

RAPTORS and WATERBIRDS

on the MAURICE RIVER

CUMBERLAND COUNTY, NEW JERSEY

*The THIRTIETH FIELD SEASON
of a Long-term Avian Use Study*

**FALL 2016 through SPRING 2017
and highlighting the CORE WINTER PERIOD 2016-2017**

Research sponsored by

CU Maurice River



**By Clay Sutton and James Dowdell
July 2017**

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Above:

The “*Bird of the Year*” on the Maurice River during this yearly monitoring cycle might arguably be the **Long-tailed Duck**. This normally uncommon bird for the river and Delaware Bay was present in unprecedented numbers in February 2017. This handsome pair was photographed at Bivalve.
photo by Clay Sutton

On the cover:

When the Maurice River avian monitoring became a year-round project back in 2003, it gave us an opportunity to witness and document the amazing come-back of Osprey on the river and Bayshore, a conservation effort in which CU Maurice River has played a pivotal role. Here is an **Osprey with a Menhaden** (“bunker”), its principal prey, at East Point in May 2017.
photo by Clay Sutton

RAPTORS and WATERBIRDS on the MAURICE RIVER

July 2016 through June 2017

The THIRTIETH FIELD SEASON

of a Long-term Avian Use Study

Sponsored by CU Maurice River

INTRODUCTION AND OVERVIEW

When Jim Dowdell clicked off the final shorebird on his counter, on the afternoon of June 1, 2017 at Heislerville Wildlife Management Area, an incredible thirty years of CU Maurice River-sponsored avian research and monitoring came to a close. The period from July 2016 through June 2017 marked the amazing thirtieth field season of long-term avian use studies carried out on the Maurice River under the auspices of CU Maurice River. Studies included the monitoring of fall migration in 2016, spring migration in 2017, anecdotal breeding bird studies, and the all-important core winter studies carried out from December 2016 through March 2017.

An in-depth review of long-term avian 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 the first twenty-five years of data, is now available (archived on the CU Maurice River website: www.cumauriceriver.org), this current single season report will only offer summary discussion of the 2016-2017 findings in relation to previous years. Note that the findings of the 26th, 27th, 28th and 29th seasons of study (2012-2013, 2013-2014, 2014-2015, and 2015-2016) are also available on the CU website as well.

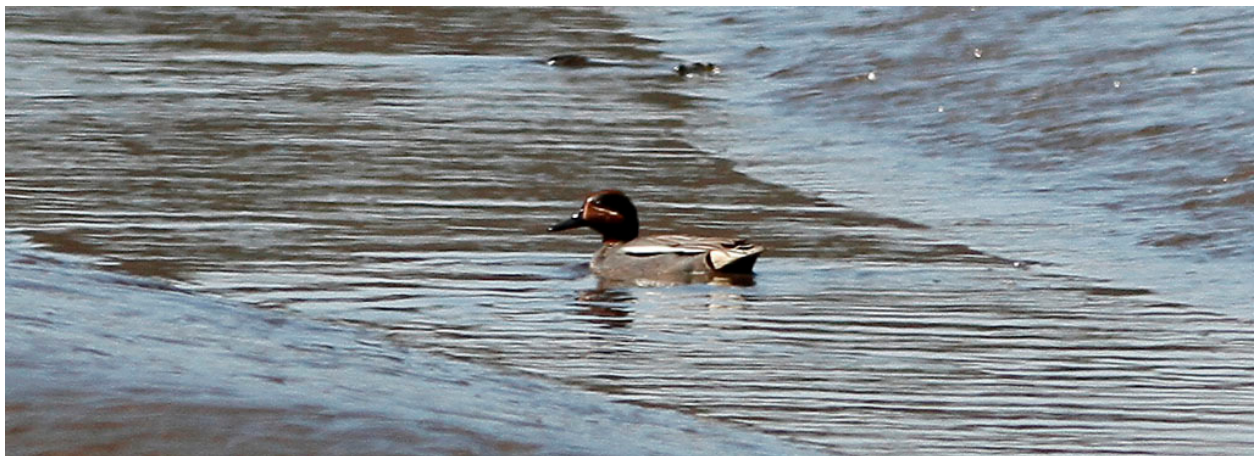
Also, and again because all of the twenty-nine years of *individual* reports are available on-line, little discussion of methodology or techniques will be offered in this short-form yearly summary. The basic methodology of the core winter raptor and waterfowl studies has remained the same since 1987: nine established sites (point counts) on the tidal Maurice River between Millville and East Point were sampled by Sutton and Dowdell for a period of 45 minutes each during each survey. Visit the CU website for in-depth review of all methodologies and sampling locations, as well as the important goals and objectives of this long-term project.

In-depth analysis of findings were 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 report (referenced above). This is a documentation of the considerable avian resources of the Maurice River, and one that includes 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).

A comprehensive 30 year analysis and report is planned and in preparation now that the 30th (and probably final) field season has concluded in June 2017. Note that this effort will be separate from this current short-form report here -- that only reviews the 2016-2017 season in relation to weather patterns and the recent findings of the past five years of studies. The stand-alone 30 year summary report will be forthcoming in late 2017, and will offer an in-depth perspective on Maurice River long-term avian status and trends over time.



A few of the all-time record 112 **Long-tailed Ducks** counted on the lower Maurice River on February 11, 2017. Long-tails are generally scarce on the river itself, but this number would be a good count for anywhere on the Jersey Coast. *photo by Clay Sutton*



A drake **Common Teal** on the upper Maurice River on March 23, 2017. This Eurasian race of the Green-winged Teal is annual on the Maurice River in winter, but this is the first one we have managed to photograph. A candidate for full species status, this little duck reached the Maurice River from either Iceland or Siberia! *photo by Clay Sutton*

FINDINGS

The results of the thirtieth annual Maurice River Raptor and Waterbird Survey for the period July 2016 through June 2017 are shown in **Table 1**. Eight full surveys were carried out during the important core winter period (December 19, 2016 to March 23, 2017). Seven surveys were conducted during the fall migration period of the study cycle, July 25 through November 28 2016, and six spring migration surveys were carried out between April 13 and June 1, 2017. In all, a total of 21 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 raptor and waterbird 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. **Shorebird high counts for the migration seasons are also highlighted in Table 1**, and “total shorebirds” present each spring and fall sampling date are also shown.

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 three times in winter 2016-2017. This marked the 27th consecutive winter season that the Cohansey River has been surveyed. The results of the Cohansey River winter raptor and waterbird survey are shown in **Table 2**. In recent decades, all Cohansey River surveys have been carried out on a *pro bono*/volunteer basis, at no cost to Citizens United. The Cohansey remains an important comparison river to the Maurice in terms of region-wide phenomena, status and trends, and seasonal phenology.

In the Maurice River drainage, as in past seasons, Canada Goose numbers on the Bayside State Prison grounds (adjacent to the Maurice) were again estimated; birds were counted from Route 47 by a drive-by technique. 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 not included in the river point count totals shown in Table 1. These archived census numbers can be reviewed at some point in the future for the insight they may offer regarding weather conditions, seasonality, and goose population trends on the river.

2016 – 2017 Canada Goose Usage -- Bayside State Prison Grounds

<i>Date</i>	<i>Number</i>	<i>Date</i>	<i>Number</i>	<i>Date</i>	<i>Number</i>
07/25/16	62	12/30/16	730	05/09/17	180
08/09/16	170	01/13/17	625	05/23/17	180
08/23/16	510	01/27/17	655	06/01/17	145
10/05/16	530	02/11/17	510		
10/26/16	364	02/27/17	360		
11/07/16	820	03/09/17	925		
11/28/16	670	03/23/17	262		
12/19/16	780	04/13/17	164		

TABLE 1 (page 1)
Maurice River
Raptor and Waterbird Survey
July 2016 through June 2017

DATE	FALL 2016							CORE WINTER PERIOD 2016-2017								SPRING 2017						
	7/25	8/9	8/23	10/5	10/26	11/7	11/28	12/19	12/30	1/13	1/27	2/11	2/27	3/9	3/23	AVG.	4/13	4/23	5/4	5/9	5/23	6/1
	**	**		**	**	**										N=8		**	WSB	**	**	**
LOONS to CORMORANTS																						
Red-throated Loon														1	1				1*			
Common Loon																	2		1	1		
Pied-billed Grebe						1	2	2									1					
Horned Grebe											1										1*	
Northern Gannet						162							4	20	60		62					
Dbl-cr Cormorant	708	360	429	410	390	258	90		1				22	43	37		279	200	400	450	502	635
BITTERNS to VULTURES																						
Great Blue Heron	8	10	19	4	14	4	19	9	7	12	8	10	5	6	8		4	3	2	4	4	4
Great Egret	76	60	45	13	12	5	10		3	3	2	3	2	3	10		56	40	104	59	62	77
Snowy Egret	94	13	45	22	2												42	25	85	24	34	55
Little Blue Heron																		1*	1*			
Tricolored Heron			1																			
Green Heron	1			1																		3
Black-cr Night-Heron	50	2	2															1	25	31	94	86
Glossy Ibis	2		1														60	125	46	3	9	
White Ibis																		1*				
Black Vulture	4	4	12	21	34	30	16	21	30	36	36	46	18	33	60	35	23	2	3	21	7	28
Turkey Vulture	35	16	74	62	130	132	122	128	153	120	160	171	164	146	118	145	131	35	34	62	65	80
WATERFOWL																						
Ross's Goose									1													
Snow Goose								50	190	109	2006	85	400	70	524	429						
Canada Goose	34		61	65	85	6	29	206	40	103	506	240	151	642	241	266	175	65	98	79	81	214
Brant					1										3*				10*			
Mute Swan	4	2			1	4	3	4	2	4	8	4	5	5	10		36	30	30	34	6	8
Wood Duck	2												2	4	2		4		2		1	
Gadwall										4	4	7	8	15		9						
American Wigeon				2							3	4	3	12	17							

Peak winter counts and peak spring shorebird counts
 Shown in **BOLD FACE**

** Lower River Survey only
 * Seen on date other than official survey date or by other observers
 WSB = non-standard Survey (World Series of Birding)

TABLE 1 (page 2)
Maurice River
Raptor and Waterbird Survey
July 2016 through June 2017

DATE	FALL 2016							CORE WINTER PERIOD 2016-2017								SPRING 2017						
	7/25	8/9	8/23	10/5	10/26	11/7	11/28	12/19	12/30	1/13	1/27	2/11	2/27	3/9	3/23	AVG.	4/13	4/23	5/4	5/9	5/23	6/1
	**	**		**	**	**										N=8		**	WSB	**	**	**
WATERFOWL (continued)																						
Am Black Duck			89	55	166	127	153	284	238	439	518	371	705	503	345	425	62	35	24	4	16	21
Mallard		1	12		7	7	126	389	365	149	315	283	220	259	160	268	7	1	1	5	8	
Blue-winged Teal				8									2*				2	2				
Northern Shoveler											4	2	14*	3	15		17					
Northern Pintail				2	14	4		125	11	6	115	298	80	64	100	100	3					
N.Pintail x Mallard hybrid-male																	1					
Green-winged Teal			1	220	226	285	48	138	60	2	51	486	1236	1278	1101	544	580	200	6			
Common Teal											1	1		2	1							
Gr-wg x C.Teal hybrid-male												1	1	1								
Redhead															1							
Ring-necked Duck								325			230	342	360	380	20							
Greater Scaup								125			4	3	3									
Lesser Scaup									7		40	13	1	6			3					
Scaup (sp.)						2				6	40	66	214	122	6							
Surf Scoter						6	1	5						2*			1					
Black Scoter							12															
Scoter (sp.)						15	12															
Long-tailed Duck							1	9		4	59	112	2									
Bufflehead					5		89	93	45	74	187	207	126	104	46	110						
Com. Goldeneye								12	3	5	5	41	2									
Hooded Merganser							2	14		17	28	80	2	8	10							
Com. Merganser											1	2	1									
Red-br Merganser							6	18	14	11	37	95	7	13	9	26	12	8	1			
Ruddy Duck					8	62	121	26	2		26	55	157	126	134		231	50	22	23	5	4

Peak winter counts and peak spring shorebird counts
 Shown in **BOLD FACE**

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TABLE 1 (page 3)
Maurice River
Raptor and Waterbird Survey
July 2016 through June 2017

DATE	FALL 2016							CORE WINTER PERIOD 2016-2017								SPRING 2017						
	7/25	8/9	8/23	10/5	10/26	11/7	11/28	12/19	12/30	1/13	1/27	2/11	2/27	3/9	3/23	AVG.	4/13	4/23	5/4	5/9	5/23	6/1
	**	**		**	**	**										N=8		**	WSB	**	**	**
DIURNAL RAPTORS																						
Osprey	88	76	116	3	3	2								2	2		142	45	82	53	91	83
Bald Eagle	24	20	32	25	33	37	13	30	27	38	32	22	36	41	53	34.88	32	3	15	26	16	35
Northern Harrier		1		8	20	20	16	9	18	15	18	13	19	20	15	15.88	7	3	5	2	3	1
Sharp-shinned Hawk				8	78	25	5	1	1	5	1	3	2	0	1	1.75	1					
Cooper's Hawk			3	4	20	7	3	4	1	4	2	2	1	0	1	1.88	3		1	1		1
Northern Goshawk										1		2										
Red-shouldered Hawk					8	5		1	0	0	0	2	0	0	0	0.38						
Broad-winged Hawk					2														1	1		
Red-tailed Hawk	5	2	5	1	42	81	14	29	28	44	16	25	30	20	35	28.38	15	1	5	7	3	13
Golden Eagle						1 im.																
American Kestrel				5	2	2	2	1	1	1	1	0	2	1	1	1	2					
Merlin				1	2			1	0	0	1	0	1	0	0	0.38						
Peregrine Falcon	2		1	1	1			1	0	0	0	4	3	2	2	1.50	1	1	2	1	3	1
GROUSE to CRANES																						
Ring-neck Pheasant								1			2											
Chukar						1																
Wild Turkey						30		11				3	75		78		34	8	30	1	7	4
Clapper Rail	22	9	14	4		1		1					1					1	33	3	26	21
Virginia Rail						2													6			
Sandhill Crane																		1*				

Peak winter counts and peak spring shorebird counts
 Shown in BOLD FACE

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TABLE 1 (page 4)
Maurice River
Raptor and Waterbird Survey
July 2016 through June 2017

DATE	FALL 2016							CORE WINTER PERIOD 2016-2017								SPRING 2017						
	7/25	8/9	8/23	10/5	10/26	11/7	11/28	12/19	12/30	1/13	1/27	2/11	2/27	3/9	3/23	AVG.	4/13	4/23	5/4	5/9	5/23	6/1
	**	**		**	**	**										N=8		**	WSB	**	**	**
SHOREBIRDS																						
Black-bellied Plover	1		53	41	14	1	22	1										5	55	107	125	9
Semipalmated Plover	36	275	471	75															67	1080	905	44
Killdeer	9	4	10		4			2	2	5	2	3	18	7	12		5	6	6	7	5	10
Am. Oystercatcher													2						2		3	6
American Avocet				1*	1																	
Greater Yellowlegs	17	2	23	66	86	33	7	4	3	3	25	32	16	14	24		112	45	272	67	14	
Lesser Yellowlegs	33	14	12	20		2	1							2	6		31	200	125	28		
Solitary Sandpiper			3																			
Willet	1e		1w	3w		1w	7w	3w	3w*	3w	4w	2w*					3e	16e	13e	12e	13e	13e
Spotted Sandpiper	1		1								1							1	1	1	9	
Ruddy Turnstone			1																1	133	142	
Red Knot																				2	30	
Sanderling										6												2
Semipalmated Sdp	2156	1900	1061	56														50	310	5104	7625	1730
Western Sandpiper	2	1		2																		
Least Sandpiper	47	7	32	6														30	25	98	20	
Wh-rump. Sandpiper		1																	1	10	8	4
Dunlin				2	515	502	510	401	105					20	6	385		1020	10130	7000	1440	6
Stilt Sandpiper																		1	6*			
Ruff																		1*				
Sh-billed Dowitcher	634	240	176	6	2													100	1553	3380	1130	8
Lg-billed Dowitcher																			1			
Wilson's Snipe						2	1						18		10		19					
Am. Woodcock					1			1							2							
Red-necked Phalarope																			2*			
unid. shorebirds																					nc5150	
TOTAL SHOREBIRDS	2937	2444	1844	278	623	541	548										170	1474	12548	17029	11471	1830

Peak winter counts and peak spring shorebird counts
 Shown in BOLD FACE

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TABLE 1 (page 5)
Maurice River
Raptor and Waterbird Survey
July 2016 through June 2017

	FALL 2016							CORE WINTER PERIOD 2016-2017								SPRING 2017						
DATE	7/25	8/9	8/23	10/5	10/26	11/7	11/28	12/19	12/30	1/13	1/27	2/11	2/27	3/9	3/23	AVG.	4/13	4/23	5/4	5/9	5/23	6/1
	**	**		**	**	**										N=8		**	WSB	**	**	**
JAEGERS to ALCIDS																						
Laughing Gull	√	√	√	√	√	4								1			√	√	√	√	√	√
Bonaparte's Gull												8	43	2			1					1
Ring-billed Gull	√		√	√	√	√	√	√	√	√	√	√	√	√	√		√	√	√	√	√	√
Herring Gull	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√		√	√	√	√	√	√
Lesser BI-backed Gull																		3*				
Gt BI-backed Gull	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√		√	√	√	√	√	√
Caspian Tern		4	7																			
Royal Tern		1	2	16	2	(50+ 10/20)																
Forster's Tern	126	40	89	72	117	70											93	100	76	120	56	48
Least Tern	9	1																	4	2	12	4
Black Tern			4																			
Black Skimmer																		1	42	10	195	65
PIGEONS to WOODPECKERS																						
E. Screech Owl																			1			
Great Horned Owl																			1			
Short-eared Owl									1*		1*											
Belted Kingfisher	1			3	3	2	7	6	3	1	1	4	2	2	4		2	1	1			1

Peak winter counts and peak spring shorebird counts
 Shown in BOLD FACE

** Lower River Survey only
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 WSB = non-standard Survey (World Series of Birding)

TABLE 2
Cohansey River
Winter Raptor and Waterbird Survey
2016 – 2017

DATE	COHANSEY RIVER			
	1/19/17	3/6/17	3/29/17	AVG.
				n = 3
LOONS to CORMORANTS				
Red-troated Loon	1			
N. Gannet			20	
Double-cr Cormorant			4	
BITTERNS to VULTURES				
Great Blue Heron	6	3	1	
Black Vulture	41	63	17	40.33
Turkey Vulture	144	131	83	119.33
WATERFOWL				
Snow Goose	972	200	1425	866
Canada Goose	2070	1130	92	1097
Mute Swan			2	
Gadwall		4		
Am Black Duck	261	61	70	131
Mallard	79	15	8	34
Northern Pintail	2	7	13	7
Green-winged Teal	0	340	306	215
Ring-necked Duck		18		
Bufflehead	2	3	12	6
Hooded Merganser	8	1		
Common Merganser		3	2	
Red-breasted Merganser	0	0	1	0
DIURNAL RAPTORS				
Osprey			9	
Bald Eagle	28	33	36	32.33
Northern Harrier	21	16	19	18.67
Sharp-sh Hawk				0
Cooper's Hawk	1	0	0	
N. Goshawk	1*			
Red-sh Hawk	2	0	0	0.67
Red-tailed Hawk	25	25	16	22
American Kestrel	2	3	4	3
Merlin				0
Peregrine Falcon				0
GROUSE to CRANES				
Wild Turkey		21		
Am. Coot				
Sandhill Crane				
SHOREBIRDS				
Killdeer			2	
Greater Yellowlegs	4		84	
Lesser Yellowlegs			2	
Dunlin	8		50	
Wilson's Snipe			1	
JAEGERS to ALCIDS				
Laughing Gull			1	
Ring-billed Gull	√	√	√	
Herring Gull	√	√	√	
Great Black-backed Gull	√	√	√	
PIGEONS to WOODPECKERS				
Belted Kingfisher	2	1		

DISCUSSION: CORE WINTER SURVEYS

Winter raptor and waterfowl surveys, the core effort of CU Maurice River-sponsored ornithological studies, were conducted for the thirtieth consecutive winter season. Eight full river surveys were carried out between December 19, 2016 and March 23, 2017. Table 1 presents the findings for the core winter studies (as well as for all seasons). For winter surveys, peak counts for all species are shown in Bold Face. The winter average for key species is 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.

As in every past winter season, winter raptor and waterfowl numbers were largely determined by the weather, both local weather and weather patterns over much of North America. Our yearly study cycle again saw temperatures much warmer than the long-term average. 2016 was determined by the State Climatologist and Rutgers University to be the third warmest year on record in New Jersey, slotting behind only 2012 and 1998 in records going back to 1895. Six of New Jersey's top ten warmest years on record have all occurred since 2002; the other four warmest years in the top ten were all in the 1990s. (See Appendix 1 from the January 2, 2017 edition of *The Press of Atlantic City*). Not only was 2016 warm, but it was a dry year as well, with rainfall well below normal. As 2017 began, South Jersey saw the warmest February on record, with an unprecedented five 70 degree days recorded. March on the other hand was below average, and colder than recent norms. As the study period ended, May was seasonable, but the second wettest May on record dating back to 1874. (*The Press of Atlantic City*).

The mild fall once again resulted in a below average and somewhat mediocre fall raptor migration, with below average totals counted at the Cape May official hawk count. Autumn raptor migration plays a large role in determining winter raptor numbers. In part, the "poor" fall migration, wherein many hawks perhaps simply elected to stay farther north, and not come this far south, resulted in below-average numbers of hawks on the Maurice River in winter 2016-2017 -- particularly the Maurice River mainstays, Red-tailed Hawk and Northern Harrier. In short, it seemed that raptors just never showed up, and for those that did, there may have been little in the way of food resources to keep them here.

Likewise, waterfowl numbers were again low in winter 2016-2017. With little in the way of ice cover and snow cover to our north, many or even most waterfowl had little reason to move this far south. Almost across the board, waterfowl peaks and averages were below recent years, and well below long-term averages. In January, it seemed as if a good waterfowl season *might* be starting, but the extremely warm February apparently allowed many ducks (and Snow Geese) to leapfrog over New Jersey and the Delaware Bayshore to locations farther north. The anticipated and expected late February and early March staging/build-up of waterfowl simply never happened in 2017.

With warmer temperatures and climate change, it is indeed reaching the point where this once-dramatic spring waterfowl spectacle is in fact no longer expected, and the anticipation of abundant waterfowl, a major part of our Bayshore heritage, seems to be only a distant memory.

Table 3 shows our findings on key species of winter raptors and waterfowl on the Maurice River. Here we show 2016-2017 data (Year 30) in relation to not only the four previous winters (Years 26, 27, 28, and 29), but also compared to the peaks and averages of Segment V (of the 25 year study) – the five year pooled results from 2007-2012. The results seen in Table 3 are largely self-explanatory, showing waterfowl in below-average numbers almost across the board.

Among raptors, Turkey Vulture and Black Vulture numbers continue to increase, with both peak and average numbers above the long-term and recent averages. Bald Eagles continue to set records. Both the peak high count of 53 and the average of 34.88 birds per survey are new records. Of interest is that it seemed as if few northern birds were pushed here in mid-winter by snow and ice farther north; instead it seemed that these eagle records instead reflect the booming New Jersey and greater Mid-Atlantic local (breeding) populations. In the early years of study, most eagles came from the north; today, many or most are indeed local breeders and their progeny.

American Kestrel was again *slightly* above recent averages for the second year in a row. One or possibly 2 individuals seemed to successfully winter in the study area, reversing (however slightly) both the recent and long-term inexorable downward trends. Peregrines were up too, again augmented by the easily seen pair in residence at their artificial eyrie on the Bayside State Prison water tower.

Cooper's Hawks were found in fairly average numbers, yet on the other hand, Sharp-shinned Hawks were down, bucking recent Maurice River trends, but mirroring the trend at the Cape May Point hawk count. Northern Goshawks were seen on three occasions (all immatures), the first time in five years that we have seen this big northern accipiter. This reflected the numbers seen during the 2017 hawk count at Cape May Point, where numerous Goshawks were counted. This powerful predator is well-known to be irruptive in response to prey populations on its northern forest breeding grounds. Somewhat inexplicably, Red-shouldered Hawks were well below average in winter 2016-2017, although this may simply reflect the mild winter. The 70 degree days in February were more conducive for Red-shoulders to sit quietly around woodland vernal pools waiting for frogs and salamanders, rather than sitting on sunny edges waiting for weakened birds and rodents during bitter cold and snowy weather.

The picture was, once again, not good for two of our common Maurice River signature raptor species. For Northern Harrier, the winter of 2013-2014 (Year 27) was the worst winter ever, and the winter of 2014-2015 was not much better. In 2015-2016, although peaks and averages rose a bit, Harriers remained well below both the recent and over-all long-term averages. During the 2016-2017 season just past, Northern Harriers barely bested the all-time low of Year 27 (15.88 vs. 15.25). The conclusion is inescapable: wintering Harrier numbers on the Maurice River are continuing to seriously decline over time, and this may well be true for the greater Delaware Bayshore as well. While the decline may be due to local conditions (see below), it is important to note that Northern Harrier counts were well below the long-term average at the Cape May Point Hawkwatch in autumn 2016. Harrier population problems may be occurring on the breeding grounds, or during migration. Or perhaps declines may be related to the entire Harrier seasonal cycle, including the loss or degradation of wintering areas.

For Red-tailed Hawk, the findings were even grimmer. Remember that in the previous cycle (Year 29), both the 2015-2016 peak (38) and average (26) for Red-tail were our lowest-ever in the 29 years of study. Previously, the 2014-2015 average of 30.63 was our lowest average ever. Before that, our lowest average ever was 31.13 in 2012-2013. While the Year 30 peak rose a bit, the average of 28 Red-tails per survey was the second lowest ever in 30 years. This means that in 30 years, our six lowest average Red-tail counts have occurred in the last six winters (although the averages of 33 birds for Years 25 and 27 tie the 33 averages of Years 1 and 2: 1987-1988 and 1988-1989).

The following is excerpted verbatim from last year's 2015-2016 report, but it is important to repeat it here:

Caveat: Note that although the data is comparable, these early years counts -- Years 1 and 2 -- were taken at a time when access to the river (and resultant viewability and countability) was far more limited than today due to posted private property. Remember too that the first two years of these counts were indeed somewhat exploratory as we established consistent methodology and protocols. At that time, today's well-established approach and techniques were yet to be fully developed, refined, and sharpened to the degree enjoyed currently -- an efficiency that follows three decades of mostly subconscious yet likely fine-tuning. In short, there were very probably, at the very least, a few more Red-tails present than were counted in the earlier years of the count, leaving our statement that "the past five years have been the five worst years for Red-tails ever" undoubtedly true. [Now six years....] For one thing, in those earliest years, with goals of conservation, we were primarily searching hard for, and studying and enjoying, the one or two (rare!) Bald Eagles found on each survey. Such have been the changes on the Maurice over time.

We remember too that in these early years of study, counting the thousands of waterfowl often present was a time-consuming process too, allowing essentially, not as much time for finding the "common" Red-tailed Hawks present. Sad but true, waterfowl counting took far more time and effort back then than it does today.

But the point is, when we see that the Red-tail *peak counts* of the past six years are generally the same as, or below, the *average* number seen for the twenty-four years before, we can readily determine that these are not good trends for Red-tailed Hawks (or Harriers). Quite probably a lack of prey is a major factor. We continue to strongly suspect that marsh rodent numbers (Meadow Voles, Rice Rats and Muskrats) on the Maurice River have not yet recovered from the combined impacts of Hurricane Irene and Superstorm Sandy. The NJDEP noted that the Muskrat harvest was cut in half in the winter following Sandy. Even though rodents 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 the 25 year report and subsequent yearly reports, frequent coastal storms are not the only problem; ongoing sea level rise and continued loss of the high marsh are a factor too. (See these reports, and particularly the 2015-2016 report, for much greater discussion and analyses).

In addition to all of the above, and in lieu of a complete literature search that would be well beyond the scope and budget of this current report, we simply quote the following from Dr. Lenore Tedesco, executive director of the Wetlands Institute in Middle Township, Cape May County:

“Rising sea level is the main factor for the marsh migration (and the dying upland edges). What we have seen is a 6-inch rise in sea level in Cape May County since 1980. In the past, marshes would flood only two to three times per year. But now, seven to ten flooding days per year on the full and new moon tides is common. It’s like pouring water into a bucket. Eventually the bucket gets full and the water has no place to go. The Delaware Bay loses about an acre of marshland a day.”

Source: *The Press of Atlantic City*, June 18, 2017

I would only add that the marsh rodents, prey for Red-tails and Northern Harriers, have no place to go either. Maybe the raptors can and do have somewhere else to go, and that is why they are not on the Maurice. But the Maurice River is diminished immensely with the loss of its Red-tails and hallmark “Marsh Hawks.”

In short and in summary, and although some of this may be speculation, we strongly believe that tidal flooding associated with sea level rise is beginning to adversely impact both prey – and predator – populations on the Maurice River. We note too that Cohansey River comparative counts (see Table 2, as well as previous reports) confirm and corroborate Maurice findings. Rough-legged Hawks and Short-eared Owls were the first raptors to disappear from Delaware Bayshore wetlands, and we now have strong evidence that the same may now be occurring with both Red-tailed Hawks and Northern Harriers.

The ongoing loss of farmland may be playing a role in these declines too, particularly with Red-tailed Hawks and male Northern Harriers (male Harriers hunt the uplands to a much greater degree than the females; smaller and more agile males hunt birds to a greater extent than the larger females that are more rodent and salt marsh-dependant). Cumberland County saw a 9% loss of farmland between 2002 and 2012. (Source: USDA 5-Year Census of Agriculture, as reported in *The Press of Atlantic City*). And even this figure does not factor in the amount/acreage of Bayshore farmland that has been converted to commercial nurseries – land that is most often quite barren in regards to rodents and raptors. “Open space” is not always quality habitat. For a Red-tail, nurseries and even orchards rarely qualify as useful farmland for hunting and feeding purposes. The decline seen in Red-tails probably applies mostly to those individuals that use the rivers and salt marshes as their feeding territories, but may well also include those birds that primarily frequent farmlands.

At least for Red-tails, there may be no great or urgent cause for concern, as they appear to remain rather common throughout most of New Jersey and the Northeast. They are well-known to adapt to a wide variety of habitats, including suburban and even urban habitats. The problem though, for a very common species, is that you can lose half the population without noticing. It does bear mentioning that migrant Red-tails and Harriers counted at Cape May today are far fewer than those tallied thirty to forty years ago (although no trend data or trend lines are readily available to us).

Red-tailed Hawks and Northern Harriers require our due diligence and monitoring, on the Maurice River, the Delaware Bayshore, and elsewhere. It is not a cliché to repeat the well-known saying, “The time to save an endangered species is when it is still common.”

TABLE 3

**Wintering Waterfowl and Raptors on the Maurice River 2007-2017;
Comparisons of Segment VI (2012-2017) to Segment V (2007-2012)**

	2007-2012			Year 26		Year 27		Year 28		Year 29		Year 30	
	Segment V			2012 - 2013		2013 - 2014		2014 - 2015		2015 - 2016		2016 - 2017	
	Best	Avg. Peak Count	Avg of Average Counts	Best	Avg	Best	Avg	Best	Avg	Best	Avg	Best	Avg
Snow Goose	12,324	6,605	2,309	13,000	2,712	5,150	1,342	5,050	1,326	5,050	1,684	2,006	429
Canada Goose	1538	796	268	507	260	1270	522	888	440	515	240	642	266
Am. Black Duck	1,274	829	487	458	276	1,585	938	955	459	721	400	705	425
Mallard	649	463	256	262	142	952	431	676	313	617	290	389	268
Northern Pintail	928	628	281	764	423	1,621	760	548	185	898	353	298	100
Green-winged Teal	5,850	3,270	988	4,182	1,807	2,966	1,119	2,265	660	3,352	1,056	1,278	544
Bufflehead	446	316	na	220	111	330	196	258	131	173	78	207	110
Red-br. Merganser	207	133	na	174	82	320	123	201	80	110	33	95	26
	2007-2012			Year 26		Year 27		Year 28		Year 29		Year 30	
	Segment V			2012 - 2013		2013 - 2014		2014 - 2015		2015 - 2016		2016 - 2017	
	Best	Avg. Peak Count	Avg of Average Counts	Best	Avg	Best	Avg	Best	Avg	Best	Avg	Best	Avg
Black Vulture	57	38.2	22.4	25	15.38	35	19.44	44	27.88	59	33.50	60	35.00
Turkey Vulture	162	143	99	124	96	126	102	166	140	196	131	171	145
Bald Eagle	48	34.6	24.15	34	25.13	50	30.38	42	27.75	43	27.63	53	34.88
Northern Harrier	43	38	25.8	22	17.63	18	15.25	24	20.13	30	18.38	20	15.88
Sharp-sh. Hawk	18	9.4	3.04	4	1.38	6	2.75	5	3.13	5	2.38	5	1.75
Cooper's Hawk	10	6.8	3.21	6	3.5	4	2.13	4	1.38	4	1.13	4	1.88
Northern Goshawk	1											2	
Red-sh. Hawk	26	8.4	1.62	2	0.75	4	1.38	7	2.63	4	1.13	2	0.38
Red-tailed Hawk	64	59.4	42	43	31.13	57	33	44	30.63	38	26	44	28
Rough-leg. Hawk	1	0.6	0.07			1	0.38	1	0.13				
Golden Eagle	2			1		1		1					
American Kestrel	10	3	0.77	1	0.5	1	0.13	1	0.25	3	1.63	2	1.00
Merlin	2			1		1		1		1		1	0
Peregrine Falcon	4	2.4	0.98	2	0.88	4	1.13	2	1	2	1.13	4	1.50

DISCUSSION: SPRING, SUMMER, AND FALL SURVEY EFFORTS

Principal CU Maurice River studies in 2016-2017 -- 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 Maurice River 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 soar. Presumptive breeding Northern Harriers were once again noted in the watershed in 2017, with a number of breeding season sightings on the lower river, both near Bivalve and East Point. We witnessed “food passes” from an adult male Harrier to an adult female on two occasions in May (between Robbinstown Road and Hansey Creek); this represents a breeding confirmation by breeding bird atlas standards. Peregrines apparently successfully bred on the Bayside State Prison Tower in both 2016 and 2017.

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 2016 season saw counts of up to 2,937 total shorebirds, and spring 2017 produced a high count of 17,029 total shorebirds on 9 May, primarily at East Point, Heislerville WMA, and the Bivalve EEP site. See Table 1 for numbers and phenology of migratory shorebird use of the Maurice.

As in previous seasons, the intense focus on the birds of the Maurice River led to many interesting finds and significant sightings, and as ecotourism continues to increase, many “good birds” were reported by others as well. A number of these sightings are included with an “asterisk” in Table 1. The asterisk signifies that the species was either reliably seen and reported by others on or about the survey date, or that Dowdell and Sutton saw the bird within a day or two of the official survey, but not during the survey. Of interest, a Chimney Swift seen by Clay Sutton and Josh Nemeth at Leesburg on February 27 was remarkably early – 15 days earlier than any previous sighting in New Jersey ever! It was a real testament to the record warm temperatures of February, but it is doubtful it survived the cold temperatures of March. While this survey recorded up to 62 Northern Gannets at East Point, veteran observer Sandra Keller counted an amazing 1,400 Gannets at East Point on March 31, another testament to an early spring as well as a reported record amount of Menhaden in the Delaware Bay this spring.

While puddle duck numbers were clearly down during winter 2016-2017, some diving ducks surprised us. While the incursion was brief, Long-tail Ducks were found in record numbers. The 112 Long-tails counted on the lower river on February 11 were a new record high. Likewise, Ruddy Ducks

were abundant too; the 231 counted (mainly at Heislerville WMA) on April 13 were likewise a new record daily count. A drake Redhead at East Point on March 23 was only our 5th “official” Redhead in 30 years. A hybrid drake Northern Pintail x Mallard cross (accompanying a female Pintail), while not unheard of, was a new hybrid for the counters and the river. Fifty (50) plus Royal Terns seen by Sutton at Bivalve on October 20 were late, unexpected, and a new record high total for the Maurice River.

A non-avian sighting of great interest was 6 Bottle-nosed Dolphins seen well, and close, off East Point by Sutton and Dowdell on May 9. They were our first dolphins during a survey, “that far up the Bay,” in our 30 years on the job!

There are two great records not shown in Table 1. Last, but far from least, a Little Egret was seen by many, including Jim Dowdell, at the Heislerville WMA impoundments, between April 27 and May 4. Over 100 observers were thrilled to see the first New Jersey state record of this Old World heron. Like the Cattle Egret before it, it has gained a foothold in the New World, and is now breeding in the Caribbean (and seems to be expanding). To Sutton though, missing that bird pales in comparison to missing the 108 Whimbrel (in two flocks), seen and photographed northbound over East Point by visiting Danish birders on May 19. Whimbrel, “Hudsonian Curlew,” are the rarest of the rare on Delaware Bay; they migrate mainly along the Atlantic Coast and often well offshore. To put this record in perspective, we have only recorded five individual Whimbrel on the Maurice in thirty years of study! But these lucky Danes were in the right place at the right time, and enjoyed these intercontinental long-distance migrants passing over on their way – no doubt non-stop – to their high arctic breeding grounds. Such is the magic and mystery of watching and waiting on the always surprising Maurice River.

SUMMARY AND ACKNOWLEDGMENTS

Winter 2016-2017 marked the remarkable thirtieth year of study of the wintering raptors and waterfowl on the Maurice River, and the fourteenth year of focused spring and fall counts. Studies conducted for CU Maurice River again documented an amazing array of avian use of this key South Jersey river. 2016-2017 efforts augmented and supplemented the findings of the first twenty-nine seasons of study and once more documented and substantiated the Maurice River as a premier avian resource area of not only New Jersey, but of the entire Mid-Atlantic Region.

These 30 years of focused and long-term study have continued to document the Maurice River as an important bird area at all seasons and by any standard applied. After thirty 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 for a better and exceptional understanding of true distribution, status, and trends of the amazing hallmark birdlife of the Maurice River.

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. A comprehensive 30 year report (in addition to and separate from this Year 30 Seasonal Report) is planned at the conclusion of the thirtieth season of studies, sometime late in 2017. At this time, many of the issues and findings referenced both previously, and again here in this Year 30 short-form report, will be fully explored, analyzed and discussed.

As we cross the proverbial finish line of our collective goal of 30 years of study, and the resultant in-depth long-term understanding of the Maurice over time, I was reminded again of these words, which I have quoted once before in these yearly reports. They were penned by a friend, Denver Holt, in the November 2015 (Vol. 19) issue of the *“The Roost,”* the newsletter of the Owl Research Institute and Ninepipes Center for Wildlife Research and Education based in Charlo, Montana. They were written about Long-eared Owl studies now in their 31st year, and Snowy Owl research now in its 26th year. Of personal note, I was reminded anew of this quote, as just two weeks prior to writing these words, I watched a male Snowy Owl on the high Arctic tundra on one of Denver’s venerable study sites, at Barrow, Alaska. Barrow, the northern-most community in the United States, is one of the myriad of places on our planet experiencing rapid changes to both wildlife and life-style due to global warming and sea-level rise.

But Denver Holt’s words could easily have been written referencing our CU Maurice River studies, and those goals and objectives that have carefully guided us over these long 30 years.

“Our philosophy is that we believe the most reliable data in wildlife research is usually generated from long-term studies conducted by the same individuals. I have realized that long-term research and monitoring is the only way to track population changes, and assess the overall health of wildlife populations regionally, nationally, and globally. And I have also realized that presentation of research results to a diverse audience is essential to generate public interest for wildlife and habitat conservation.”

-- Denver Holt, President of ORI November 2015

In conclusion, we once again thank Brian and Karen Johnson, Tony Klock, Mary Watkins, Kathy Michel, Karen Williams, Paul Kosten, Janet Crawford, Tom Reed, Bob Fogg, Sam Galick, Steve Glynn, Pete Dunne, Leslie Ficcaglia, Vince Elia, Harvey Tomlinson, Jack Miller, Linda Widdop, Chris Herz, Steve Eisenhauer, 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, Josh Nemeth, and Pat Sutton for their assistance during the ongoing and long-term volunteer Cohansey River comparative surveys. Ward Dasey and Brian Johnson stand tall in their support and interest in the inimitable excitement of the Bayshore. And Pat Sutton has been so important, indeed crucial, in putting these long 30 years of reports together..... All of them. How do I thank her? I can't really, except maybe by saying thank you for sharing your commitment, excitement, and love of the natural world with me.

We thank the many members, supporters, and friends of CU Maurice River for allowing us to be a long-term part of your 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, healthy, and protected Maurice River. Thank you all too for supporting this and other avian projects through your generous support of the CU Maurice River team, "*The Fish Hawks*" in the important World Series of Birding conservation fundraiser. As always, we sincerely thank Jane Galetto, the staff, and the officers of CU for your vision of what role these long-term studies might play in the protection of these valuable avian resources and the wonderful 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 CU Maurice River. 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.

With heartfelt appreciation
(and still excited after 30 years),

Clay Sutton

Clay Sutton
July 2017

APPENDIX 1

THE PRESS OF ATLANTIC CITY

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2016 one of N.J.'s warmest years

LEN MELISURG
NJ.com

TRENTON — Remember all those brutal heat waves last summer that had us literally dripping in sweat?

Turns out they were a big factor in making 2016 the third warmest year ever recorded in the state.

That ranking was confirmed by State Climatologist David Robinson at Rutgers University, whose office analyzed climate data across each region of the Garden State dating to 1895, NJ.com reported.

This year, which includes data through Dec. 29, New Jersey's average temperature — calculated by averaging the daily highs and daily lows — was 55.0 degrees, Robinson said. That ties 2006 as the state's third warmest year on record, landing behind only 2012 and 1998.

In 2012 the state's average temperature was 55.9 degrees, and in 1998 the mercury averaged 55.2 degrees, according to Robinson's data.

Six of New Jersey's top 10 warmest years on record all occurred since 2002, the statistics show. The other four warmest years in the top 10 were all in the 1990s.

That mirrors the global trend of warmer temperatures recorded across the planet during the past few decades. Although the final analysis won't be complete until sometime in January, there's a strong likelihood 2016 will be Earth's warmest year on record, according to climate scientists.

"There is no question that New Jersey has gotten warmer over the past several decades," Robinson said this week. "The underlying cause for the warming is human modification of the climate system, namely greenhouse warming. Certainly there are year-to-year fluctuations of a natural

kind, but these are taking place on a continually elevating foundation of higher temperatures brought on by human-kind."

Among the interesting monthly and seasonal stats that all played a role in New Jersey's warm year were:

- The winter of 2015-16 was the state's 2nd mildest winter on record.
- The spring was the state's 10th warmest spring on record.
- The summer was the state's second hottest summer on record.
- The fall turned out to be the sixth mildest autumn on record.
- This year also had the hottest August on record, the fourth warmest March, the fourth warmest September and the seventh hottest July, Robinson said.

In addition to being unseasonably warm, 2016 turned out to be a dry year as well.

As of Dec. 29, New Jersey had a total of 39.92 inches of rain and melted snow, Robinson said in his annual climate summary. That is 6.44 inches below normal.

In nine of the 12 months of 2016, the state had below-normal precipitation, causing drinking water supplies to drop to alarming levels and prompting the state to declare a drought warning in 14 counties in late October.

Robinson said the rainfall totals in some places around the state were among the lowest in a century. Among them were Sussex Borough and the Charlotteburg section of West Milford, both of which had their fourth driest year in the past century, and Cape May, which had its 12th driest year in about 100 years.

Although final calculations haven't been made, 2016 will likely go down as New Jersey's 25th driest year on record.

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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