RAPTORS AND WATERBIRDS

ON THE MAURICE RIVER

CUMBERLAND COUNTY, NJ

The TWENTY-SEVENTH FIELD SEASON
of an Ongoing and Long-term Avian Use Study

FALL 2013 through SPRING 2014
and highlighting the Core WINTER Period 2013-2014

Research sponsored by

CITIZENS UNITED TO PROTECT THE MAURICE RIVER AND ITS TRIBUTARIES, INC.

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July 2014

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On the cover:

A **Snowy Owl** perched on a roof-top near the East Point Lighthouse on 28 December 2013, one of two in sight *at once* there on this very memorable day. The *second* East Point Snowy Owl, sitting in a red cedar near the edge of the Delaware Bay, is shown above. Snowy Owls staged an unprecedented "invasion" throughout the Northeast during the winter of 2013-2014. They were enjoyed in numbers by many on the Jersey Coast and Delaware Bayshore during this remarkable movement of these high Arctic breeders. While the cover photo may not seem to be in a "natural setting," Snowy Owls frequently perch on seaside and marsh-side buildings and structures, and from this elevated East Point perch, the owl had a commanding view of the lower Maurice River and its many potential food resources. – photos by Pat Sutton. 28 December 2013

RAPTORS AND WATERBIRDS ON THE MAURICE RIVER

July 2013 through June 2014

The TWENTY-SEVENTH FIELD SEASON

of an Ongoing and Long-term Avian Use Study

Citizens United to Protect the Maurice River and its Tributaries, Inc.

INTRODUCTION AND OVERVIEW

The period from July 2013 through June 2014 marked the amazing twenty-seventh field season of long-term avian use studies carried out on the Maurice River under the auspices of Citizens United to Protect the Maurice River and its Tributaries, Inc. Studies included the monitoring of fall migration in 2013, spring migration in 2014, limited breeding bird studies, and the all-important core winter studies carried out from December 2013 through March 2014.

An in-depth review of long-term status and trends was prepared (at the twenty-five year milestone) early in 2013, and presented at the Partnership for the Delaware Estuary Science and Environmental Summit held in Cape May, NJ (27-30 January 2013). Because this landmark major report/paper, analyzing all twenty-five years of data, is now available (archived on the CU Maurice River website: www.cumauriceriver.org), this current one season report will only offer brief discussion of the 2013-2014 findings in relation to previous years. Note that the findings of the 26th season of study (2012-2013) are also available on the CU website as well.

Also, and again because all of the twenty-six years of *individual* reports are available on-line, little discussion of methodology or techniques will be offered in this short-form yearly summary. The basic methodology of the core winter studies has remained the same since 1987: nine sites (point counts) on the tidal Maurice River between Millville and East Point are sampled by Sutton and Dowdell for a period of 45 minutes each during each survey.

Visit the website for in-depth review of all methodologies and sampling locations, as well as the goals and objectives of this long-term project. In-depth analysis of findings have been prepared at the five-year, ten-year, fifteen-year, and twenty-year milestones of this long-term study; see "Literature Cited / For Further Reference" for a complete listing of these reports. These milestone reports are now joined by the in-depth twenty-five year look at the considerable avian resources of the Maurice River, which included an analysis of status and trends in raptor and waterbird populations over the entire study period. This report, when viewed on the CU Maurice River website, can be seen in both a short form illustrated summary (14 pages) and in its entirety (98 pages).

FINDINGS

The results of the Maurice River Raptor and Waterbird Survey for the period July 2013 through June 2014 are shown in **Table 1**. Nine full surveys were carried out during the core winter period (3 December 2013 to 27 March 2014). Six surveys were conducted during the fall migration period of the study cycle, 9 July through 19 November 2013, and five spring migration surveys were carried out between 9 April and 4 June 2014. In all, a total of 20 field days were expended in this year-long period. Spring and fall survey results are also shown in Table 1, but are not included in the core winter season *averages* for key species shown in the table. **Peak winter season daily high counts for key species are shown in Bold Face**, although note that for a number of migratory species, spring and fall totals easily exceed the peak core winter season count. Also note in Table 1 that for hawks and eagles, the very low numbers seen on 10 March 2014 (due to inclement weather) were not used in computing the seasonal averages; therefore N = 8 for hawks and eagles, and N = 9 for waterfowl and vultures.

As in the past, comparative studies were conducted on Cumberland County's Cohansey River as an adjunct to the core winter Maurice River studies. The Cohansey River was sampled two times in winter 2013-2014. (The Salem River was not sampled this season, as Clay Sutton was recovering from knee-replacement surgery in the early months of 2014). Cohansey River winter raptor and waterbird surveys are shown in **Table 2**. Long-term data from these adjunct studies of Delaware Bayshore "comparison rivers" will be fully explored and analyzed in an upcoming in-depth report – one that will compare and contrast all of the major South Jersey river systems. For this reason, discussion will be deferred and not included herein. All Cohansey River surveys have been carried out on a *pro bono*/volunteer basis, at no cost to Citizens United.

As in past seasons, Canada Goose numbers on the Bayside State Prison grounds (adjacent to the Maurice River) were again estimated; birds were counted from Route 47. Most, if not all, "Bayside geese" use the Maurice River for roosting and feeding, and these counts offer insight to regional goose populations and the potential for seasonal herbivory on Maurice River wild rice marshes. The numbers are shown below, but note that these "prison numbers" are <u>not</u> included in the river count totals shown in Table 1. These archived census numbers will be reviewed at some point in the future for the insight they may offer regarding conditions and goose populations on the river itself.

2013 – 2014 Canada Goose Usage -- Bayside State Prison Grounds

Date	Number	Date	Number	Date	Number
07/09/13	0	01/09/14	540	05/07/14	90
07/30/13	NC	01/31/14	330	05/20/14	154
08/22/13	850	02/12/14	700	05/28/14	120
10/01/13	540	02/24/14	1050	06/04/14	90
11/04/13	650	03/10/14	675		
11/19/13	460	03/20/14	460		
12/03/13	1000	03/27/14	486		
12/13/13	855	04/09/14	357		

TABLE 1 (page 1)
Maurice River
Raptor and Waterbird Survey
July 2013 through June 2014

	FALL 2013						CORE WINTER PERIOD 2013-2014										SPRING 2014				
DATE	7/9	7/30	8/22	10/1	11/4	11/19	12/3	12/13	1/9	1/31	2/12	2/24	3/10	3/20	3/27	**AVG**	4/9	5/7	5/20	5/28	6/4
		*	*		*	*												*	*	*	*
LOONS to CORMORANTS																					
Red-throated Loon														2	1		4	1			
Common Loon																			1	1	
Pied-billed Grebe									3	3	1										
Horned Grebe																	1				
Red-necked Grebe										1			1	2							
Northern Gannet															3		19				
Dbl-cr. Cormorant	430	395	260	303	29	10	2			2			2	9	**17**		556	293	441	282	225
Great Cormorant						1							2								
BITTERNS to VULTURES																**N = 9**					
Great Blue Heron	5	8	3	10	3	11	18	**22**	12	8	3	7	4	16	16		6	2	1	2	5
Great Egret	151	102	65	39		2		1							19		46	108	62	80	76
Snowy Egret	99	160	143	68											2		105	86	118	105	120
Little Blue Heron			1																		
Tricolored Heron			1																		
Green Heron	1		2	2																1	1
Black-cr. Night-Heron	69	2	2	1					1	1	2				1			20	169	148	134
Yellow-cr.Night-Heron															1**						
Glossy Ibis	38	7	36												1		52				2
White-faced Ibis															1		1**				
Black Vulture		7	2	10	24	32	18	**35**	31	11	32	2	12	16	18	19.44	11	1	12	4	10
Turkey Vulture	32	45	20	97	99	112	109	96	123	66	106	105	63	120	**126**	102	132	27	78	23	48
WATERFOWL																**N = 9**					
Snow Goose							458	275	247	0	826	**5150**	4100	1020	0	1342					
Canada Goose	165	19	24	91	46	264	50	187	**1270**	382	1243	435	410	343	375	522	191	52	36	34	21
Brant														3							
Mute Swan	6				9	7	9	13	**14**	4	8	6	4	8	6		12	7	5	3	6
Tundra Swan						1**		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)
Maurice River
Raptor and Waterbird Survey
July 2013 through June 2014

	FALL 2013						CORE WINTER PERIOD 2013-2014										SPRING 2014				
DATE	7/9	7/30	8/22	10/1	11/4	11/19	12/3	12/13	1/9	1/31	2/12	2/24	3/10	3/20	3/27	**AVG**	4/9	5/7	5/20	5/28	6/4
		*	*		*	*												*	*	*	*
WATERFOWL (continued)																					
Wood Duck											2		4	**13**	5		14				
Gadwall								4	4	1		25	90	190	**266**		131				
American Wigeon							1				2	32	64	**80**	74		15				
Am Black Duck	1	5	25	40	55	334	140	432	1166	640	1546	**1585**	745	998	1193	938	383	17	15	18	13
Mallard	1		7	1	4	16	53	17	356	205	688	542	353	717	**952**	431	24	2	3	1	
Blue-winged Teal			2	3										4			2		1		
Northern Shoveler												1	14	106	**164**		173				
Northern Pintail				72	3	208	92	40	114	4	921	1572	1287	**1621**	1185	760	32				
Green-winged Teal				257	149	525	377	355	44	2	123	**2966**	1320	2501	2384	1119	3503	43			
Common Teal											1			2			1				
Canvasback								1			1		4	**18**							
Redhead									1**												
Ring-necked Duck												4	**650**	497	160						
Greater Scaup							18	15	25	**34**	6	28	15	6	4						
Lesser Scaup						2	12	100	48	89	22	80	9	**108**	20		22			1	
Scaup (sp.)						2	30	45	60	85	170	4	**269**	108	262		19				
Surf Scoter														2	2		80				
White-winged Scoter										4	5	5									
Black Scoter	1																6				
Scoter (sp.)																	42				
Long-tailed Duck							1		**52**	11	1		1	2			1				
Bufflehead					13	72	84	186	**330**	261	230	105	208	230	133	196	140				
Com. Goldeneye									87	142	88	2	**168**	31	9						
Hooded Merganser					2		2	3	5	15	3	9	**121**	5	70						
Com. Merganser								3	**51**	43	23	3		5	2		5				
Red-br. Merganser						11	1	111	118	**320**	283	34	63	116	60	123	8			2	
Ruddy Duck				4	23				2	1			2	**5**			1		1	4	4

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)
Maurice River
Raptor and Waterbird Survey
July 2013 through June 2014

	FALL 2013						CORE WINTER PERIOD 2013-2014										SPRING 2014				
DATE	7/9	7/30	8/22	10/1	11/4	11/19	12/3	12/13	1/9	1/31	2/12	2/24	3/10	3/20	3/27	**AVG**	4/9	5/7	5/20	5/28	6/4
		*	*		*	*												*	*	*	*
DIURNAL RAPTORS																**N = 8**					
Osprey	125	79	76	4	2								1**	3	25		112	36	63	57	78
Mississippi Kite																					
Bald Eagle	19	14	15	46	20	11	16	26	36	31	38	24	21	22	**50**	30.38	18	14	12	10	14
Northern Harrier	2		2	11	20	29	17	16	17	15	**18**	10	7	13	16	15.25	19	5	8	3	1
Sharp-sh Hawk				10	8	19	5	**6**	0	1	4	1		2	3	2.75	2				
Cooper's Hawk		2	2	4	4	2	2	**4**	1	4	2	1		0	3	2.13	4		4		3
Northern Goshawk																0					
Red-shouldered Hawk					7	9	2	0	**4**	1	2	1		0	1	1.38					
Broad-winged Hawk																					
Red-tailed Hawk	1	2	1	8	76	53	26	41	36	24	**57**	11	3	34	35	33	37	5	10	2	10
Rough-legged Hawk							0	0	1	0	1	0		1	0	0.38					
Golden Eagle					4	1	0	1	0	0	0	1		0	0	0.25					
American Kestrel				30	1	1	1	0	0	0	0	0		0	0	0.13	4				
Merlin				4			0	1	1	1	0	1		0	0	0.5					
Peregrine Falcon	1	1		1		1	1	0	0	1	0	1		**4**	2	1.13	4	1	2	1	1
GROUSE to CRANES																					
Ring-nk. Pheasant							1			1											
Wild Turkey	1		31	4		22				**84**	26	6	2	71			42	5		6	1
Clapper Rail	24	32	33	12	13		**9**			1		1						34	25	31	35
King Rail				1																	
Virginia Rail										1											
Sora				3																	
American Coot										1					1**						
Sandhill Crane																		1**			
SHOREBIRDS																					
Black-bellied Plover			2	1													92	152	282	216	6
Semipalmated Plover		140	813															404	1735	400	16
Killdeer	19	5	10				6	3	4	3	6	20	10	17	**48**		5	3	3	7	2
Am. Oystercatcher							1							2	**5**				3		

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 4)
Maurice River
Raptor and Waterbird Survey
July 2013 through June 2014

	FALL 2013						CORE WINTER PERIOD 2013-2014										SPRING 2014				
DATE	7/9	7/30	8/22	10/1	11/4	11/19	12/3	12/13	1/9	1/31	2/12	2/24	3/10	3/20	3/27	**AVG**	4/9	5/7	5/20	5/28	6/4
		*	*		*	*												*	*	*	*
SHOREBIRDS (continued)																					
Black-necked Stilt			1																		
Greater Yellowlegs	2	2	16	59	10	131	54	12	6	1	7	10	14	44	**59**		226	454	120	45	18
Lesser Yellowlegs	4	22	65	8	141	12	9		2					6	**41**		190	851	36	7	
Willet	13	1															1	19	15	18	15
"Western Willet"		1															1				
Spotted Sandpiper		1	1															4	3	3	
Marbled Godwit			1**																		
Ruddy Turnstone			3															30	250	1400	
Red Knot																		11	212	2052	
Sanderling		5	4				1		5								1	15	38	16	
Semipalmated Sdp	20	3550	8570	22														2150	17190	13305	810
Western Sandpiper		2							1									1			
Least Sandpiper	48	19	150	9													16	58	233	33	
Wh-rump. Sandpiper																			12	15	
Pectoral Sandpiper					3										1						
Dunlin					395	343	345	1082	600	112	135	2			**1760**		5802	9080	1085	563	3
Curlew Sandpiper																			1**		
Stilt Sandpiper		1	3																1**		
Long-billed Dowitcher															1		1				
Short-billed Dowitcher	57	1450	580	2		1											3	1400	2543	60	13
Wilson's Snipe				1					1		8			12	**55**		1				
Am. Woodcock						1		1				8**	1				17**				
Wilson's Phalarope																					
Red-necked Phalarope																			1**		
unid. shorebirds	40																	1200			
TOTAL SHOREBIRDS	203	5199	10219	102	549	488											6339	15832	23760	18140	883

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 5)
Maurice River
Raptor and Waterbird Survey
July 2013 through June 2014

	FALL 2013						CORE WINTER PERIOD 2013-2014										SPRING 2014				
DATE	7/9	7/30	8/22	10/1	11/4	11/19	12/3	12/13	1/9	1/31	2/12	2/24	3/10	3/20	3/27	**AVG**	4/9	5/7	5/20	5/28	6/4
		*	*		*	*												*	*	*	*
JAEGERS to ALCIDS																					
Laughing Gull	√	√	√	√	1	1									1**		340	√	√	√	√
Little Gull																					
Com. Bl-headed Gull													1**				1				
Bonaparte's Gull									1			**110**	2	110	16		71	220			
Ring-billed Gull		3	4	√	√	√	√	√	√	√	250	√	√	√	√		√	3	10	√	√
Herring Gull	√	√	√	√	√	√	√	√	√	√	5000	√	√	√	√		√	√	√	√	√
Lesser Bl-backed Gull											2						1				
Great Bl-backed Gull	√	√	√	√	√	√	√	√	√	√	150	√	√	√	√		√	√	√	√	√
Gull-billed Tern																		2			
Caspian Tern			14	1																	
Royal Tern			9	5																	
Forster's Tern	218	155	144	204	26												51	54	126	146	84
Least Tern	6	2																	10	12	3
Black Skimmer																		86	151	139	50
PIGEONS to WOODPECKERS																					
E. Screech Owl															1						
Great Horned Owl												1									
Snowy Owl								1**		2**											
Short-eared Owl										2**					1**						
Belted Kingfisher	1			10	1	2	4	1	3	3	2		1	2	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 2
Cohansey River
Winter Raptor and Waterbird Survey
2013 – 2014

	COHANSEY RIVER		
DATE	1/19/14	2/17/14	AVG.
			n = 2
LOONS to CORMORANTS			
Double-cr Cormorant	1		
BITTERNS to VULTURES			
Great Blue Heron	10	4	
Black Vulture	2	45	23.5
Turkey Vulture	50	74	62
WATERFOWL			
Snow Goose	2000	5287	3644
Canada Goose	750	3600	2175
Mute Swan	2		
Gadwall		2	
Am Black Duck	35	70	53
Mallard	2	40	21
Northern Pintail	0	0	
Green-winged Teal	0	0	
Canvasback	60**		
Ring-necked Duck		2	
Bufflehead	10	10	
Hooded Merganser	3	10	
Common Merganser	25	27	
Red-breasted Merganser		7	
Ruddy Duck		1	
DIURNAL RAPTORS			
Bald Eagle	14	26	20
Northern Harrier	11	14	12.5
Sharp-sh Hawk	1	0	0.5
Cooper's Hawk	1	0	0.5
Red-shouldered Hawk	2	3	2.5
Red-tailed Hawk	28	20	24
American Kestrel	1	0	0.5
GROUSE to CRANES			
Wild Turkey	10	12	
Sandhill Crane	19**	7**	
SHOREBIRDS			
Greater Yellowlegs	1		
Dunlin	20		
Wilson's Snipe	1		
JAEGERS to ALCIDS			
Ring-billed Gull	√	√	
Herring Gull	√	√	
Great Black-backed Gull	√		
PIGEONS to WOODPECKERS			
Short-eared Owl	2**		
Belted Kingfisher	1		

** Seen either on a date other than official survey date or seen by other observers

SOME HIGHLIGHTS OF THE SEASON

This migrant immature **Golden Eagle** was over East Point Road on 4 November 2013. It was one of four seen that day, a new all-time daily high count for the Maurice River.
-- photo by Clay Sutton

This light morph (adult female) **Rough-legged Hawk** was photographed near East Point Lighthouse on 2 February 2014. It was no doubt a mid-winter "refugee" escaping the heavy snow cover to our north, to hopefully find refuge on Delaware Bay. – photo by Clay Sutton

DISCUSSION: CORE WINTER SURVEYS

Winter raptor and waterfowl surveys, the core effort of CU-sponsored ornithological studies, were conducted for the twenty-seventh consecutive winter season. Nine full river surveys were carried out between 3 December 2013 and 27 March 2014. Table 1 presented the findings for the core winter studies (as well as for all seasons); for winter surveys, peak counts for all species were shown in Bold Face. The winter average for key species was also shown in Table 1. Based on these findings, once again the Maurice River was proven to host regionally significant numbers of raptors and waterfowl in winter. In short and in summary, the winter past was amazing on the Maurice. It was a true "Old Fashioned Winter," with cold temperatures, heavy snow, and considerable ice on the river and Delaware Bay. These conditions brought the best waterfowl numbers seen in many years on the Maurice, and proved that the river can still host spectacular numbers of waterfowl when true winter conditions prevail. So too Bald Eagles responded to the wintry conditions, and a new record high of 50 Bald Eagles was tallied on 27 March.

Winter weather was the big story of 27th winter study season. A fall that was filled with northwest wind cold fronts (the conditions that bring migratory raptors to our region), was followed by a cold, snowy, and icy winter – the type of winter that characterized the early years of these Maurice River studies. Depending on the exact area and slightly varying snow totals, it was largely the fifth snowiest winter in the 130 years of record keeping in the South Jersey region. Not only did 44.5 inches of snow fall, but snow cover was far longer lasting than in most winters due to the colder than average temperatures. (Source: various articles on various dates from *The Press of Atlantic City*, all quoting National Weather Service South Jersey data).

While December was slightly warmer than average, January, February and March were significantly colder than recent averages. Coming off a long stretch of moderate winters, at an average of 33 degrees F. winter 2013-2014 was the third coldest winter since 1982 and the 34th coldest of the last 120 years. (Source: New Jersey Office of Climatology). Numerous daily low temperatures were set, and while Maurice River and Delaware Bay waters never really "locked up," there was ice on most still bodies of water for much of the season. Furthermore, these cold "Arctic Blasts" (aka Polar Vortices) gripped the entire Northeast and Upper Midwest. By mid-March, the Great Lakes were 92.2% ice-covered, and just short of the record 94.7% set in 1979. As a result, waterfowl that in recent years have been wintering farther north than historically (due to the trend of mild winters), were hit very hard by the ice. Many ducks on the Great Lakes, particularly Red-breasted Mergansers, died of starvation by the thousands when they could no longer feed due to ice cover.

Locally however, it was a banner year for waterfowl. As we have learned over the 27 long years of this Maurice River study, our best waterfowl years occur when ducks from farther north are pushed to our region by the snow and ice of harsh winters in the Northeast and Great Lakes regions. (Those that escape to warmer climes in the fall and early winter do just fine; it is the lingerers -- attempting to winter as far north as possible -- that get caught as mentioned above regarding the Great Lakes).

While goose numbers were unexceptional, probably due to local snow cover (on their

preferred field and marsh feeding areas) that sent them even farther south, ducks (birds that feed in open water) were very abundant in winter 2013-2014. American Black Ducks posted their highest peak count and average count since the winter of 2005-2006. The Mallard peak count was the best seen since 2003-2004. Northern Pintail, a signature species of the Maurice River, saw a peak of 1,621 birds on 20 March, the best count since 1996-1997, and their average of 760 birds per survey was the best since winter 1992-1993. Green-winged Teal, an increasing species on the Maurice as birds are wintering farther north (than their historically more southern wintering range) due to milder winters/climate change, tallied their highest average since 2008-2009 – in this case in spite of the cold. Gadwall were above average, and Northern Shoveler posted an all-time high count of 164 (previous high was 154 in 1998-1999).

Diving ducks were counted in exceptional numbers as well. Pushed into open waters near East Point by ice farther out in the Delaware Bay, both numbers and a good variety of divers were tallied. Bufflehead posted their highest peak count since 2009-2010. The peak for Red-breasted Merganser (320 on 31 January) was nearly a record, beaten only by 2003-2004 in the 27 years of counts. Hooded Mergansers posted an all-time record of 121 on 10 March (previous high of 81 in 2006-2007), with virtually all seen at Heislerville WMA. Oddly, Common Mergansers, the bird perhaps most characteristically pushed to our region by ice to the north, were not seen in large numbers; perhaps many went even farther south than the Delaware Bay region.

Ring-necked Ducks were simply off the charts! While our "official count day" high count was "only" 650 on 10 March, Clay counted 1,900 on a non-official count on 6 March. And this pales in comparison to Pete Dunne's count of 3,500-4,000 on 4 March – a New Jersey maxima by far. All were on the sand plant ponds just outside of Mauricetown, an amazing if short-lived sight as they staged there on their way north. A single Redhead was found by others at Heislerville in early January, only the fourth Maurice River record in 27 years for this regionally scarce diving duck, and finally, a Greater White-fronted Goose was found at Bayside State Prison by Tom Johnson for only the third Maurice River record. At least 2 Common Teal (Eurasian Green-winged Teal) were present on three count dates; they are nearly annual on the Maurice but always a good find.

As was expected and predicted, the severe winter to our north pushed record numbers of Bald Eagles into the Bayshore region. An all-time Maurice River peak daily count of 50 was carefully tallied on 27 March (previous peak count was 48 in 2009-2010), and the average of 30 per survey ties our two best averages from previous years. Bald Eagle numbers represent a combination of local breeding birds and true wintering birds from farther north, and in 2013-2014, rising numbers of breeding pairs combined with "refugees" from the frozen north made for a spectacular eagle winter along the length of the Maurice.

Another escapee from the snow-covered areas north of our region was Rough-legged Hawk. Winter 2013-2014 saw our first records at all since 2009-2010, and our best average since 2004-2005. Three different birds were seen, and all were light morph individuals. It was good to again see a few of these formerly much more numerous hawks.

However the picture was not good for two of our far more common Maurice River signature raptor species. For Northern Harrier, the peak count of 18 is our all-time lowest peak;

the previous lowest peak was 22 in the 1989-1990 winter season and again in 2012-2013. The Harrier average of only 15.25 per survey ties 1996-1997 as our all-time lowest average. For Red-tailed Hawk, the findings were even grimmer: The average of 33 ties our second-lowest average ever (in 2011-2012). The lowest average ever was 31 in 2012-2013. This means that in 27 years, our three lowest average Red-tail counts have occurred in the last three years.

These are not good trends for Harriers or Red-tailed Hawks. Quite probably a lack of prey is a major factor. We suspect that marsh rodent numbers have not yet recovered on the Maurice River from the combined impacts of Hurricane Irene and Superstorm Sandy. Even though they have been reported as "starting to recover by late summer 2013" at Forsythe NWR (Source: personal communication by Becky Kern, US Fish and Wildlife Service), this may not be the case on the Maurice River and perhaps the wider Delaware Bayshore. And, as we discussed at length in both the 25 year report and subsequent year 26 report, sea level rise and loss of the high marsh are a factor too. (See these full reports for much more discussion and speculation). But low rodent populations might indeed explain why individual Snowy Owls didn't remain for long on the Bayshore, quite unlike those found on the Atlantic Coast marshes. The few Maurice River and other reported Delaware Bayshore Rough-legged Hawks didn't "stick" either.

Snowy Owls. A special bird requires special discussion, and Snowy Owl was the bird of the winter on the Delaware Bayshore and the Jersey Coast in winter 2013-2014. This past winter we were all hugely fortunate to witness the biggest Snowy Owl invasion of our lifetimes, and possibly the largest-ever incursion in New Jersey and throughout the Northeast. Beginning just after Thanksgiving, it is fun to remember just how this event unfolded. First it was the somewhat expected one or two late November reports of "one day wonders" in the classic "tundra-like" habitats and places – a bird at Holgate, one at Sandy Hook, another at Barnegat Light. Nothing too unusual, yet…. Then it got closer to home; our friend Brian Johnson found a Snowy Owl in the dunes at Strathmere, and one or two tantalizing reports came in from the Delaware Bayshore. Hmm…. The very first day that Clay actually thought, "Hey, maybe something's up here," he headed over to Stone Harbor Point, walked out onto the beach, scanned, and was staring into the enigmatic eyes of a Snowy Owl sitting only 100 yards away. A couple of days later, when Clay couldn't go, his wife Pat did the same; she went to Stone Harbor Point and enjoyed three Snowy Owls in sight at once. She watched them all afternoon, and towards dusk was rewarded when she saw one of them deftly catch a rabbit. And it only got better from there. Soon it seemed as if Snowys were everywhere.

As the event unfolded, a personal highlight for Clay and Pat was seeing two Snowys in sight at once (!) at East Point in Cumberland County on 28 December -- at an iconic spot we had always dreamed of seeing one. While (frustratingly….) none were found on any of the official CU Maurice River count days, individuals were seen at East Point on several dates, and they were regular at nearby Moore's Beach, Fortescue, and Egg Island Point. In 27 years, we have had only one prior Snowy Owl record for the Maurice, a bird found at Bivalve in December 2008. In the end, the "Snowy Winter" was a once in a lifetime event, and one to savor forever.

How big was the Snowy Owl invasion of 2013-2014? It was probably the largest ever recorded, yet comparisons are hard to make. It was undoubtedly the largest irruption in the East

since the winter of 1926-1927. The current winter invasion involved hundreds upon hundreds, maybe thousands, of Snowy Owls. No one can put a firm number on it yet and we probably won't be able to do so until all reports are compiled, analyzed, and published.

There were at least 50 Snowys seen in Atlantic, Cape May, and Cumberland Counties alone – and possibly many more. For example, Snowy Owls were seen daily at Reed's Beach (on the Delaware Bay in Cape May County) for about a two week period at the height of the explosion. One could easily assume that the same bird was seen each day, yet Tom Reed kept careful notes and photos of each sighting, and determined that at least five *different* Snowys occurred there. One observer reported 14 Snowy Owls at the Holgate Unit of Forsythe NWR *on a single day*, a high count for New Jersey that will probably stand for at least another century. Up to 7 Snowys were found on the expansive north end of Brigantine Island. Multiple Snowy Owls were found on all the coastal Christmas Bird Counts (a record five on the Cape May CBC, and one on the Cumberland County CBC -- a bird seen at Fortescue). Because of daily movements early on, some observers felt that the true numbers were essentially uncountable. As expected in our region, all the Snowys were young of the year (most adults remain behind in the Arctic), and most were young males that characteristically travel the greatest distances.

Comparisons with previous invasions remain difficult however. No previous major Snowy Owl flight was welcomed by cell phones, list serves, tweets, twitters, text messages, and social media. During the 1926-1927 flight, information was disseminated by hand-written letters penned late into the night or maybe even well after the fact. In 2013-2014, an owl's appearance was known by hundreds in real time! Therefore, true comparisons remain hard to make. During the invasion of 1926-1927, most Snowy Owls were observed by those looking down the barrel of a shotgun, and thousands were killed. Sadly this was in the dark ages for predators, and at the time, one ornithologist checked taxidermy shops across the northern states and learned of 2,363 Snowy Owls killed and brought in to be mounted as trophies. Sadly, no doubt the death toll was many, many times higher since most Snowy Owls were killed for target practice or "predator control" and left where they lay. We've come a long way since those dark days for predators, and this time around, save for the few owls hit by vehicles or aircraft, most will again return north to breed.

There was much speculation regarding where the owls came from and where they would end up. But here again, in the information age, answers were almost instantaneous. This winter's invasion of Snowy Owls followed an exceptional breeding year in the eastern Arctic, mainly in northern Quebec. The birds that came south were the many young produced the previous breeding season (summer of 2013). If food is scarce, Snowy Owls may not nest. Yet if food is abundant, as in years when the highly cyclical lemming population reaches its peak, Snowys may lay up to 12 or even 14 eggs, taking advantage of the bountiful food supply. There was a widely circulated photo of a 2013 Snowy Owl nest in northern Quebec with the rim of the nest lined with 70 lemmings and 8 voles (before the eggs had even hatched!), confirming a remarkable lemming explosion and subsequent excellent breeding season for Snowy Owls in the eastern Arctic.

Most of these winter visitors this season were quite healthy and helped disprove the old theory that Snowy Owls only irrupt after lemmings "crash" and the birds are starving. They ate well here too, and observed South Jersey prey included rabbits, Black Duck, Ruddy Duck,

Ruddy Turnstone, and numerous gulls. No doubt meadow voles, rice rats, muskrats, and the ubiquitous Norway rat were favored as well. (The above Snowy Owl discussion is based in-part on an article written for the 2014 edition of *The Peregrine Observer, the Journal of the Cape May Bird Observatory*, by Clay and Pat Sutton, and we thank CMBO for allowing this excerpt here).

In summary, it was a good old-fashioned winter, with lots of ice and snow to the north pushing really good numbers of waterfowl and eagles south to the Maurice River. After many warm winters, it was good to see the return of good counts, particularly for Pintail and Mallard, and that the river, when given the opportunity (by a cold winter), can still attract and indeed well support ducks -- despite climate change, known sea level rise, the salt water line moving north, and the loss of wild rice acreage. It was a heartening winter on the Maurice, and one that finally harkened back to the abundance of the earlier years of this long-term study.

DISCUSSION: SPRING, SUMMER, AND FALL SURVEY EFFORTS

Principal Citizens United Maurice River studies in 2013-2014 -- as in all previous seasons -- have focused primarily on winter raptors and waterfowl. In recent years however, a greater emphasis has been placed on spring and fall migration. Also, over time, comparatively little effort has been focused on the breeding birds of the Maurice River watershed. However, because much of spring migration through the region is virtually concurrent with the local breeding season for many species, and because "fall" (southbound) migration for many shorebirds occurs in mid-summer, current survey efforts and protocol have allowed for a significant (if not in-depth) look at the breeding birds of the Maurice River. Findings from spring and fall sampling dates are also shown in Table 1.

As an example, during survey efforts we continue to see ample evidence of the continuing and booming resurgence of Osprey and Bald Eagles on the Maurice River, but these are well documented and reported elsewhere by CU and the ENSP, and will not be elaborated on here. Suffice it to say that Osprey and Bald Eagle have made a truly remarkable recovery in the Bayshore region and numbers continue to grow. During 2014, we discovered that a pair of Peregrine Falcons had taken up residence on the water tower at Bayside State Prison, and brought this to the ENSP's attention. With the complete loss of American Kestrel, Peregrine is now the commonest falcon of the region (except during fall migration).

Highly significant on the Delaware Bayshore is the continuing wader rookery at Heislerville WMA. Active since the 2010 breeding season, in spring 2014 this roost and rookery contained as many as 169 Black-crowned Night-Herons – and possibly over 100 pairs. At least one pair, if not more, of Great Blue Herons are again in the rookery, along with hundreds of Snowy Egrets and Great Egrets. (Rookery numbers are being monitored by the Division of Fish and Wildlife's Nongame and Endangered Species Program). In 2014, Double-crested Cormorants again nested at Heislerville in numbers, with easily over 100 pairs present. This is only the second known Cormorant nesting colony on the Bayshore to our knowledge, the other being the few pairs that have nested for about a decade on the navigation towers near the mouth of the Cohansey River. Double-crested Cormorant is well-known to be expanding its numbers and range throughout the East.

Migratory shorebird use of the lower Maurice River impoundments and mudflats remains one of the key avian ecovalues of the region. Shorebird use of the Maurice River was explored in depth in the 2009–2010 seasonal report, and again in the recent 25 year summary report, and therefore will not be elaborated upon here. However, as Table 1 will readily attest, the Maurice River in both spring and fall continues to host globally significant numbers of migratory shorebirds. The fall 2013 season saw counts of up to 10,219 shorebirds, and spring 2014 produced a high count of 23,760 total shorebirds on 20 May, principally at East Point, Heislerville WMA, and the Bivalve EEP site. Particularly significant were the high numbers of Red Knot seen, with an all-time Maurice River record 2,052 counted at East Point on 28 May – on what was possibly their final day on Delaware Bay before departing for their high Arctic breeding grounds. (1,400 Ruddy Turnstones were present that day as well, also a Maurice River record). Red Knot numbers on the Maurice are only a part of the total picture on Delaware Bay, but it is hoped that these counts augment State efforts in charting the comeback of this endangered shorebird. On a far less positive and alarming note, Sanderling seemingly are continuing their steady decline on Delaware Bay beaches in spring, and give great cause for

concern. Sanderling numbers need to be watched closely, both on Delaware Bay and Atlantic beaches.

As in previous seasons, the intense focus on the birds of the Maurice River led to many interesting finds and significant sightings, and many "good birds" were reported by others as well. Sightings occurred throughout the seasonal cycle. A migrant Yellow-bellied Flycatcher was at Heislerville WMA on 22 August, one of few known records for the region. A very good total of 46 Bald Eagles, most of them migrants, were counted on the lower river on 1 October. A record for any and all seasons and years, 4 migrant immature Golden Eagles were seen well on the lower river on 4 November by Clay Sutton. 2,000 Dunlin were at Bivalve on the non-survey date of 23 November, and 3,500 Dunlin were at Heislerville on 1 December; both were totals that well-eclipsed the official counts made just a few days before or after. A Lapland Longspur was with Horned Larks at East Point on 13 December. Red-necked Grebes were found on three occasions, no doubt related to the freeze-ups on the Great Lakes (as were 311 Common Mergansers on Union Lake on 27 February, reported by Sandra Keller. 8 Red-necked Grebes were also at Union Lake). One or more Black-headed Gulls joined the annual spring gathering of Bonaparte's Gulls at East Point on several occasions, and an adult Little Gull was there on 2 April, seen by others. (Sutton saw a/the? Little Gull at Maple Avenue in Dividing Creek on 14 March, but, alas, we have yet to record one on the Maurice!). Oddly, and despite many regional sightings, no Broad-winged Hawks or Mississippi Kites were found during this cycle; in birders' terms, both species were rather "big misses."

Wilson's Snipe peaked at an excellent 55 birds on 27 March. Finally, and of particular interest, was a Maurice River record 17 American Woodcock seen foraging for worms on plowed lower river roadsides following a late eight inches of snowfall (and 10 degree F. temperatures) on 5 April. The Woodcock no doubt made it through this late cold snap, as temperatures rose dramatically soon after, and spring finally appeared. But for birds and birders and biologists alike, it was a remarkable and memorable winter.

SUMMARY AND ACKNOWLEDGMENTS

Winter 2013-2014 marked the twenty-seventh year of study of the wintering raptors and waterfowl on the Maurice River and the eleventh year of focused spring and fall counts. Studies conducted for Citizens United to Protect the Maurice River and its Tributaries, Inc. again documented an amazing array of avian use of this key South Jersey river. 2013-2014 efforts augmented and supplemented the findings of the first twenty-six seasons of study and documented and substantiated the Maurice River as a premier avian resource area of not only New Jersey, but of the entire Mid-Atlantic Region. Much greater in-depth discussion and recommendations were offered in the twenty-five year summary report that was presented in January 2013 at the Partnership for the Delaware Estuary Conference, and subsequently placed on the CU Maurice River website. These 27 years of study have continued to document the Maurice River as an important bird area at all seasons and by any standard applied.

After twenty-seven years of study, we now firmly know the depth and diversity of the substantial birdlife of the Maurice River. Long-term studies have created a baseline of avian resource data rarely equaled for the Delaware Bayshore and the Mid-Atlantic region, and allow a better and exceptional understanding of true distribution, status, and trends of the amazing -- and dare we say unique -- birdlife of the Maurice River.

In conclusion, we thank Brian and Karen Johnson, Tony Klock, Laurie Pettigrew, Janet Crawford, Tom Reed, Bob Fogg, Sam Galick, Steve Glynn, Pete Dunne, Tom Johnson, Leslie and Tony Ficcaglia, Dave Lord, Vince Elia, Chris Herz, and Sandra Keller for shared sightings and insights, and for their continuing deep interest in the Maurice River and the Delaware Bayshore. Clay thanks Ward Dasey and Pat Sutton for their support and assistance during the ongoing and long-term volunteer Cohansey River (and Salem River) comparative surveys.

We thank the many members, supporters, and friends of Citizens United 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 Maurice River. We particularly thank Lillian Armstrong for her interest and for all her support and efforts to shepherd these studies and publications along. As always, we sincerely thank Jane Galetto for her vision of what role these long-term studies might play in the protection of these valuable avian resources and the river upon which they so depend.

Finally, we sincerely thank the U.S. Department of the Interior's National Park Service, Wild and Scenic Rivers Program, for continuing assistance to Citizens United. The award of a Wild and Scenic Rivers Partnership Grant to CU supported this project and enabled these surveys to be conducted. We recognize and thank the NPS for their continuing interest in this study and in the wildlife resources of the Maurice River.

– Clay Sutton

LITERATURE CITED / FOR FURTHER REFERENCE

All comparative Maurice River ornithological studies discussed and / or referenced in this report have been directed and co-authored by Clay Sutton, either as an independent contractor or formerly as staff ornithologist, Southern Regional Manager and Vice President of Herpetological Associates, Inc., Plant and Wildlife Consultants. (Comparative Cohansey River studies are embedded within the Maurice River annual reports). Principal reports and publications resulting (either wholly or in part) from these studies (and funded or co-funded by Citizens United to Project the Maurice River and its Tributaries, Inc.) are as follows:

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