

# WINTERING RAPTORS and WATERFOWL on the MAURICE RIVER

CUMBERLAND COUNTY, NEW JERSEY

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

Findings for the WINTER PERIOD: December 2021 through March 2022

*Research and Monitoring Sponsored by:*  
**CU Maurice River**



Although some key species on the Maurice River continue to decline, the river system and its habitats readily support significant populations of both migratory and resident birds at all seasons. Here is an **American Woodcock** near East Point, photographed during our survey on 8 March, 2022.

*Photo by Clay Sutton*

**Clay Sutton and James Dowdell**

**April 2022**



**Green-winged Teal** (above) continue to be abundant on the Maurice River in winter (and particularly in early spring), but **Northern Pintail** (below) has shown a steady decline over the years.     *Photos by Clay and Pat Sutton.*





Pictures can be worth a thousand words: Many of the declines of raptor and waterfowl species on the Maurice River and the Delaware Bayshore can be traced to sea level rise and related *Phragmites* encroachment. Here a “normal” high tide is shown on a Delaware Bay tributary (top), and a rapidly expanding stand of *Phragmites* is shown at Natural Land’s Peek Preserve in February 2022 (middle). These issues continue to adversely impact many key species on the Maurice, including the **Northern Harrier** (bottom).  
*Photos by Clay and Pat Sutton.*



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## *The THIRTY-FIFTH FIELD SEASON of a Long-term Avian Use Study*

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### **Introduction and Background:**

Following the previous thirty-four years of long-term winter raptor and waterfowl status and distribution studies on the Maurice River (a major Delaware Bay tributary), this current report presents the results from a continuation of these unique studies: the 35<sup>th</sup> consecutive winter-season monitoring of the regionally significant birds of prey and waterfowl populations that spend the winter on the Maurice River.

A comprehensive 30-year report was finalized and presented to CU Maurice River in March of 2018, detailing the findings and observed long-term trends of the annual winter raptor and waterfowl population studies on the tidal Maurice River. This report is available on the CU Maurice River website at [www.cumauriceriver.org/raptor-and-waterfowl-surveysstudies/](http://www.cumauriceriver.org/raptor-and-waterfowl-surveysstudies/). Summary reports have also been completed at each five-year interval throughout these studies and over the years, and are also available at this website.

Because these reports, as well as all of the previous thirty-four years of *individual season* reports are available on-line, little discussion of methodology and techniques is presented in this short-form yearly single-season summary. The basic methodology of these 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 approximately 45 minutes each during each survey. Consistent monitoring has been conducted approximately every ten days between 1 December and 31 March each season. Point Count locations on the 14.4 mile tidal section of the Maurice River are shown in **Figure 1**. Visit the CU website for in-depth review and discussion of all methodologies and sampling locations, as well as the important conservation goals and objectives of this long-term project.

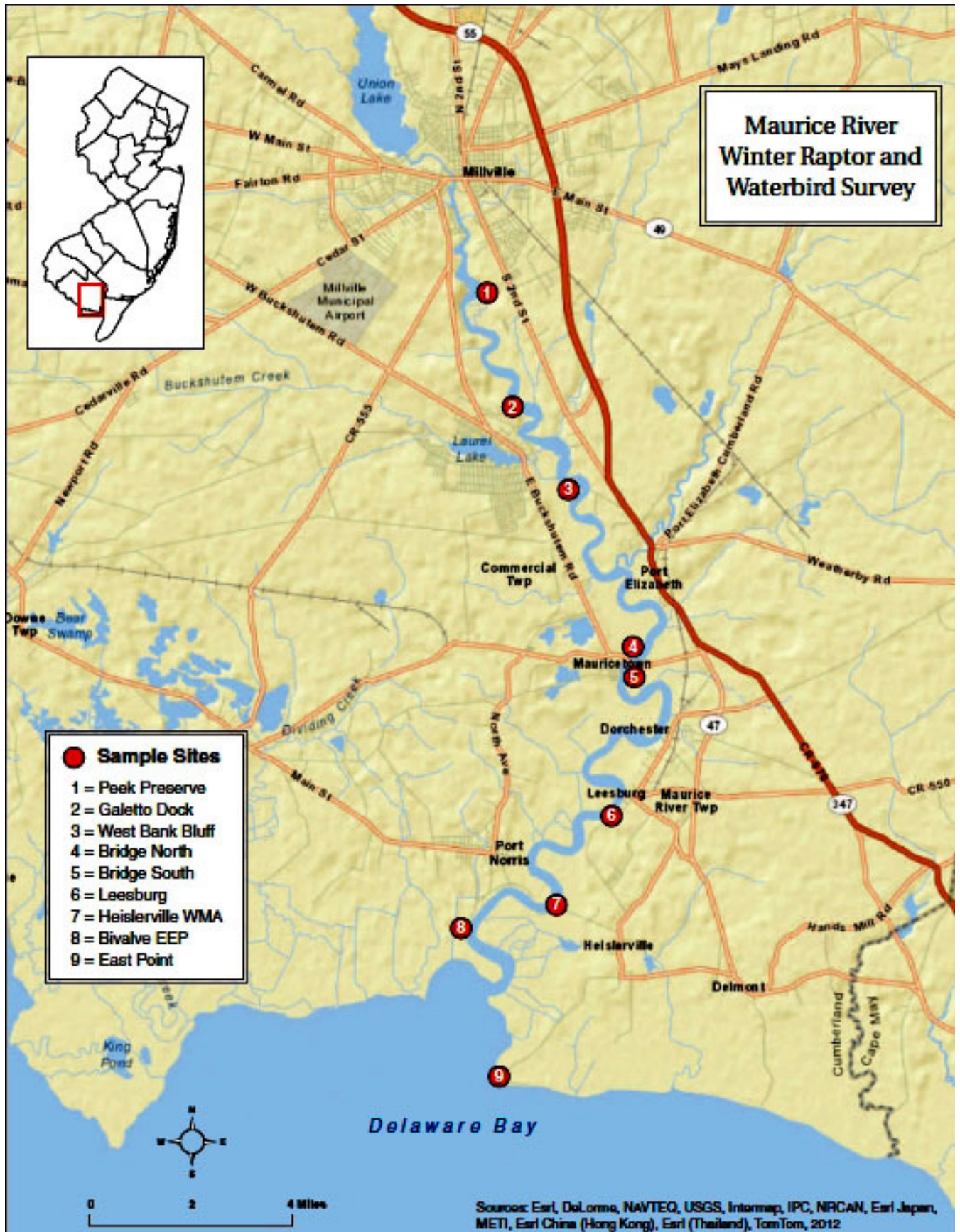
The February 2018 30-year report detailed highly alarming downward trends in the winter numbers of both raptors and waterfowl on the Maurice River, and as a result, it was decided by CU Maurice River to continue these long-term studies (and highly significant and valuable data set) into the 35<sup>th</sup> winter season. Without reiterating the extensive findings offered in the 30-year summary report, suffice it to say that there are well-documented declines in a number of raptor and waterfowl species on the river, with strong evidence suggesting that these downward trends are linked to sea level rise on the Maurice River and in the greater Delaware Bay region. It was this disturbing and compelling evidence – the hard facts of observed major declines in many key species – that prompted CU Maurice River to support and continue these studies and the highly important documentation of the local adverse impacts on our hallmark avian resources resulting from the international phenomenon of climate change. Changes on the Maurice have been rapid, significant, and are clearly ongoing and accelerating.

Beyond our field work, during winter 2021-2022 we continued to work on scientific papers detailing and analyzing all 35 years of winter raptor and waterfowl data. Working with Dr. Paul Kerlinger, a former Director of New Jersey Audubon's Cape May Bird Observatory and more recently a consultant to the wind power industry (and now retired), we continued the in-depth process of further review and statistical analysis of our previous findings and preliminary conclusions, particularly those detailed and expressed in both the 30-year report and the prior 25-year report (October 2012) prepared for CU Maurice River. Having read these two reports, Dr. Kerlinger described our long-term monitoring research and data as "a goldmine of information and insight." With CU Maurice River's approval, Sutton and Kerlinger in 2020 began to review and analyze the then 33 years of data as to what it might reveal regarding observed changes in Maurice River raptor and waterfowl numbers over time, and what this data may indicate in regards to climate change and sea level rise. See the introduction to the 30-year report for much more information on the strong value of long-term monitoring, the need for further analyses of our data set, as well as possible theories and scenarios in regard to the potential impacts of sea level rise and habitat change on the Maurice River.

These scientific papers, *now including all 35 seasons of data*, are being finalized for submission as this current seasonal report is written. One paper will focus on long-term trends in raptor populations, and the second will focus status and trends in waterfowl numbers on the Maurice. Following CU Maurice River's review and approval, these scientific papers will be submitted to the appropriate science journals. The eventual publication of these peer-reviewed papers will be a milestone for our long-term Maurice River studies, one that will not only bring recognition to both the Maurice River and CU, but also strongly support and bring attention to the trends that we have discovered over time. Emergent alarming trends, particularly the rather recent precipitous declines in wintering Northern Harriers and Red-tailed Hawks, have galvanized us into the decision to publish as soon as possible. The dire findings of the most recent ten years, particularly when viewed in relation to the bountiful earlier years of the study, have urgently dictated that these trends need to be highlighted and publicized now.



FIGURE 1



## Findings and Discussion:

Core winter raptor and waterfowl monitoring continued for the 35<sup>th</sup> consecutive winter season. The Maurice River was sampled on eight dates between 7 December 2021 and 29 March 2022. These findings are presented in **Table 1**. Also shown in Table 1 are the winter 2021-2022 average counts for key species. The eight survey dates in this current season, the 35<sup>th</sup> winter season of monitoring on the Maurice, bring our cumulative total of winter surveys to 341 over the 35 years, dating back to the study's inception in 1987. *Note that all surveys over the 35 years have been carried out by the same two observers, Sutton and Dowdell.* Such consistent methodology gives us an unparalleled perspective on the changing avian resources of the Maurice River. (See 30-year report).

As in past seasons, Cumberland County's other major Delaware Bay tidal tributary, the Cohansey River, was also sampled (albeit on only two occasions) during the winter period. For 32 years the Cohansey has been monitored as a "comparison river" or "control" to ascertain whether findings on the Maurice are representative; that is, whether they are either localized or more widespread on the Delaware Bayshore. Cohansey River results for winter 2021-2022 are shown in **Table 2**. The two survey dates on the Cohansey River during the current season bring the cumulative total to 55 winter surveys over the 32 years of this comparative study dating back to 1990. All Cohansey surveys were carried out by Sutton. The depth of this effort and data set allows for strong comparisons, contrasts, and corroborations.

*Note: The Cohansey River survey was conducted on a volunteer basis at no cost to CU Maurice River. Also note that five additional volunteer/pro bono days were donated in the preparation of this short-form summary report on the winter 2021-2022 efforts.*

**Table 3** shows peak and average numbers of winter raptors and key waterfowl species on the Maurice River during winter 2021-2022, shown in relation to both Segment V (2007-2012) and Segment VI (2012-2017) of this long-term study, as well as the individual single-season results from Year 31, Year 32, Year 33, and Year 34. The findings are straight-forward and self-explanatory, particularly when viewed with and against the findings and extensive discussion in the 30-year report presented in February 2018. Indeed, Year 35 (*aka* as Season 35) completes the seventh 5-year segment of the study (Segment VII), and all seven segments are shown chronologically for waterfowl in **Table 4**, and raptors in **Table 5**. In each table, the *best count* (peak daily count), *five year average of peak counts*, and the *average of all five average counts* are shown for each five year segment, offering the perspective of changes over time.

As with every winter season, the relative abundance and phenology of wintering raptors and waterfowl found on the Maurice River were in large part dictated by the weather. While winter 2021-2022 was a cold one, with temperatures near long-term averages (and below more recent averages), there were virtually no prolonged bitter cold spells that led to freeze-ups either on the Maurice River, the Bayshore, or to our north (where such conditions can send large numbers of waterfowl to our region). While snowfall was above average, there was no prolonged snow cover, or persistent and widespread ice during the winter of 2021-2022. So while we experienced a relatively cold winter, the requisite snow and ice that is needed to push birds to the Bayshore Region in possibly average or above average numbers were again absent.

After 34 years of previous study, we believe that the findings on the Maurice for winter 2021-2022 (Year 35) were about what we have come to expect for a winter without lengthy or deep freeze-ups. Snow Geese were present, yet itinerant as usual, with most regional geese remaining west and north of the Maurice River region. The numbers of Snow Geese found were

well below the long-term average. Canada Goose numbers were modest as well, as many remained north of the Delaware Bayshore due to the lack of Northeast Region snow cover and frozen conditions early in the winter. Diving duck numbers were unremarkable. The lack of ice, and the relatively mild early spring led to very early departures of ducks for their northern breeding areas, and this too was (once again) a factor in very low average numbers for all ducks in 2021-2022.

American Black Duck, Mallard, and Northern Pintail numbers were once again very low compared to long-term averages. **Black Duck posted its 3<sup>rd</sup> lowest average in 35 winter seasons. Mallard showed its 3<sup>rd</sup> lowest average in 35 winter seasons, and Pintail had its second lowest average number over the 35 years of monitoring.** This comes on the heels of the previous season, Year 34, when in winter 2020-2021 Black Duck, Mallard, and Pintail all showed the lowest (worst) peaks and averages, by far, found in all 34 years of monitoring. For all three species, their absence was presumably due to both the weather (lack of a harsh winter, and subsequent early spring) and to the long-term and on-going diminishing of quality brackish wild rice habitat. This degradation of habitat is anecdotally observed to be continuing and accelerating. The crucial wild rice acreage that was once prevalent on the brackish tidal upper river (the habitat that supported large numbers of dabbling ducks) has been rapidly disappearing, presumably due to sea level rise and possibly increasing salinity (see 30-year report). In addition, *Phragmites* encroachment continues and is accelerating along much of the Maurice River, rapidly out-competing (“crowding out”) and replacing wild rice. Non-native *Phragmites*, or Common Reed, is well known to be aggressively invasive, and indeed catastrophic to native wetlands ecosystem in many places.

Winter raptor numbers on the Maurice were regionally significant, but two of the Maurice River’s hallmark hawks, Northern Harrier and Red-tailed Hawk, continued to show extremely low counts compared to the earlier segments of the study. Tallies were well below long-term peaks and averages. In Year 35, the alarming downward trend continued for these two Maurice River and Delaware Bay signature raptors.

**The 2021-2022 seasonal average of 13.63 Northern Harriers is the third lowest in the 35 years of monitoring. The 2021-2022 Red-tailed Hawk average of 18.75 is the second-lowest average seen in all 35 years of study.** This sadly but clearly follows recent trends (see Table 3). These low numbers were possibly in-part due to an unremarkable fall migration, as well as the comparatively mild winter (cold, but with little prolonged snow cover or ice). Over time, the higher numbers of raptors have normally occurred during colder winters, when raptors are pushed to our region by harsh conditions farther north. But although winter 2021-2022 was below recent averages in temperature, other causal factors clearly seem to be at work here. The long-term downward trends for Northern Harriers and Red-tailed Hawks continue to be significant, dramatic, and disturbing. When viewed in relation to the findings of previous years, the entire 35 years of study, it is clear that things have changed drastically for these two hallmark raptors of the Maurice River.

As extensively reviewed and discussed in the 30-year report and subsequently, we strongly believe that the cause for these distressing downward trends is the lack of marsh rodent prey availability. As we have explored previously, we hypothesize that the frequent and persistent tidal flooding from winter storms, as well as from monthly Full Moon and New Moon high tides, has severely impacted (nearly eliminated?) marsh rodents from much of the formerly productive Maurice River marshes. The findings from winter 2021-2022 again support the likelihood that this trend is continuing and most probably accelerating. An additional factor is that pervasive, increasing, and rapid *Phragmites* encroachment is continuing to eliminate hunting



habitat for raptors – areas that were previously dominated by *Spartina* and wild rice wetlands. Not only are voles either absent or less numerous in *Phragmites*, but also Harriers and Red-tails simply cannot hunt in areas of exclusive and thick (impenetrable) *Phragmites*.

Although the two comparative Cohansey River surveys of winter 2021-2022 are inconclusive at best due to their limited number, these findings and those of recent years show the exact same picture. Northern Harrier and Red-tailed Hawk numbers continue to be very low, and well below the long-term averages, on the Cohansey River as well. Importantly, see our discussion in the earlier reports to further understand how Cohansey River findings support and confirm Maurice River findings over time. Whatever is adversely impacting Northern Harriers and Red-tailed Hawks on the Maurice River is clearly happening on the Cohansey River also.

While the issues of habitat change and resultant prey availability on the Maurice River are clearly adversely impacting Harrier and Red-tailed Hawk numbers, other widespread factors are involved as well. It is now well-documented that these two species have declined at many hawkwatches (hawk migration monitoring sites) in the Northeast and Mid-Atlantic regions in recent years. Without intensively investigating this issue here, in summary, most of these watch sites consider climate change to be a major factor. Simply put, warmer temperatures and the concomitant lack of snow cover are allowing many hawks to remain farther north in winter.

Wondering what role these issues might play in Maurice River declines, we looked at hawk counts taken at Cape May, New Jersey over time. **Figure 2** shows Northern Harrier and Red-tailed Hawk autumn counts from the Cape May Bird Observatory's annual Cape May Point Hawkwatch from 1987 to 2021. (Note that this is the same 35 year period covered by these Maurice River winter counts). Both Harriers and Red-tails show downward trends over this time period, and the trends appear to be accelerating in recent years. It is important to state that these downward trends are not supported by statistical tests, mainly because the counts are so variable year-to-year due to the weather (the number of cold fronts, or lack thereof, that are well known to push migrating hawks to the coast). But with that caveat understood, the visual aspect of these trend lines certainly supports the possibility that fewer Harriers and Red-tails are migrating this far south (and to the Maurice River) in fall than previously.

Data from other regional hawk migration monitoring sites support this theory as well. In an autumn 2021 migration summary article, Hawk Mountain Sanctuary in Pennsylvania reports that "Red-tailed Hawk was 35% below the 10-year average" [in fall 2021], and that "Christmas Bird Count data suggests that Red-tailed Hawks in the East are not migrating as much or are migrating shorter distances than in the past." (*Hawk Mountain News*, Spring 2022). Fewer fall migrant raptors, that subsequently find diminished habitat and fewer food resources, combine to mean fewer wintering hawks on the Delaware Bayshore and the Maurice River. While a complex subject and one that involves a matrix of issues, climate change is impacting raptors both locally and throughout the Eastern Flyway.

*Note: Both the Maurice River Winter Raptor and Waterfowl 25-year report and the 30-year report each contained figures showing trend analyses and trend lines for all raptor species, including Northern Harrier and Red-tailed Hawk, as well as key waterfowl species, including American Black Duck, Mallard and Northern Pintails. Because of our concurrent work on the two planned journal submissions (and resultant time availability), these trend analyses have not been updated for this Year 35 short form report, but will be analyzed and discussed at length in the upcoming journal submissions. Also note that the trend lines for these species have not shifted dramatically (visually) in the last five years, and the graphic depictions in the figures in the 30-year report still clearly illustrate the continuing downward trends discussed here.*

Table 4 and Table 5 herein, that compare peak and average counts for raptor and waterfowl species over time, clearly show that alarming downward trends have continued and accelerated during Years 30 to 35. One modest method of reviewing changes over time is to compare the first (of the seven 5 year segments), 1987-1992, to that of the last segment, 2017-2022, for these species of concern. When comparing the *average peak counts* for the initial five year segment versus the final five year segment, we calculate that **American Black Duck has decreased by 92.44%** on the Maurice River in the past 35 years. **Mallard has decreased 87.66%** in our long-term monitoring, and **Northern Pintail has decreased by 84.95%**. **Northern Harrier has shown a 26.43% decrease, and Red-tailed hawk has posted a 35.04% decrease** in the 35 winter seasons. And this simplistic approach does not even take into account the confounding fact that some of the middle segments of our study had higher peaks and averages for Harriers and Red-tails than the first segment (see 25-year report and 30-year report).

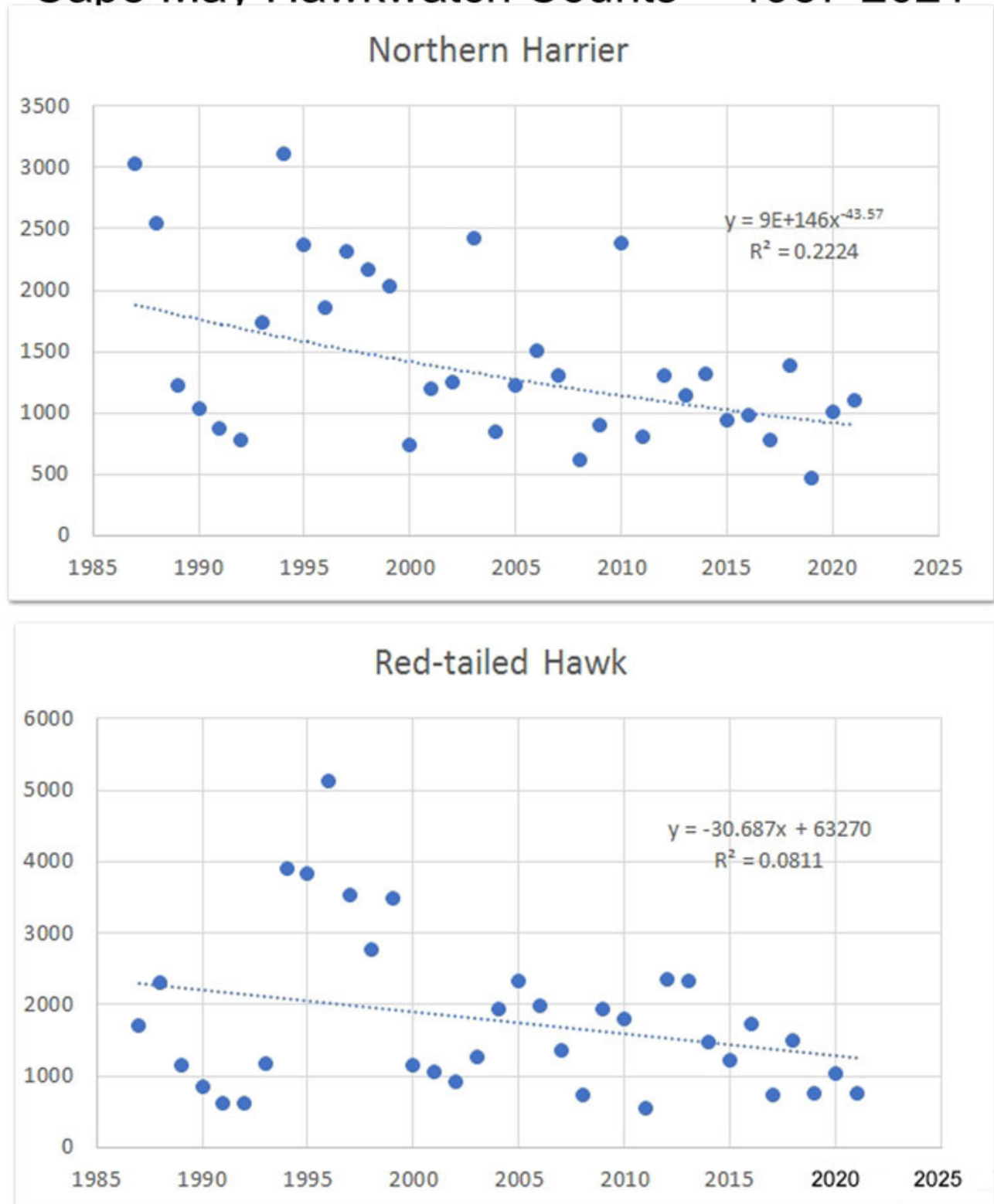
At least there is considerable good news to balance the bad. Bald Eagle numbers continue to soar on the Maurice River. The winter of 2021-2022 again saw eagles present in continuing high numbers akin to recent winters. Today, Bald Eagles are in sight at virtually all times during our surveys, and this is very heartening in light of those declining species we have discussed above. One Golden Eagle was tallied, following none for the past three winters; in a cause and effect relationship, fewer waterfowl mean fewer Golden Eagles (Goldens are well-known to hunt waterfowl). Peregrine Falcon continued to show an increasing trend. For the fourth winter in a row, no Rough-legged Hawks were recorded. This once regular hawk has all but disappeared from the entire Bayshore, clearly a victim of habitat loss of its preferred high marsh (*Spartina patens*) hunting areas due to sea level rise (see 25-year report).

Also continuing recent trends, Turkey Vulture, at 234 birds per survey, easily posted a new record high average count. Indeed, the Year 35 *average* count bested all previous *peak* counts, save one. The peak Turkey Vulture count of 318 on 19 January is an all-time high daily count for the Maurice; indeed, 168 of these vultures were in sight *at once* at the NLT's Peek Preserve. 84 Black Vultures recorded the same day were also a new all-time high peak daily count. Vultures are well known to be increasing throughout the Northeast, wintering in higher numbers and farther north than in previous years (a range and population expansion thought to be in part resulting from the warmer winters of climate change).

Other highlights of winter 2021-2022 included an amazing count of 1,180 Ring-necked Ducks, all on a sand plant pond south of Mauricetown, on 21 February. This number easily eclipses our previous daily high count of 720 (on the same pond) in Year 34. By far, 1,180 is the all-time high count for all of New Jersey to our research and knowledge. Common Ravens were seen twice in 2021-2022 following our first record ever in Year 34. Two Ravens were seen together soaring near Leesburg on 9 February. A migrant Sandhill Crane was seen over the Peek Preserve on 7 December, one of our few records for the Maurice. 29 Sandhill Cranes were observed on the Cohansey River on 6 January 2022. This wintering flock of Sandhills continues to grow at this dependable Cohansey location. This is a recent, wondrous, and welcome winter range extension, and some of these cranes have remained to breed in the Delaware Bayshore region. And finally, beyond birds, a Harbor Seal was hauled out on the rocks at East Point on 8 March, 2022. The Maurice River continues to amaze those who search for its wonders.

FIGURE 2

## Cape May Hawkwatch Counts -- 1987-2021



Source: Cape May Bird Observatory



## Summary and Conclusions:

The results of our 35<sup>th</sup> winter season of raptor and waterfowl studies on the Maurice River have not only again verified and confirmed our observed long-term trends over the many years, but also have strongly supported and substantiated the alarming findings from the most recent decade. There is now little doubt that the compounding and cumulative effects of climate change and resultant sea level rise continue to accelerate and negatively impact the raptor and waterfowl populations of the river and the region. While this remains a hypothesis, it is a strong theory and a basis for extreme concern and needed action. This hypothesis, as outlined in both our 25 and 30-year reports, will be explored in much greater depth in the upcoming scientific papers that are currently in the works by Clay Sutton and Dr. Paul Kerlinger in concert with CU Maurice River staff and volunteers. Regional warming, sea level rise, increasing salinity, and the changing habitats – the initial loss of *Spartina patens*, the more recent loss of wild rice, and the rapid and accelerating encroachment of *Phragmites* – will all be further addressed and evaluated in these upcoming papers.

To continue to document these disturbing changes and unsettling downward trends is today an important goal of this long-term project, even though this was not something even remotely considered at the outset of these studies 35 years ago, way back in 1987. Such documentation is why long-term studies are highly important, and why we continue to monitor raptor and waterfowl populations in these times of great and rapid change. Much of what we have chronicled in recent years is not good news, but it is critical news that needs to be reported.

We commend and thank CU Maurice River for sharing these concerns and continuing to support this important work. We thank the officers, staff, volunteers, and all the members of CU Maurice River for their yeoman efforts in protecting the river and its resources, and for their continuing vision and belief in the innate and deep values of this long-term research effort. We continue to be proud to represent CU Maurice River as we all learn together.

The Maurice River continues to exhibit substantial avian ecovalues, and remains a regionally important bird area by all standards and barometers, but the documented declines in birds and the habitats on which they depend are real and need to be acknowledged and addressed. The sobering findings of these CU Maurice River long-term monitoring studies join those region-wide, nation-wide, and indeed world-wide efforts in focusing us on the immediacy of the issues and the urgent need for real and comprehensive actions on sea level rise and associated habitat changes on both the Delaware Bayshore and beyond.

– Clay Sutton April 2022

**TABLE 1**  
**Maurice River Raptor and Waterfowl Survey**  
**December 2021 through March 2022**

	CORE WINTER PERIOD 2021-2022								
DATE	12/7	12/21	1/8	1/19	2/9	2/21	3/8	3/29	AVG.
									<b>N=8</b>
<b>LOONS to CORMORANTS</b>									
Red-throated Loon		8		1	1	1			
Common Loon	1								
Pied-billed Grebe				1				1	
Horned Grebe									
Northern Gannet		8						55	
Dbl-cr Cormorant	2		1		1	1	38	306	
<b>BITTERNS to VULTURES</b>									
Great Blue Heron	4	19	<b>36</b>	9	13	3	2	10	
Great Egret					1*			7	
Black-cr Night-Heron							10		
Black Vulture	33	6	31	<b>84</b>	58	49	24	26	39
Turkey Vulture	231	295	185	<b>318</b>	267	238	172	163	234
<b>WATERFOWL</b>									
Snow Goose	0	0	80	0	<b>2000</b>	1500	1100	250	616
Canada Goose	68	252	<b>538</b>	266	294	405	427	344	324
Mute Swan	9	13	8	11	10	<b>14</b>	9	12	
Tundra Swan									
Wood Duck								8	
Gadwall				12	7	<b>14</b>	8	8*	
American Wigeon				1		14	4	<b>17*</b>	
Am Black Duck	54	75	181	186	<b>423</b>	346	364	133	220
Mallard	37	54	<b>353</b>	269	283	152	251	42	180
Blue-winged Teal								2*	
Northern Shoveler		2		1		3	9	<b>85*</b>	
Northern Pintail	2	40	27	<b>63</b>	33	21	4	0	24
Green-winged Teal	223	396	343	220	244	761	<b>2113</b>	1326	703
Canvasback					1				
Redhead					2				
Ring-necked Duck	155				411	<b>1180</b>	310		
Greater Scaup					<b>70</b>		15		
Lesser Scaup	2			7	64	4	<b>115</b>		
Scaup (sp.)	80	4	12	60	60	177		60	
Surf Scoter		4			6				
Black Scoter	1	6		1					
White-winged Scoter					1	1	1	1	
Scoter (sp.)	4	25			25	2			

Peak counts shown in **Bold Face**

\* Seen on date other than official survey date or by other observers

**TABLE 1 (page two)**  
**Maurice River Raptor and Waterfowl Survey**  
**December 2021 through March 2022**

	CORE WINTER PERIOD 2021-2022								
DATE	12/7	12/21	1/8	1/19	2/9	2/21	3/8	3/29	AVG.
									<b>N=8</b>
<b>WATERFOWL (continued)</b>									
Long-tailed Duck		4	<b>6</b>	5	4		1		
Bufflehead	120	96	<b>183</b>	101	162	180	172	116	141
Com. Goldeneye	8	6	14	40	<b>61</b>	16	2		
Hooded Merganser		6	7	6	22	<b>36</b>	4	4	
Com. Merganser				<b>17</b>	5	3	1	4	
Red-br Merganser	41	29	21	76	<b>80</b>	26	18	25	40
Ruddy Duck	2	1						7	
<b>DIURNAL RAPTORS</b>									
Osprey								62	
Bald Eagle	33	21	28	25	35	<b>57</b>	44	47	36.25
Northern Harrier	14	<b>21</b>	14	14	17	11	12	6	13.63
Sharp-shinned Hawk	<b>4</b>	1	3	3	3	2	0	1	2.13
Cooper's Hawk	1	<b>6</b>	4	3	4	5	1	5	3.63
Northern Goshawk									
Red-shouldered Hawk	0	1	<b>2</b>	1	0	2	0	0	0.75
Rough-legged Hawk									
Red-tailed Hawk	10	11	20	20	25	<b>27</b>	21	16	18.75
Golden Eagle					1				
American Kestrel	2	1	0	0	1	0	0	<b>2</b>	0.75
Merlin									
Peregrine Falcon	1	1	1	<b>2</b>	2	1	2	2	1.50
<b>GROUSE to CRANES</b>									
Ring-neck Pheasant									
Wild Turkey					6*	<b>16</b>	5		
Clapper Rail	1								
<b>SHOREBIRDS</b>									
Sandhill Crane	1								
Black-bellied Plover	18	<b>24</b>			1				
Killdeer				3		3	2	<b>8</b>	
Am. Oystercatcher					1				
Greater Yellowlegs	8	37	3	<b>48</b>	10	22	24	39	
Lesser Yellowlegs							1	<b>7</b>	
Pectoral Sandpiper									
Sanderling		7			14	5	<b>80</b>		
Dunlin	410	<b>467</b>	80		151		62	120	

Peak counts shown in **Bold Face**

\* Seen on date other than official survey date or by other observers



**TABLE 1** (page three)  
**Maurice River Raptor and Waterfowl Survey**  
**December 2021 through March 2022**

	CORE WINTER PERIOD 2021-2022								
DATE	12/7	12/21	1/8	1/19	2/9	2/21	3/8	3/29	AVG.
									N=8
<b>SHOREBIRDS (continued)</b>									
Long-billed Dowitcher							1		
Wilson's Snipe	1	<b>70</b>	40	2			4	1	
American Woodcock							2		
<b>JAEGERS to ALCIDS</b>									
Laughing Gull								20	
Bonaparte's Gull					1	<b>5</b>	2		
Ring-billed Gull	√	√	√	√	√	√	√	√	
Herring Gull	√	√	√	√	√	√	√	√	
Lesser BI-backed Gull					1				
Gt BI-backed Gull	√	√	√	√	√	√	√	√	
Forster's Tern									
<b>PIGEONS to WOODPECKERS</b>									
E. Screech Owl									
Great Horned Owl									
Short-eared Owl									
Belted Kingfisher	6	<b>10</b>	4	5	2	3	1	4	
Common Raven		1			<b>2</b>				

Peak counts shown in **Bold Face**

\* Seen on date other than official survey date or by other observers

**TABLE 2**  
**Cohansey River Raptor and Waterfowl Survey**  
**December 2021 through March 2022**

COHANSEY RIVER 2021-2022		
DATE	1/6/22	2/28/22
<b>BITTERNS to VULTURES</b>		
Red-throated Loon	1	1
Great Blue Heron	4	3
Black-crowned Night-Heron		
Black Vulture	59	43
Turkey Vulture	171	120
<b>WATERFOWL</b>		
Snow Goose	3,550	3,200
Cackling Goose		
Canada Goose	2600	1,868
Mute Swan	2	2
Wood Duck		3
Gadwall		
Am. Black Duck	66	134
Mallard	100	100
Northern Pintail	2	75
Green-winged Teal		275
Greater Scaup		
Scaup sp.		
Bufflehead		2
Common Goldeneye		1
Hooded Merganser	6	4
Common Merganser		1
<b>DIURNAL RAPTORS</b>		
Bald Eagle	40	37
Northern Harrier	25	15
Sharp-shinned Hawk	1	1
Cooper's Hawk	1	2
N. Goshawk		
Red-shouldered Hawk	2	2
Red-tailed Hawk	11	30
Golden Eagle		
American Kestrel	3	2
Merlin	1	1
Peregrine Falcon	1	
<b>GROUSE to CRANES</b>		
Ring-necked Pheasant		1
Wild Turkey		8
Clapper Rail		
Sandhill Crane	29	
Killdeer		1
Greater Yellowlegs	2	
Dunlin	50	
Wilson's Snipe	1	
<b>JAEGERS to ALCIDS</b>		
Bonaparte's Gull		
Ring-billed Gull	√	√
Herring Gull	√	√
Great Black-backed Gull	√	√
Short-eared Owl		
Belted Kingfisher	1	

**TABLE 3**  
**Wintering Waterfowl and Raptors on the Maurice River 2007–2022**  
**Comparison of Year 35 to Segment V (2007–2012), Segment VI (2012-2017), and Years 31, 32, 33, and 34**

	2007-2012			2012-2017			Year 31		Year 32		Year 33		Year 34		Year 35	
	Segment V			Segment VI			2017 - 2018		2018 - 2019		2019 - 2020		2020 - 2021		2021 - 2022	
	Best	Avg. Peak Count	Avg of Average Counts	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	6,051	1,499	3,800	1,053	3,000	1,410	3,100	854	2,000	320	2,000	616
Canada Goose	1538	796	268	1,270	764	346	1256	498	291	215	361	243	703	300	538	324
Am. Black Duck	1,274	829	487	1,585	887	500	635	440	357	209	400	263	241	128	423	220
Mallard	649	463	256	952	579	289	509	266	311	142	427	197	132	63	353	180
Northern Pintail	928	628	281	1,621	826	364	300	90	324	130	320	87	68	16	63	24
Green-winged Teal	5,850	3,270	988	4,182	2,809	1,021	2,317	890	1,426	405	569	260	1,018	483	2,113	703
Bufflehead	446	316	na	330	238	125	265	174	323	234	198	177	194	131	183	141
Red-breasted Merganser	207	133	na	320	180	69	154	66	69	46	22	17	38	17	80	40
	2007-2012			2012-2017			Year 31		Year 32		Year 33		Year 34		Year 35	
	Segment V			Segment VI			2017 - 2018		2018 - 2019		2019 - 2020		2020 - 2021		2021 - 2022	
	Best	Avg. Peak Count	Avg of Average Counts	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	60	44.6	26.24	57	31.71	73	53.75	61	43	68	42	84	39
Turkey Vulture	162	143	99	196	156	123	196	135	185	159	216	155	180	146	318	234
Bald Eagle	48	34.6	24.15	53	44.4	29.15	59	44.14	53	38.88	53	42	58	39	57	36.25
Northern Harrier	43	38	25.8	30	22.8	17.45	21	15.57	18	13.13	25	14.57	18	12.25	21	13.63
Sharp-shinned Hawk	18	9.4	3.04	6	5	2.28	6	2.71	4	1.63	6	1.71	3	1.13	4	2.13
Cooper's Hawk	10	6.8	3.21	6	4.4	2	7	2.71	4	2.00	4	1.71	3	1.50	6	3.63
Northern Goshawk	1			2												
Red-shouldered Hawk	26	8.4	1.62	7	3.8	1.25	7	2.00	5	1.75	1	0.14	3	1.50	2	0.75
Red-tailed Hawk	64	59.4	42	57	45.2	29.75	40	23.14	41	27.88	27	13.57	30	19.50	27	18.75
Rough-legged Hawk	1	0.6	0.07	1			1	0.14								
Golden Eagle	2			1			1								1	
American Kestrel	10	3	0.77	3	1.6	0.7	1	0.71	1	0.25	1	0.29	1	0.25	2	0.75
Merlin	2			1					1	0.25	1	0.14	1	0.25		
Peregrine Falcon	4	2.4	0.98	4	2.8	1.13	2	1.14	3	1.25	2	1.14	3	2.13	2	1.50



**TABLE 4**  
**Wintering Waterfowl on the Maurice River**  
**Comparisons of Five Year Segments for Key Species**  
**1987 - 2022**

	1987-1992			1992-1997			1997-2002		
	Segment I			Segment II			Segment III		
	Best	Avg. Peak Count	Avg of Average Counts	Best	Avg. Peak Count	Avg of Average Counts	Best	Avg. Peak Count	Avg of Average Counts
Snow Goose	14,000	5,510	1,848	13,100	7,261	2,402	7,910	6,223	2,394
Canada Goose	1,000	499	104	880	498	133	1,038	758	321
Am. Black Duck	8,120	5,439	2,630	4,877	2,103	1,233	8,060	3,865	1,595
Mallard	3,758	2,805	1,303	3,896	1,358	723	3,325	1,645	624
Northern Pintail	3,020	1,429	539	3,293	1,254	545	1,069	752	349
Green-winged Teal	1,378	788	195	1,170	613	197	4,071	2,790	746
	2002-2007			2007-2012			2012-2017		
	Segment IV			Segment V			Segment VI		
	Best	Avg. Peak Count	Avg of Average Counts	Best	Avg. Peak Count	Avg of Average Counts	Best	Avg. Peak Count	Avg of Average Counts
Snow Goose	7,150	5,070	1,992	12,324	6,605	2,309	13,000	6,051	1,499
Canada Goose	1,520	910	412	1,538	796	268	1,270	764	346
Am. Black Duck	2,858	2,173	1,079	1,274	829	487	1,585	887	500
Mallard	994	600	350	649	463	256	952	579	289
Northern Pintail	1,495	1,036	409	928	628	281	1,621	826	364
Green-winged Teal	3,779	2,060	557	5,850	3,270	988	4,182	2,809	1,021
	2017-2022								
	Segment VII								
	Best	Avg. Peak Count	Avg of Average Counts						
Snow Goose	3,800	2,780	851						
Canada Goose	1,256	630	316						
Am. Black Duck	635	411	252						
Mallard	509	346	170						
Northern Pintail	324	215	69						
Green-winged Teal	2,317	1,489	548						

**TABLE 5**  
**Wintering Raptors on the Maurice River**  
**Comparisons of Five Year Segments for all Species**  
**1987 - 2022**

	1987-1992			1992-1997			1997-2002		
	Segment I			Segment II			Segment III		
	Best	Avg. Peak Count	Avg of Average Counts	Best	Avg. Peak Count	Avg of Average Counts	Best	Avg. Peak Count	Avg of Average Counts
Black Vulture	45	19.6	4.92	58	35.2	15.40	76	42.6	13.80
Turkey Vulture	209	135.8	71.60	266	131.0	72.80	195	145.8	85.80
Bald Eagle	15	9.0	4.46	20	13.4	7.78	20	15.0	8.36
Northern Harrier	32	28.0	20.10	33	28.6	18.80	38	32.0	23.00
Sharp-shinned Hawk	13	8.6	2.74	16	9.2	2.48	7	6.6	2.72
Cooper's Hawk	5	3.2	1.12	7	4.6	1.66	5	4.4	2.28
Northern Goshawk	1 (2 total)			1 (2 total)			1 (4 total)		
Red-shouldered Hawk	2 (9 total)	1.0	0.18	3 (14 total)	2.0	0.30	2 (11 total)	1.4	0.23
Red-tailed Hawk	59	50.8	36.40	59	53.4	40.20	57	53.4	41.60
Rough-legged Hawk	4 (51 total)	3.2	1.45	3 (24 total)	1.4	0.50	1 (6 total)	0.6	0.12
Golden Eagle	2 (10 total)			1 (5 total)			1 (5 total)		
American Kestrel	8	5.4	2.46	5	3.6	1.38	4	2.6	0.93
Merlin	1 (1 total)			2 (8 total)			1 (7 total)		
Peregrine Falcon	1 (5 total)	0.8	0.11	2 (12 total)	1	0.25	2 (18 total)	1.2	0.37
	2002-2007			2007-2012			2012-2017		
	Segment IV			Segment V			Segment VI		
	Best	Avg. Peak Count	Avg of Average Counts	Best	Avg. Peak Count	Avg of Average Counts	Best	Avg. Peak Count	Avg of Average Counts
Black Vulture	75	53.4	19.00	57	38.2	22.4	60	44.6	26.24
Turkey Vulture	155	139.4	94.00	162	143	99	196	156	123
Bald Eagle	31	27.0	14.92	48	34.6	24.15	53	44.4	29.15
Northern Harrier	40	36.6	26.40	43	38	25.8	30	22.8	17.45
Sharp-shinned Hawk	11	7.0	2.62	18	9.4	3.04	6	5	2.28
Cooper's Hawk	7	5.0	2.48	10	6.8	3.21	6	4.4	2
Northern Goshawk	1 (1 total)			1 (3 total)			2 (3 total)		
Red-shouldered Hawk	8 (36 total)	3.4	0.75	26 (69 total)	8.4	1.62	7 (50 total)	3.8	1.25
Red-tailed Hawk	87	66.0	44.20	64	59.4	42	57	45.2	29.75
Rough-legged Hawk	2 (8 total)	1.0	0.17	1 (3 total)	0.6	0.07	1 (4 total)		
Golden Eagle	1 (7 total)			2 (7 total)			1 (4 total)		
American Kestrel	4	2.2	0.70	10	3	0.77	3	1.6	0.7
Merlin	2 (10 total)			2 (7 total)			1 (11 total)		
Peregrine Falcon	3 (25 total)	2	0.54	4 (40 total)	2.4	0.98	4 (50 total)	2.8	1.13
	2017-2022								
	Segment VII								
	Best	Avg. Peak Count	Avg of Average Counts						
Black Vulture	84	68.6	41.89						
Turkey Vulture	318	219	166						
Bald Eagle	59	56	40.05						
Northern Harrier	25	20.6	13.83						
Sharp-shinned Hawk	6	4.6	1.86						
Cooper's Hawk	7	4.8	2.31						
Northern Goshawk	(0 total)								
Red-shouldered Hawk	7 (41 total)	3.6	1.23						
Red-tailed Hawk	41	33	20.57						
Rough-legged Hawk	1 (2 total)								
Golden Eagle	1 (2 total)								
American Kestrel	2	1.2	0.45						
Merlin	1 (5 total)								
Peregrine Falcon	3 (55 total)	2.4	1.43						

## **For More Information / Literature Referenced:**

Thirty Years on the Maurice River: Facts and Figures, Findings and Reflections, Questions and Concerns. A summary of 30 Years of Winter Raptor and Waterfowl Studies on Cumberland County, New Jersey's Iconic Delaware Bay Tributary, 1987-2017. Clay Sutton and James Dowdell. February, 2018. 61 pp. Long-term studies carried out under the auspices of Citizens United to Protect the Maurice River, Inc.

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