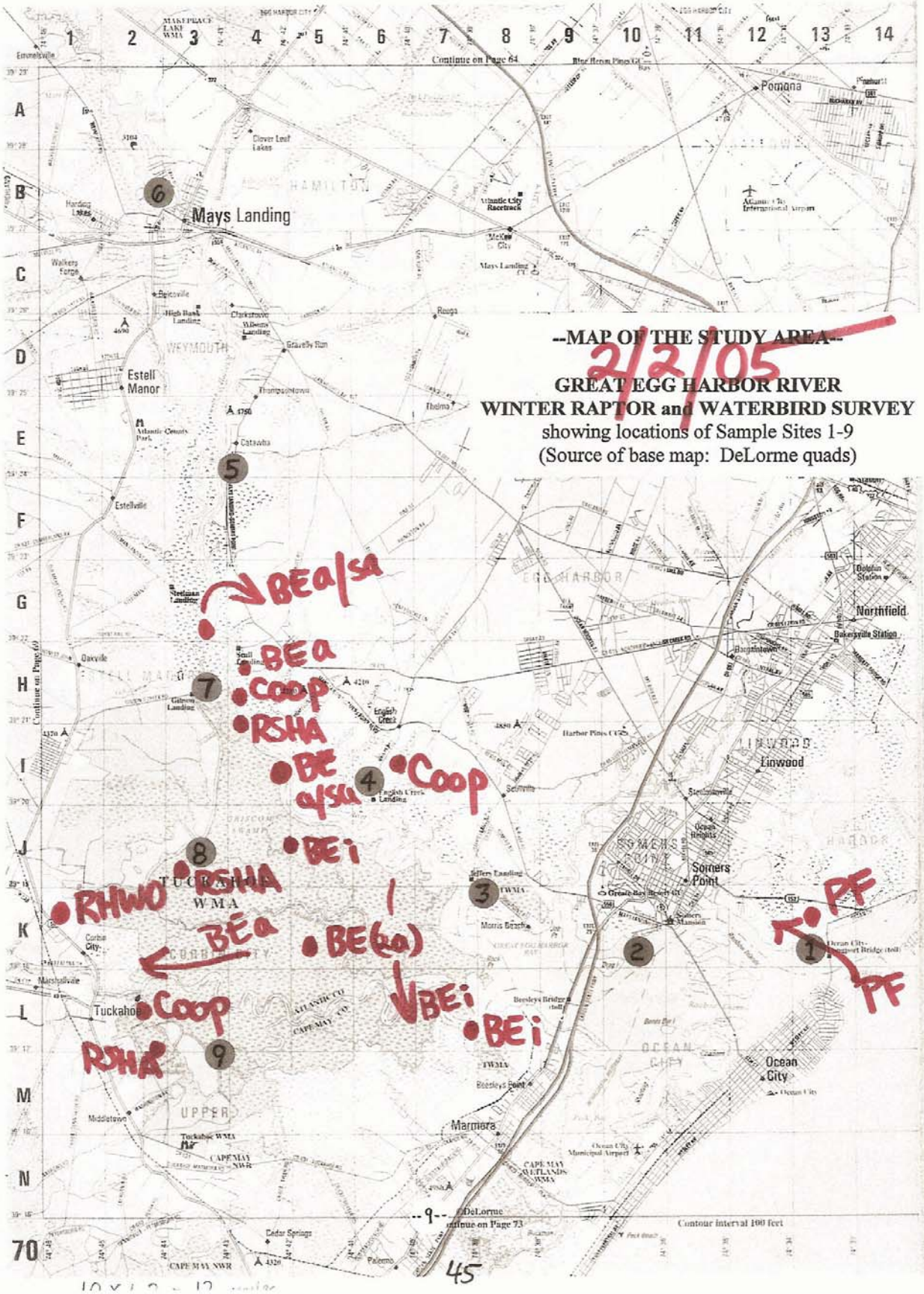
1/07/05
GREAT EGG HARBOR RIVER
WINTER RAPTOR and WATERBIRD SURVEY
showing locations of Sample Sites 1-9
(Source of base map: DeLorme quads)
Mays Landing
Estell Manor
Northfield
Linwood
Somers Point
Ocean City
Marmora
Pomona
Coop.
BE a
chased ♂ Harrier for 5 minutes
Coop.
BE i
BE i
BE i
Coop
BE i
RS
2 Coopers (both ♂) territorial chase!
Peregrine
SE Owls (?)
43


--MAP OF THE STUDY AREA--
GREAT EGG HARBOR RIVER
WINTER RAPTOR and WATERBIRD SURVEY
showing locations of Sample Sites 1-9
(Source of base map: DeLorme quads)
1/21/05
Mays Landing
BEi
0-2 BEad.
0-2 RHWO
Red-headed woodpecker
BE-2 ad.
coop.
PS
N. GOS
BEa
BEi
GE
BEi
Coop.
Pomona
Estell Manor
Northfield
Linwood
Somers Point
Ocean City
Marmora
TUCKAHOE WMA
Tuckahoe
Contour interval 100 feet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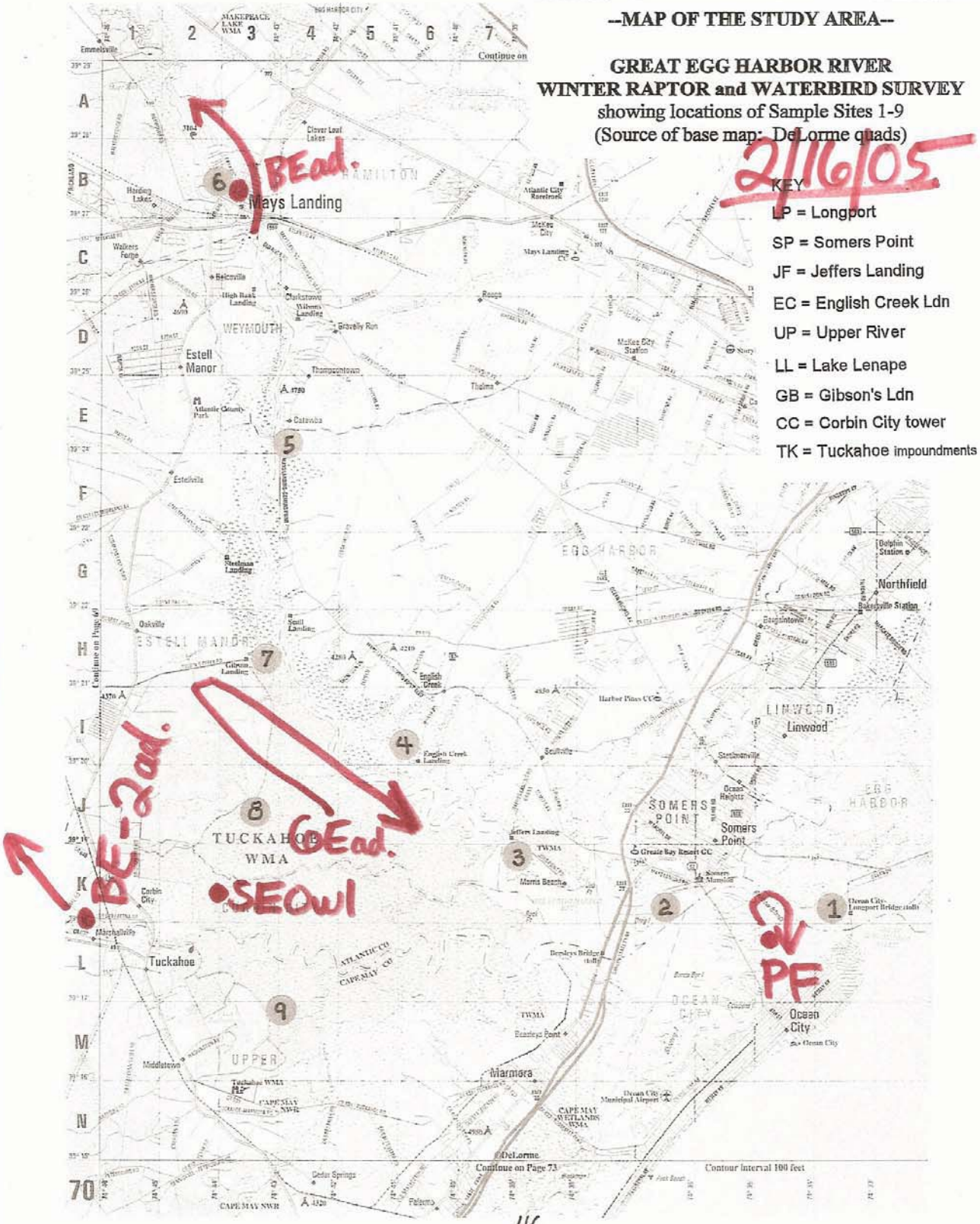
2/2/05
GREAT EGG HARBOR RIVER
WINTER RAPTOR and WATERBIRD SURVEY
showing locations of Sample Sites 1-9
(Source of base map: DeLorme quads)
Mays Landing
Estell Manor
Pomona
Northfield
Linwood
Somers Point
Ocean City
Marmora
Tuckahoe
BEa/sa
BEa
COOP
RSHA
BE a/sa
COOP
BEi
RHWO
RSHA
BEa
BE(ba)
BEi
BEi
COOP
RSHA
PF
PF
Contour interval 100 feet
45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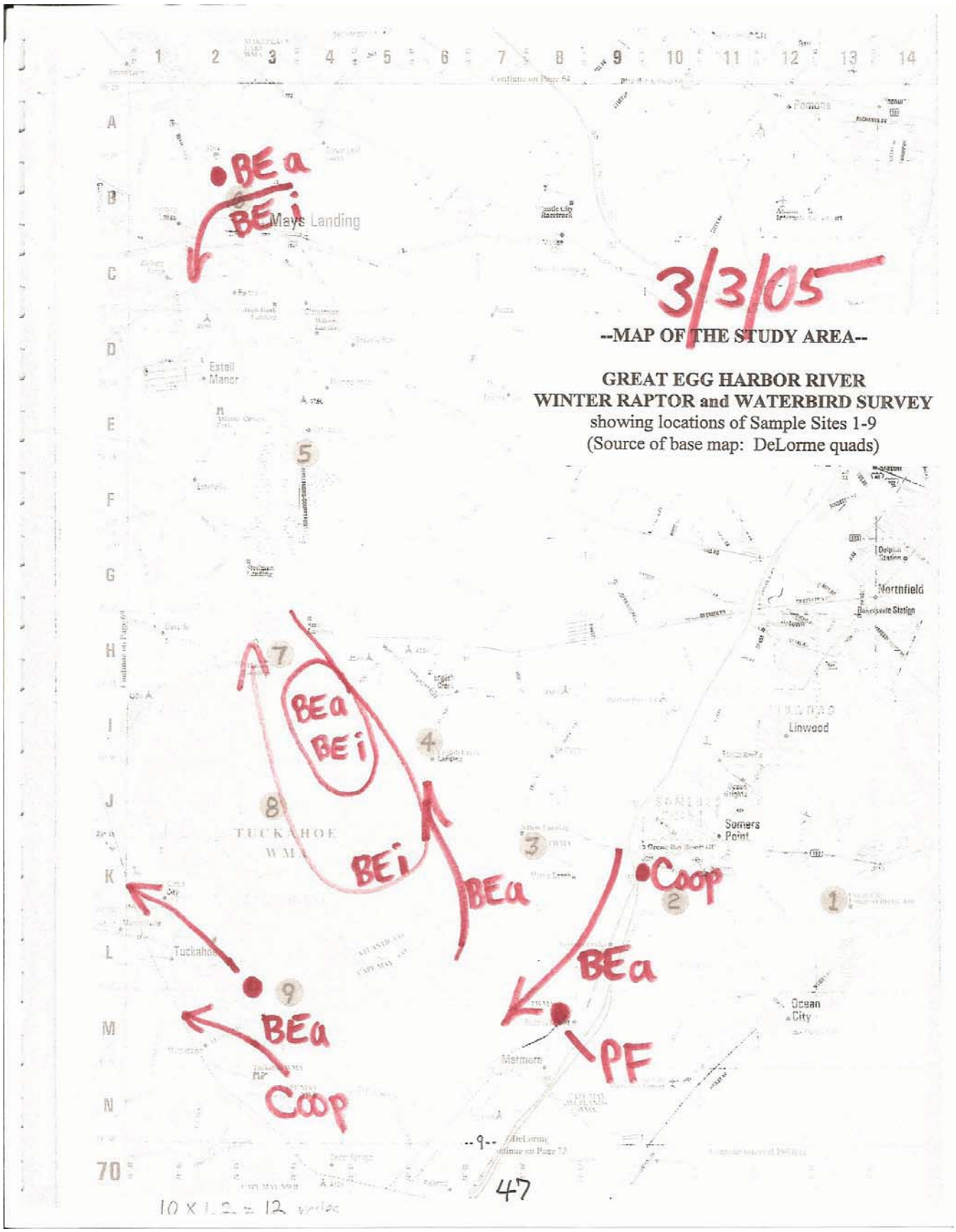
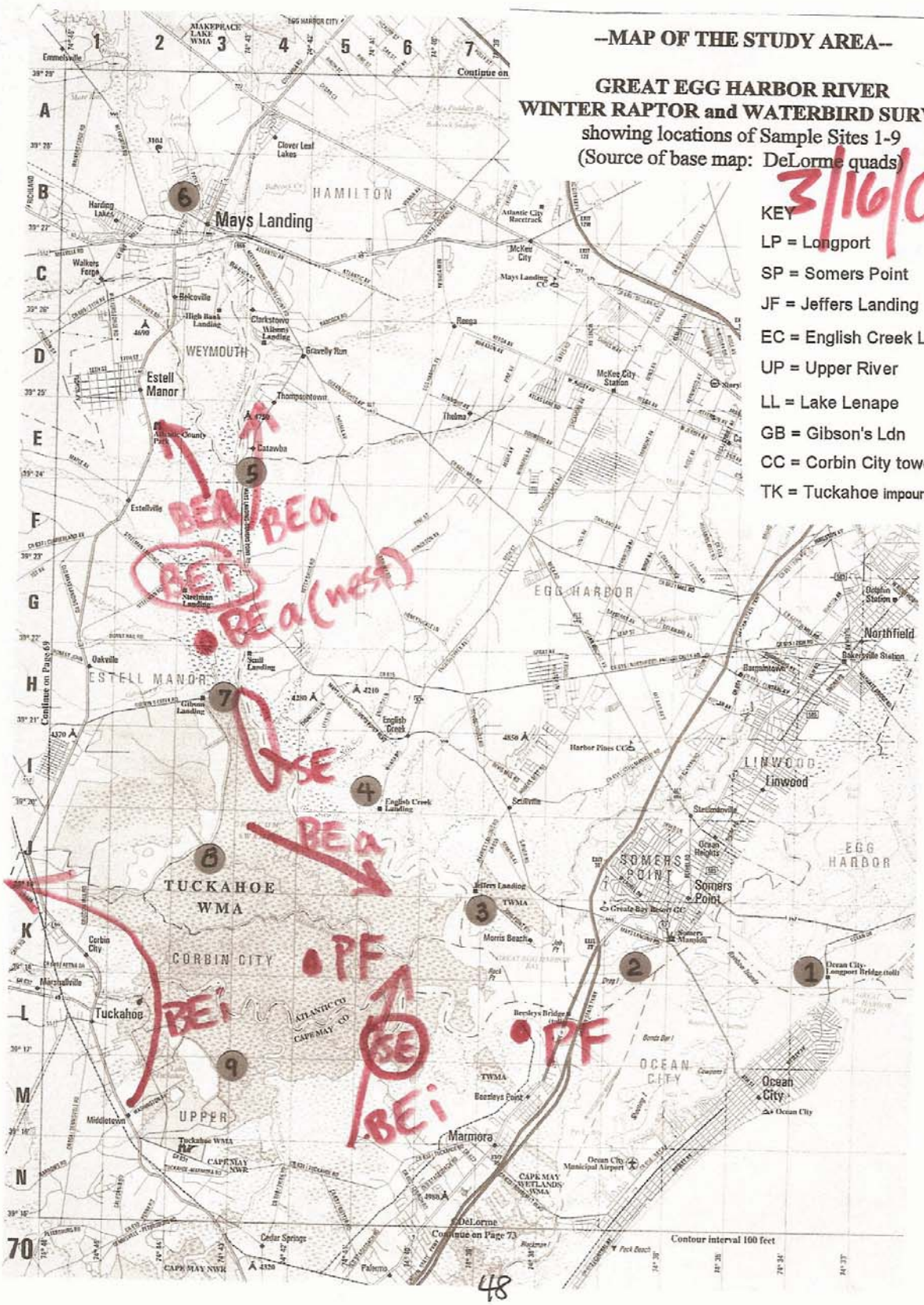
GREAT EGG HARBOR RIVER
WINTER RAPTOR and WATERBIRD SURVEY
showing locations of Sample Sites 1-9
(Source of base map: DeLorme quads)
2/16/05
KEY
LP = Longport
SP = Somers Point
JF = Jeffers Landing
EC = English Creek Ldn
UP = Upper River
LL = Lake Lenape
GB = Gibson's Ldn
CC = Corbin City tower
TK = Tuckahoe impoundments
BEad.
BE-2ad.
GEad.
SEOwl
PF
Mays Landing
WEYMOUTH
Estell Manor
ESTELL MANOR
EGG HARBOR
Northfield
LINWOOD
Linwood
SOMERS POINT
Somers Point
TUCKAHOE WMA
Tuckahoe
UPPER
Marmora
Ocean City
Continue on Page 73
Contour Interval 100 feet
DeLorme

46


BEa
BEi
Mays Landing
3/3/05
--MAP OF THE STUDY AREA--
GREAT EGG HARBOR RIVER
WINTER RAPTOR and WATERBIRD SURVEY
showing locations of Sample Sites 1-9
(Source of base map: DeLorme quads)
Estell Manor
Northfield
Linwood
Somers Point
TUCKAHOE WMA
BEa
BEi
BEi
BEa
Coop
BEa
Tuckahoe
BEa
Coop
Ocean City
Marmora
PF
47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WINTER RAPTOR and WATERBIRD SURVEY
showing locations of Sample Sites 1-9
(Source of base map: DeLorme quads)
3/16/05
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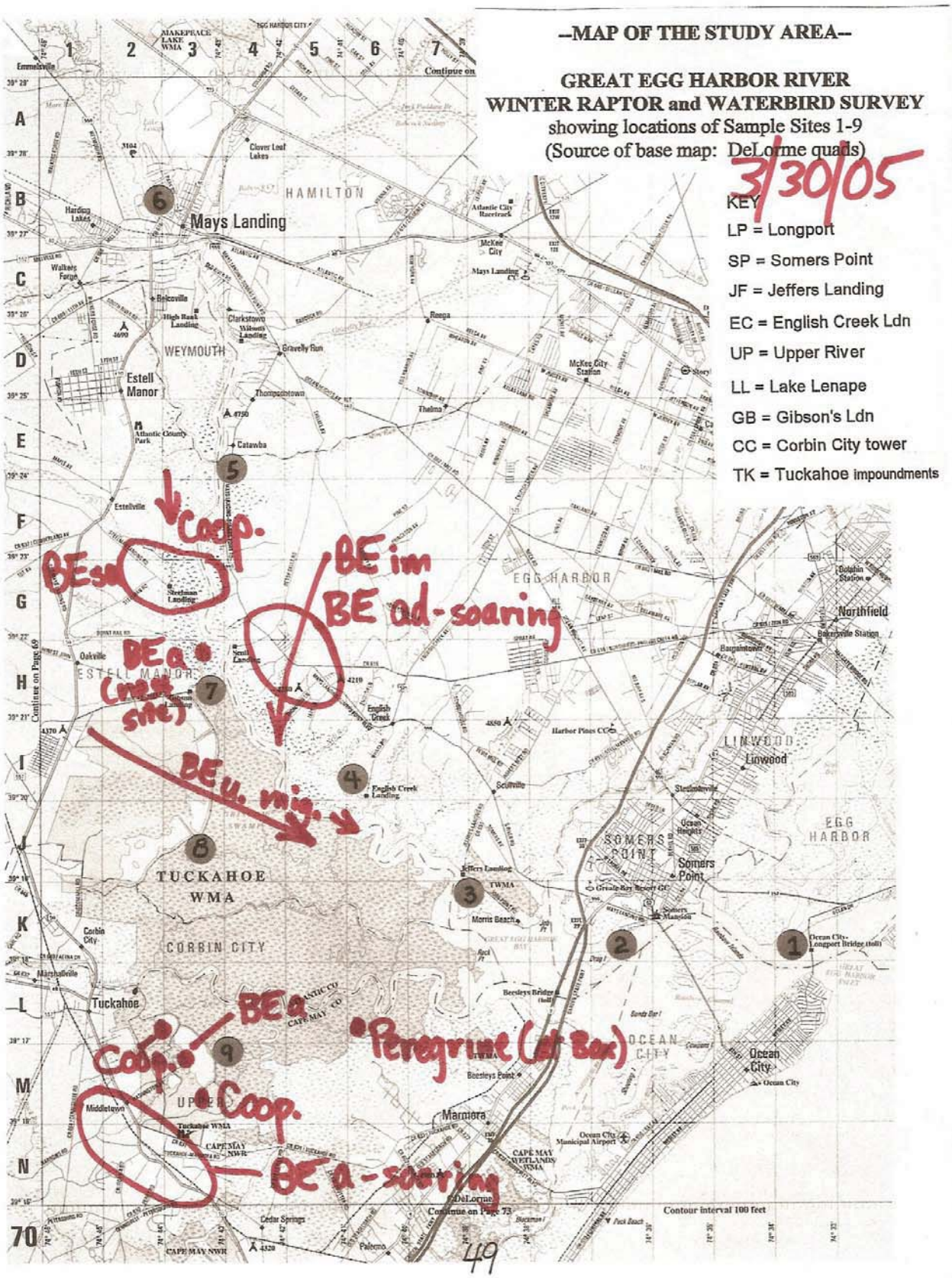
GB = Gibson's Ldn
CC = Corbin City tower
TK = Tuckahoe impoundments
Mays Landing
HAMILTON
WEYMOUTH
Estell Manor
ESTELL MANOR
EGG HARBOR
TUCKAHOE WMA
CORBIN CITY
UPPER
SOMERS POINT
LINWOOD
OCEAN CITY
Marmora
Tuckahoe
Somers Point
Ocean City
Northfield
BEN
BEa
BEi
PF
SE
Contour interval 100 feet
48


--MAP OF THE STUDY AREA--
GREAT EGG HARBOR RIVER
WINTER RAPTOR and WATERBIRD SURVEY
showing locations of Sample Sites 1-9
(Source of base map: DeLorme quads)
3/30/05
KEY
LP = Longport
SP = Somers Point
JF = Jeffers Landing
EC = English Creek Ldn
UP = Upper River
LL = Lake Lenape
GB = Gibson's Ldn
CC = Corbin City tower
TK = Tuckahoe impoundments
Mays Landing
HAMILTON
WEYMOUTH
Estell Manor
ESTELL MANOR
EGG HARBOR
Northfield
LINWOOD
Linwood
SOMERS POINT
Somers Point
TUCKAHOE WMA
CORBIN CITY
Tuckahoe
OCEAN CITY
Ocean City
Marmora
Coop.
BE sa
BE im
BE ad-soaring
BE a (crest site)
BE u. mig.
BE a
Coop.
Peregrine (at Box)
Coop.
BE a-soaring
Contour interval 100 feet
49

The Great Egg Harbor Watershed Association

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akers@gowebway.com

The birds of the Great Egg Harbor River are one of the many Outstandingly Remarkable Resource Values that enabled designation of the river into the National Wild and Scenic Rivers System in 1992. This 2nd year study provides additional information on the status and trends of raptors and waterbirds in the river corridor to assure their long-term protection.

The Great Egg Harbor Watershed Association (GEHWA) would like to recognize and thank the National Park Service for financial and administrative support of this project. This inventory is just one example of the successful partnership GEHWA maintains with the National Park Service to jointly protect the 129-mile Wild & Scenic river corridor, and the watershed.

Special thanks again to Clay Sutton, who brought his wealth of bird knowledge and years of professional expertise to the Great Egg Harbor River and the Mullica River. Special thanks also to the Estate of Lynne Ward for the funding for the Mullica River part of this report