RAPTORS AND WATERBIRDS

ON THE GREAT EGG HARBOR RIVER

ATLANTIC COUNTY, NJ

WINTER 2012 - 2013

The Tenth Field Season of a Systematic Study of an Important Avian Wintering Area

including Key Comparisons to the MULLICA RIVER

and an update on the continuing investigation of

FALL and SPRING MIGRATION and the BREEDING BIRDS of the Great Egg Harbor River Watershed

Submitted to: THE GREAT EGG HARBOR WATERSHED ASSOCIATION



by Clay Sutton and James Dowdell July 2013 Submitted to: The Great Egg Harbor Watershed Association c/o Fred Akers, Director PO Box 395 Newtonville, NJ 08346 www.gehwa.org <u>Submitted by:</u> Clay and Pat Sutton LLC 129 Bucks Avenue Cape May Court House, NJ 08210 609-465-3397 <u>clavsutton@comcast.net</u> www.patandclaysutton.com



On the cover:

An Osprey carrying a Menhaden or "Bunker."

While Osprey is not a wintering species on the Great Egg, they are present for at least nine months of the year as both breeders and migrants. And, with recent mild winters, individual Osprey have apparently successfully wintered twice over the course of this ten year study. The Menhaden is a primary food source for Osprey, and a major prey item for such species as Striped Bass, Weakfish, and Bluefish. Menhaden are a significant part of the estuarine and near-shore food web.

– Photo by Clay Sutton. September 2012.

Above:

Four Osprey chicks in a nest built by the Great Egg Harbor River Council.

- Photo by Fred Akers. June 2013

RAPTORS AND WATERBIRDS ON THE GREAT EGG HARBOR RIVER

The Tenth Field Season of a Systematic and Long-term Study Fall 2012 through Spring 2013

INTRODUCTION AND OVERVIEW

Beginning in August 2012, then through the core winter study period, and finally through spring of 2013, raptor and waterbird counts were conducted on the Great Egg Harbor River in Atlantic County, New Jersey. This marked the tenth consecutive field season for these studies carried out for the Great Egg Harbor Watershed Association. This short form summary report of the individual 2012-2013 field season will be followed by a separate in-depth analysis and report that will summarize the findings over the entire ten years of study. Ten years of data will allow for a full evaluation of ornithological status and trends and avian ecovalues on the Great Egg Harbor River.

Survey locations and methodology remained the same as in the first nine seasons of study (see: *Wintering Raptors and Waterbirds of the Great Egg Harbor River, Atlantic County,* NJ - A *Summary of the First Five Years of Study, 2003-2008,* as well as subsequent yearly reports). Seven core program winter surveys were conducted between 19 December 2012 and 26 March 2013. The results of these counts are shown in **Table 1**. **Peak winter season counts are shown in Bold Face**. Also shown are seasonal averages for key winter species. As in the first nine seasons of study, rare, threatened, and endangered species mapping (field sighting locations) for all survey dates are included at the end of this report.

While the core winter segment of this survey was carried out with the exact same methodology as the prior nine seasons of survey efforts, in 2012-2013 the survey scope was again expanded to include the migration cycle, including fall and spring surveys. Survey efforts were conducted in order to assess and document spring and fall migration as well as breeding species. Table 1 also shows the findings of two systematic counts conducted in fall 2012 and two counts done in spring 2013.

Accordingly, core winter studies were carried out for the tenth consecutive winter season, and were complemented by surveys carried out during the "shoulder seasons" of fall and spring. Waterfowl and raptors use the Great Egg Harbor River at all seasons; numbers build in fall and the extent and duration of the fall migration in part determines wintering numbers. In addition, many birds, particularly waterfowl (ducks and Brant) linger and remain well into the spring season, and other birds, including shorebirds, stage or concentrate in large numbers as they journey north. Finally, good numbers and a wide variety of breeding birds nest in the Great Egg watershed, and these are partially censused during spring and early fall surveys. Migratory shorebird use was a particular focus of these expanded spring and fall efforts.

While core winter studies remained the major focus, expanded survey efforts in fall and spring were carried out in an effort to document the full extent of avian resources of the Great Egg at all seasons of the year.

TABLE 1 (page 1)Great Egg Harbor RiverWinter Raptor and Waterbird Survey 2012 -- 2013

	FALL	2012	CORE WINTER PERIOD 2012-2013			AVG.	SPRING 2013					
DATE	8/17	11/25	12/19	12/30	1/18	2/4	2/25	3/9	3/26	N=7	4/8	5/22
	*											
LOONS to CORMORA	NTS											
Red-throated Loon		1	7	4	16	18	17	17	10		4	
Common Loon		13	10	14	19	11	31	23	39		28	7
Pied-billed Grebe		1			3	1	2	3	1		2	
Horned Grebe			2				3	6	13		12	
Northern Gannet											25	
Double-cr Cormorant	3	69	90	10	57	33	77	115	126		464	166
BITTERNS to VULTU	RES											
Great Blue Heron	8	17	19	11	17	12	19	14	17		2	3
Great Egret	31	5	1	1	2	5	2	3	30		56	168
Snowy Egret	59										21	99
Little Blue Heron												4
Tricolored Heron												4
Black-cr Nt-Heron	2								1			2
Yellow-cr Nt-Heron											2	9
Glossy Ibis	3										2	25
Black Vulture	4	7	11	2	12	4	11	5	5	7.14	1	2
Turkey Vulture	38	91	109	51	95	50	89	119	93	87	102	52
WATERFOWL												
Snow Goose										0		
Cackling Goose		2										
Canada Goose	36	210	262	379	337	444	209	63	71	252	78	44
Brant		779	992	398	325	629	390	404	700	538	796	42
Mute Swan	15	70	46	74	87	60	59	45	49		48	72
Tundra Swan		1		14		2	2					
Gadwall		4			4		18	6	22		5	
Eurasian Wigeon					1	1	1					
American Wigeon			14		86	57	190	180	28		14	
Am Black Duck	5	206	644	365	670	294	319	384	381	437	111	11
Mallard	1	157	83	34	230	126	102	41	10	89	33	24
Blue-winged Teal											8	
Northern Shoveler		13										
Northern Pintail		17	61	11	560	167	521	39	52	202	42	
Green-winged Teal		49	6	1	180	38	644	45	26	134	428	
Common Teal							2					
Ring-necked Duck		1			1	2	7		2		10	
Greater Scaup					2		2					
Lesser Scaup		4		18	19	2	12	21	21		8	
scaup sp.			30		1			1	35			
Surf Scoter		6	16									
Black Scoter		4	11			1	1					

Peak winter counts Shown in BOLD FACE

* Lower River Survey only ** Seen on date other than official survey date or by other observers

TABLE 1 (page 2)Great Egg Harbor River Winter Raptor and Waterbird Survey 2012 -- 2013

	FALL	2012	CORE WINTER PERIOD 2012-2013		3	AVG.	SPRING 2013					
DATE	8/17	11/25	12/19	12/30	1/18	2/4	2/25	3/9	3/26	N=7	4/8	5/22
WATERFOWL (contin	nued)											
Scoter sp.									7			
Long-tailed Duck		8	27	4	8	3	30	38	26		18	
Bufflehead		118	119	43	61	119	322	154	269	155	136	
Com. Goldeneye				2			22		4			
Hooded Merganser		4	18	9	52	26	56	2	8			
Com. Merganser						18	11	3	6			
Red-br Merganser		6	26	4	27	21	89	83	103	50	106	3
Ruddy Duck		3		1								
DIURNAL RAPTORS												
Osprey	55				1**				19		63	61
Bald Eagle		6	10	15	17	13	16	15	8	13.43	8	2
Northern Harrier		13	22	6	18	13	20	8	12	14.14	10	4
Sharp-sh Hawk		1	2	0	2	0	0	2	0	0.86	1	
Cooper's Hawk	2	1	2	1	1	1	0	2	2	1.29	3	1
Red-sh Hawk		1	0	2	1	0	0	0	0	0.43		
Broad-wing. Hawk	1											2
Red-tailed Hawk	6	33	34	16	33	34	40	40	23	31	28	5
Rough-leg. Hawk		1	0	1	2	0	2	2	1	1.14		
Golden Eagle					1		2	2		0.71		
American Kestrel											1	
Merlin										0		
Peregrine Falcon	1	2	2	4	3	4	4	4	3	3.43	2	1
GROUSE to CRANES												
Ring-nk Pheasant		3										
Wild Turkey											1	4
Clapper Rail	7							1				26
SHOREBIRDS												
Black-bellied Plover	1	32	1	2		18						114
Am Golden-Plover	3**											
Semipalmated Plover	122			6	6							113
Piping Plover												1
Killdeer		25		1		2					2	
Am Oystercatcher	76	69	68	29	25	19	14	18	22		32	15
Greater Yellowlegs	29	7	16	3	19	22	7	2	9		65	4
Lesser Yellowlegs	27		10	1	4	6	2				2	2
Willet	1											69
Spotted Sandpiper	2											
Whimbrel												2
Ruddy Turnstone												35
Red Knot												49

Peak winter counts Shown in BOLD FACE

* Lower River Survey only ** Seen on date other than official survey date or by other observers

TABLE 1 (page 3)Great Egg Harbor RiverWinter Raptor and Waterbird Survey 2012 -- 2013

	FALL	2012	CORE WINTER PERIOD 2012-2013							AVG.	SPRING 2013	
DATE	8/17	11/25	12/19	12/30	1/18	2/4	2/25	3/9	3/26	N=7	4/8	5/22
SHOREBIRDS (continued)												
Sanderling	200	70	8	12		12	26	11				248
Semipalmated Sdp	180											2621
Western Sandpiper	10											
Least Sandpiper	49				1							5
Wh-rump. Sandpiper	4											1
Purple Sandpiper		2										
Dunlin		586	6	444	62	460	1				18	1087
Sh-billed Dowitcher	14											64
Wilson's Snipe			1	1		4						
American Woodcock						3						
unidentified shorebirds	300											
TOTAL shorebirds	1019	791									119	4430
JAEGERS to ALCIDS												
Laughing Gull	\checkmark											\checkmark
Bonaparte's Gull			2									
Ring-billed Gull	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark
Herring Gull	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark
Gt Bl-backed Gull	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	\checkmark
Gull-billed Tern	10											1
Common Tern	75											56
Forster's Tern	73	1									2	118
Least Tern												20
Black Skimmer	1000+											249
PIGEONS to WOODP	ECKEF	RS										
Great Horned Owl					1							
Belted Kingfisher		1	1	1	3	2	3	3	5		2	

Peak winter counts Shown in **BOLD FACE**

* Lower River Survey only ** Seen on date other than official survey date or by other observers

FINDINGS: WINTER RAPTORS AND WATERBIRDS – CORE WINTER STUDIES

Because the ongoing and long-term winter studies were extensively summarized and discussed at the five-year milestone, (see: *Wintering Raptors and Waterbirds of the Great Egg Harbor River, Atlantic County, NJ – A Summary of the First Five Years of Study, 2003-2008*), and because all previous reports dating back to 2003 are archived on the Great Egg Harbor Watershed Association website (<u>www.gehwa.org/newsletter</u>), we will not present an in-depth review of goals and objectives or methodologies here. For this tenth season, methods for core winter studies remained the same in winter 2012-2013 as in the first nine seasons of study. Nine point counts on the tidal Great Egg Harbor River and Bay were conducted by Sutton and Dowdell for a period of 45 minutes per site.

In 2012-2013, seven surveys were conducted between 19 December 2012 and 26 March 2013. At least two additional surveys were planned, but were "weathered out" and could not be rescheduled. The findings of winter 2012-2013 compared favorably with the previous nine seasons of study, again confirming and corroborating the known high ecovalues of the Great Egg Harbor River. Red-throated Loons and Common Loons were abundant in the lower estuary, and Great Blue Herons were common throughout the winter. American Oystercatcher and Dunlin wintered on the lower rivers, mudflats, and beaches in good numbers.

Waterfowl numbers, particularly for key Great Egg species such as Brant, American Black Duck, and Green-winged Teal were consistent with recent years, although with the warm fall and well above average winter temperatures, followed by a normal spring, few lingered as late as normally expected – a factor that kept seasonal averages down for many/most ducks.

Winter raptor populations were again significant on the Great Egg Harbor River in 2012-2013. Most species and numbers were either at or near recent averages. The Bald Eagle winter average of 13.43 birds per survey bested the 2011-2012 average, and a peak count of 17 Bald Eagles was tallied on 18 January 2013. Golden Eagles were seen on three survey dates, and included at least two (perhaps three) individuals. Two "Goldens" were seen on 25 February and two on 9 March. Of interest, we saw no Golden Eagles on the two surveys carried out on the Mullica, and none were reported by others – perhaps due to access issues in the wake of Hurricane Sandy.

It was another "non-flight" year for the irruptive Rough-legged Hawk, yet at least three individuals were known to be present in the Great Egg system. Peregrines were consistent throughout the season – recorded on all survey dates – with two breeding pairs present. Red-tailed Hawk numbers were well below average, no doubt due in part to the warm autumn and very warm winter, and reflected an observed region-wide trend. (See discussion below).

Once again, adjunct comparative studies were carried out on the Mullica River in winter 2011-2012. Although scaled back due to time constraints, for the ninth consecutive year counts were undertaken on the Mullica River in order to compare and contrast raptor and waterfowl numbers and thereby gain perspective on Great Egg Harbor River bird populations. Mullica methodology was the same as in previous seasons. The findings for the Mullica River are shown in **Table 2**. (As in 2011-2012, the 2012-2013 Mullica counts were carried out pro bono in order to continue and maintain this important long-term data set).

TABLE 2Mullica RiverWinter Raptor and Waterbird Survey2012 -- 2013

	М	Mullica River			Mullica River		
DATE	2/10/13	3/17/13	AVG.	DATE	2/10/13	3/17/13	AVG.
			N=2				N=2
LOONS to CORMOR	ANTS			DIURNAL RAPTORS			
Red-throated Loon	13	8		Osprey		2	
Common Loon	4	19		Bald Eagle	12	7	9.5
Pied-billed Grebe	7			Northern Harrier	17	17	17
Horned Grebe	7	9		Sharp-sh Hawk			0
Double-cr Cormorant	1	7		Cooper's Hawk		1	0.5
BITTERNS to VULTU	IRES			Red-sh Hawk	1		0.5
Great Blue Heron	23	15		Red-tailed Hawk	22	22	22
Great Egret		2		Rough-leg. Hawk	3	1	2
Black-cr Nt-Heron	1	1		Golden Eagle			0
Black Vulture	0	0	0	American Kestrel			0
Turkey Vulture	60	68	64	Merlin		1	0.5
WATERFOWL				Peregrine Falcon	2		1
Snow Goose	300	50	175	SHOREBIRDS			
Cackling Goose				Black-bellied Plover		1	
Canada Goose	372	152	262	Killdeer	2		
Brant	208	153	181	Am Oystercatcher	2	6	
Mute Swan		2		Greater Yellowlegs	2	3	
Am Black Duck	240	157	199	Sanderling	6		
Mallard	347	231	289	Dunlin		200	
Northern Pintail			0	Wilson's Snipe		1	
Green-winged Teal		4	2	JAEGERS to ALCIDS		T	
Canvasback		2		Ring-billed Gull	\checkmark	\checkmark	
Redhead	1			Herring Gull	\checkmark	\checkmark	
Ring-necked Duck		5		Gt Bl-backed Gull			
Greater Scaup	50	3		PIGEONS to WOODF	PECKERS)	
Lesser Scaup	2	3		Belted Kingfisher	4	1	
scaup sp.	12	94					
Black Scoter		1					
Long-tailed Duck	15	6					
Bufflehead	315	97	206				
Com. Goldeneye	12						
Hooded Merganser	176	33					
Com. Merganser	5						
Red-br Merganser	45	101	73				

FINDINGS: EXPANDED SPRING THROUGH FALL STUDIES

For the fifth fall season and for the fourth time in spring, expanded seasonal studies sought to document the value of the Great Egg Harbor River Watershed throughout the year. During the spring migration period, the breeding season (which mostly coincides with the spring migration season), and the all-important fall migration for which South Jersey is so aptly known, counts were conducted for all raptor and waterbird species, and data was indeed kept for all birds encountered, including passerines (songbirds). Table 1, in addition to showing core winter studies findings, also presents the results of these expanded seasonal studies.

Even though a full seasonal analysis is planned in the ten year comprehensive report that will soon follow this individual season report, it is important to note here that these five years of spring, fall, and breeding season surveys have been extremely successful. As Table 1 attests, waterbirds use the Great Egg Harbor River and estuary at all seasons. Loons are present in good numbers in spring and fall. Wading birds – herons, egrets, and ibis – abound in the warmer months, and findings from 2009 through 2013 have documented major wading bird rookeries in the Ocean City and Longport areas.

Fall 2012 and spring 2013 observations confirmed the continued presence of the "beachnester" colony at the Longport Sod Banks, *aka* Malibu Beach WMA (see previous season report). The tern and skimmer colony on the lower Great Egg Estuary is a major avian resource of the region. It is the largest and most successful Black Skimmer colony in New Jersey. Also in spring 2013, breeding Piping Plover (endangered) were found on the lower Great Egg Estuary – with a bird seen in flight near at Malibu Beach WMA (see mapping).

A total shorebird count of 1019 birds was achieved on the "fall" (southbound) date of 17 August, and an excellent 4430 shorebirds were counted on 22 May 2013. While these numbers are substantial and significant, they still only hint at the shorebird use of the lower Great Egg due to the fact that the current methodology and point count locations are far from prime low tide mudflats and high tide roost sites. In short, shorebirds are drastically undercounted; access by boat would be required to fully assess shorebird numbers using the Great Egg Harbor estuary.

In summary, Great Egg Harbor River core winter survey results confirmed and corroborated previous study results, and continued to document the Great Egg as a highly important area for raptors, waterfowl, and other waterbirds. Expanded coverage in fall 2012 and spring 2013 again amply proved the value of the area to migrating waterbirds, waterfowl, raptors, and shorebirds alike. Both early fall and spring dates overlapped the breeding season, confirming several wading bird rookeries and a tern and skimmer nesting colony unique to the entire region. Significant shorebird use has been found in both spring and fall on the Great Egg Harbor estuary. It is a place for birds and birders at all seasons.

DISCUSSION

As was discussed at length in the 5 year summary Great Egg report, (and will be visited in depth in the upcoming ten year report), there is a clear cause and effect between weather conditions and winter raptor populations. The most raptors (and waterfowl) generally are found during colder winters. 2012 was the hottest year on record in the US, and the Northeast and New Jersey were well above average. (See attached article from the *Press of Atlantic City*). December was 5.7 degrees above normal and January was 2.1 degrees above normal, although February was 1.2 degrees below normal. (Source: National Weather Service data for Atlantic City Airport). In short, it was a warm winter, with warmer than usual waters and little in the way of snow or ice.

However one weather event had a far bigger impact on raptors. Hurricane/Superstorm Sandy struck on 29 October, devastating coastal New Jersey. The impacts on fish and wildlife populations and habitats were severe, long-term, and far-reaching. (See attached Newsletter of the Monmouth County Audubon Society, which succinctly summarizes this vastly complex issue). The indirect but crucial impact to wintering raptors was the record tide levels and storm surge which drowned a very high percentage of tidal wetlands rodents – the prey base on which many raptors depend – principally meadow voles, mice, and rice rats. Natural Lands Trust land manager Brian Johnson reported finding dozens of drowned rodents in a very small area near Dividing Creek (on the Delaware Bayshore) in the immediate aftermath of Sandy. There is little doubt that the record low Northern Harrier counts - both the peak count of only 22, and the average count of 14 are record lows by far - were a direct result of Sandy. (The previous Harrier lowest peak was 28 in 2010-2011, and the previous record low average was 20 – following Hurricane Irene). Similarly, the Red-tailed Hawk peak count of 40 was the lowest ever (previous lowest was 42 in 2011-2012 following Irene), and the Red-tail average count was the second lowest (31 - the lowest average of 28 also followed Hurricane Irene – see below). In short, with little food available on the Great Egg Harbor River and Bay marshes, birds of prey were either forced to move on and hunt elsewhere, or, in some cases -- mostly with inexperienced young birds -- possibly starve.

In addition, Hurricane Sandy came on the heels of Hurricane Irene. Irene made landfall as a tropical storm near Little Egg Harbor on 28 October, 2011, and was responsible for severe tidal flooding throughout Southern New Jersey. It was then theorized that Irene's impacts on prey were a factor in winter 2011-2012's very low raptor totals on both the Great Egg Harbor River and on the Maurice River. It remains to be seen how long salt marsh rodent populations will take to recover from the combined effects of two major storm/flooding events back to back, and we eagerly anticipate the planned 2013-2014 winter raptor surveys on the Delaware Bayshore's Maurice River to provide further insight on this climate change/sea level rise issue. (See the upcoming 10 year Great Egg report for further discussion). Of interest, these counts such as we have on the Great Egg (and on the Maurice) are two of very few studies that have provided definitive data of the cause and effect impacts of Hurricane/Superstorm Sandy on raptors. Ten years of data offers a true long-tern perspective of the effects of Sandy on the birds of the Great Egg Harbor River.

Finally, damage from the storm surge from Sandy (and Irene) are suspected in low waterfowl totals as well – particularly for Brant – as shallow bays and mudflats were both scoured and received siltation from the flooding, potentially severely impacting submerged aquatic vegetation and other food resources.

This individual report is a short form presentation of data from the 2012-2013 season only,

and makes no effort to assess long-term status and trends. These in-depth analyses, and discussion, will be done in the major comprehensive report now being prepared following the conclusion of the tenth year of studies. Nonetheless, 2012-2013 survey results are another important piece of the ongoing effort that has established the Great Egg Harbor River and Great Egg Harbor Bay to be of high value to waterbirds, waterfowl, raptors and shorebirds in both New Jersey and the entire Mid-Atlantic Region, and at all seasons of the year.

We thank the Great Egg Harbor River Watershed Association for the great opportunity to carry out these important studies. We sincerely thank the many members, supporters, and friends of the Association for allowing us to be a long-term part of the continuing significant work on this great South Jersey river. Thank you for all of your important conservation efforts in Southern New Jersey, and for your ongoing vision of a wild and scenic Great Egg Harbor River. We particularly thank Fred Akers for his vision of what role these long-term studies might play in the protection of these valuable avian resources and of the river upon which they so depend.

- Clay Sutton

Attachment 1 (Page 1)

2012 a busy year for weather news

The year was marked by Hurricane Sandy, the June 'derecho' storm and persistent warmth throughout.

By SARAH WATSON

Staff Writer

Hurricane Sandy was the big weather story, but there were plenty of other events that kept weather fans talking in the past 12 months.

You have to start with Sandy, the most devastating storm on record in the state," said state climatologist David Robinson. "Other than that, you have to talk about the persistent warmth and the string of 21 consecutive months of (the state's average temperature) at or above normal."

> The ongoing warmth adds to the effects climate change is having on weather locally, nationally and internationally, as 2012 was the warmest year on record for the U.S. and the world, according to the National Oceanic and Atmospheric Administration. Arctic sea ice reached a record low amount this summer, and much of the Midwest has been lodged in an extreme drought for the past year.

The heat joins Hurricane Sandy and the June 30 "derecho" storm as the top three South Jersey weather events of 2012. The two storms brought extended power outages to much of the region, as well as millions of dollars in damage.

Sandy, the costliest disaster in state history, made landfall just south of Atlantic City as a post-tropical northeaster at 8 p.m. Oct. 29. The massive storm lashed the coast with rain, wind and coastal flooding for three days. In southern Cape May County, more than a foot of rain fell in places. In Atlantic County, up to 8 inches of rain fell from the storm. Tropical storm-force winds were felt across the state, with hurricane-force gusts recorded in Atlantic City and northward.

Statewide, 40 people died in the storm, including four in South Jersey. At one point, nearly 200,000 Atlantic City Electric customers were with-

Press of Atlantic City

MONDAY, DECEMBER 31, 2012

Monthly temperatures

Chart shows average monthly temperature for the year, in degrees Fahrenheit, with normal temps. All data taken at Atlantic City International Airport.



Monthly precipitation



*As of December 28 Press graphic

Source: National Weather Service

out power, and as many as 3 million utility customers had no power statewide.

Meanwhile, the June 30 thunderstorm was the most destructive one in South Jersey in recent memory. The storm barreled across Cumberland and Atlantic counties, packing hurricane-force winds and intense lightning. More than 200,000 Atlantic City Electric customers were without power when the storm was over, and some did not see electricity restored for more than a week.

The warmth contributed to a moderate short-term drought that developed in late winter and lasted through much of the spring. However, heavy rain from Sandy and from other coastal storms in November and December erased that drought, and the year will finish with rainfall about 5 inches above normal.

It's impossible to predict exactly what the weather will be in the coming months and year, particularly for the East Coast, which sees only a few overall trends from large-scale climate patterns that are more routinely predicted, Robinson said.

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South Jersey's year in weather

January

Average temperature: 39.2 degrees, 6.2 degrees above normal

Precipitation: 2.35 inches, .87 inches below normal

Notable events: Winter surfers complained there were no waves. There were days with temperatures in the 60s. Light winds, sunny skies, and a half-inch of snow Jan. 9 and 1.6 inches of snow Jan. 21. The average temperature was more than 6 degrees above normal, setting the stage for the fourth-warmest winter on record at Atlantic City International Airport in Egg Harbor Township. The warmth also meant that the ocean temperature didn't drop below 38 degrees for the entire winter.

February

Average temperature: 40.4 degrees, 5.1 degrees above normal

Precipitation: 2.39 inches, .48 inches below normal

Notable events: It was the fifth-warmest February on record at Atlantic City International. The warmth and lack of snow cover also led to the start of a significant fire season that began several weeks earlier. The high temperature reached 68 degrees Feb. 1, setting a record.

March

Average temperature: 51.2 degrees, 9 degrees above normal

Precipitation: 2.1 inches, 2.11 inches below normal

Notable events: It was the warmest March on record at Atlantic City International and marked the start of a moderate drought that lasted until nearly June. High temperatures reached 70 degrees on nine days, and much of the month felt more like early May. Fire weather warnings were issued on multiple days, and forest fire crews battled several major fires in rural areas of the Pinelands. Pollen counts were surprisingly high, with counts exceeding 1,000 many days.

April

Average temperature: 53.5 degrees, 1.8 degrees above normal

Precipitation: 2.93 inches, .7 inches below normal

Notable events: Ongoing dryness and warm weather created a tough fire season, with forest wardens describing conditions at one point as "one match away from Armageddon." Rain toward the end of the month lowered the fire risk, but drought persisted.

May

Average temperature: 65 degrees, 3.9 degrees above normal

Precipitation: 3.56 Inches, .21 inches below normal

Notable events: The third-warmest May on record also was notable because of the unusually warm ocean temperature. In early May, the water off Atlantic City reached 70 degrees, a temperature typically seen in July. Memorial Day weekend had the weather of a July weekend.

June

Average temperature: 69.9 degrees, 1 degree below normal

Precipitation: 6.2 inches, 3.09 inches above normal

Notable events: The seventh-wettest June on record also was the first month of the year in which the temperature was below normal, due to relatively chilly temperatures during the first half of the month. There also were two heat waves, the second of which was punctuated with a powerful line of thunderstorms that struck in the middle of the night June 30, bring-

ing hurricane-force winds and downing thousands of trees and power lines.

July

Average temperature: 78.5 degrees, 2.3 degrees above normal

Precipitation: 3.38 inches, .34 inches below normal

Notable events: The fifth-hottest July on record was marked by 14 days with temperatures of at least 90 degrees and two days when the temperature reached 100 degrees.

August

Average temperature: 75.5 degrees, 1.1 degrees above normal

Precipitation: 5.59 inches, 1.48 inches above normal

Notable events: August didn't seem especially warm and, in fact, there were strings of days with September-like weather toward the end of the month. But the average temperature was more than a degree above normal, helping cement summer 2012 as the 10th warmest on record.

September

Average temperature: 67.4 degrees, .2 degrees above normal

Precipitation: 3.52 inches, .37 inches below normal

October

Average temperature: 58 degrees, 1 degree above normal

Precipitation: 8.09 inches, 4.67 inches above normal

Notable events: October seemed as if it would be a relatively average month, with some warmer days toward the beginning, the first frost toward the middle and relatively average rainfall. That is, until Hurricane Sandy. In addition to the rain, wind and storm surge, Sandy shattered the New Jersey record for the lowest barometric pressure of 946 millibars recorded at landfall. That number also tied the record of lowest barometric pressure recorded in the Northeast U.S. north of Cape Hatteras, equal to the 1938 "Long Island Express" Hurricane. Sandy's storm surge was a 10th of a foot lower than that of the December Storm of 1992 in Atlantic City, but flooding occurred in many barrier island communities at record levels

November

Average temperature: 42.1 degrees, 4.7 degrees below normal

Precipitation: 1.34 inches, 1.93 inches below normal

Notable events: Sandy ushered in a wintery weather pattern that lasted for weeks, with December-like temperatures many days. The northeaster that struck Nov. 7 dropped 2.5 inches of snow at the airport in Egg Harbor Township, shattering a November snowfall record. Snow fell even at the coast, leaving a dusting in many areas.

December

Average temperature: 43.5 degrees, 6.1 degrees above normal

Precipitation: 7.15 inches, 3.67 above normal

Notable events: November's cold snap did not last long. Much of December was unseasonably warm, with high temperatures in the upper 50s to low 60s many days. There were numerous strong fronts that came through, bringing high winds and heavy rains, but the weather did not turn cold until just before Christmas. A series of coastal storms brought high winds, heavy rain and more coastal flooding that battered areas weakened by Sandy.

Sarah Watson

Attachment 2



Hurricane Sandy's impact on New Jersey's birds

As New Jersey was very literally in the eye of the storm, Hurricane Sandy's impact upon the state was profound. Many of the state's barrier islands and coastal marshes were transformed by storm surge; forest tracts reconfigured by pruning winds.

Our thoughts and well wishes are upon and neighbors as they restore order to their storm-disrupted lives. Yet, destructive as they are, storms are nature's way of rebooting the natural world, down loading new possibilities.

But many in a position to do so have wondered how New Jersey's birds and wildlife have been impacted by Sandy. What species were most affected? What are the long term impacts of coastal erosion or natural food stock reduction?

The questions are apt; the answers in development. Right now, we can only speculate on immediate and long term impacts. The main challenge will be insuring that the future needs of birds and other wildlife are addressed as human recovery efforts move forward.

The good news is that there is little evidence that the storm had a serious, direct impact on breeding or wintering bird populations. Late October falls right between that time when summer residents have migrated and most winter residents arrive.

But it is almost certain that the flooding tides caused mortality among rodent populations, thus reducing the prey base for wintering birds of prey. New Jersey's Atlantic and Delaware Bay marshes rank among the planet's greatest winter raptor strongholds. This year, many Rough-legged Hawks, Northerm Harrier, and Short-eared and Long-eared Owls will be forced to move on and hope to find less affected areas to meet their food needs.

In woodlands, high winds stripped trees of fruit and seeds sending such wild bird staples as acoms, wild grape, poison ivy berries to the forest floor where snow or ice may put them out of reach. There may be an issue for cavity nesting species, like woodpeckers, if many of the dead standing trees went down in the storm. Importantly, if natural disasters become-more frequent or are of greater magnitude, it may be beyond certain species' ability to compensate and eventually recover.

As fortune has it, this year is marked by the largest "invasion" of wintering northern finches in decades. Low natural food stocks have sent millions of Red-breasted Nuthatches, Blue Jays, Pine Siskins, Purple Finches, and Evening Grosbeaks south in search of food. Home owners can mitigate shortfalls caused by Sandy by feeding birds in their yards (and gain hours of entertainment in the process).

But the storm's greatest potential concern may be the impact upon beach nesting birds. In a wholly natural environment, coastal storms are part of the

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from a letter by Eric Stiles, President and CEO, NJ Audubon (additional comment by Dena Temple)

dynamic that creates the habitat needed by endangered, beach nesting birds like Piping Plover, Least Tern and Black Skimmer. But coastal habitat modified for human use constitutes a counterweight. As coastal communities rebuild, they and we will have to be mindful of the needs of beach nesting birds. Fortunately again, most beach nesting species will not arrive until April, leaving months for planning and restoration.

(Editor's Note: Our area suffered a devastating loss of coastal habitat. If you live in a coastal community, be a voice in that community for smart coastal redevelopment with an eye toward the the environment and the future. Conservation and coexistence should be part of any plan.)



In this issue...

23 bird species listed as Rare, Threatened, Endangered, and of Special Concern were observed and counted during the 2012-2013 Great Egg Harbor field survey. Table 5 lists the highest daily counts and the number of days these species were observed and counted

2012-2013 Bird Survey Endangered, Thre	eatened, Priority, an	d Special Concern	Species Col	unts
Listed Bird Species	Breeding Status	Non-breeding Status	High Count	No. Days
American Kestrel (Falco sparverius)	Special Concern +	Special Concern+	1	1
American Oystercatcher (Haematopus palliatus)	Special Concern	Special Concern	76	11
Bald Eagle (Haliaeetus leucocephalus)	Endangered	Threatened	17	10
Black-crowned Night-heron (Nycticorax nycticorax)	Threatened	Special Concern	2	3
Black Skimmer (Rynchops niger)	Endangered	Threatened	1,000	2
Broad-winged Hawk (Buteo platypterus)	Special Concern	Regional Priority	2	2
Cattle Egret (Bubulcus ibis)	Special Concern +	Special Concern	0	0
Coopers Hawk (Accipiter cooperii)	Threatened	Threatened	2	10
Glossy Ibis (Plegadis falcinellus)	Special Concern	Regional Priority	25	3
Great Blue Heron (Ardea herodias)	Special Concern	Stable	19	11
Least Bittern (Ixobrychus exilis)	Special Concern	Special Concern	0	0
Least Turn (Sterna antillarum)	Endangered	Endangered	20	1
Northern Harrier (Circus cyaneus)	Endangered	Special Concern	22	10
Osprey (Pandion haliaetus)	Threatened	N/A	63	5
Peregrine Falcon (Falco peregrinus)	Endangered	Endangered	4	11
Pied-billed Grebe (Podilymbus podiceps)	Endangered	Special Concern	0	0
Piping Plover	Endangered	N/A	1	1
Red Knot (Calidris canutus)	Endangered	Special Concern	49	1
Red-shouldered Hawk (Buteo lineatus)	Endangered	Special Concern	2	3
Sanderling (Calidris alba)	N/A	Special Concern	248	8
Semipalmated Sandpiper (Calidris pusilla)	N/A	Special Concern	2621	2
Sharp-shinned Hawk (Accipiter striatus)	Special Concern	Special Concern	2	5
Short-eared Owl	Endangered	N/A	0	0
Spotted Sandpiper (Actitis macularia)	Special Concern	Regional Priority	2	1
Tricolored Heron (Egretta tricolor)	Special Concern	Special Concern	4	1
Whimbrel (Numenius phaeopus)	N/A	Special Concern	2	1
Yellow-crowned Night Heron (Nyctanassa violaceus)	N/A	Threatened	9	2
Note: + = Recommended Threatened status listing by the	Endangered and Nongar	ne Species Advisory Corr	imittee	
	page 15			

Rare, Threatened, and Endangered Species

Field Mapping

2012 - 2013

The following Seven field maps, created to provide a spatial representation of rare, threatened and endangered species observed during the survey, are marked according to the following key:

> BE = Bald Eagle Broadwing = Broad-winged Hawk BLSK = Black Skimmer GBTE = Gull-billed Tern CP = Coop = COHA = Cooper's Hawk COTE = Common Tern LETE = Least Tern NH = NOHA = Northern Harrier PBGR = Pied-billed Grebe PF = Peregrine Falcon YCNH = Yellow-crowned Night Heron a = Adult i = Immature













