NorthEast Hawk Watch
2016 Hawk Migration Report

Osprey. Photo by Vic Berardi

2016 NorthEast Hawk Watch Sites

NorthEast Hawk Watch

The *NorthEast Hawk Watch* promotes the systematic study of migrating hawks in New England, southeastern New York and northeast New Jersey. Membership is open to anyone. Annual dues are $10 payable to "NEHW" c/o treasurer: Joe Wojtanowski, PO Box 142, Poquonock, CT 06064.

Visit the website of *NorthEast Hawk Watch* at www.battaly.com/nehw/ to download a membership application, view seasonal site totals at all sites and daily counts at selected sites, download PDFs of previous reports, and find directions to hawkwatch sites in the northeast.

All counts can be easily reported online through a free service offered by the Hawk Migration Association of North America (HMANA). To sign up, visit www.hawkcount.org and click on "Account Request" link. To receive daily reports from all sites using the hawkcount program, subscribe to BIRDHAWK, which is also free and can be done by visiting the HMANA homepage at www.hmana.org and following the simple instructions there.

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From the Editor:

You did it again! You helped to count hawks at watch sites all over the Northeast! You undoubtedly went to the watch sites to enjoy the wonder of our raptor migrations across the landscape. In doing so, you also collected important data that is helping us to understand our raptor movements. Thank you for your hours of fun! Thank you for keeping the count! Thank you for your dedication to our conservation efforts! Also, thank you for using hawkcount.org to document your count, and thanks to Jason Sodergren of HMANA for keeping hawkcount.org such a vital tool for our data collection.

This *Hawk Migration Report* is about your data. I organized it into summary tables and bars charts to show relative abundance of species, but each number presented herein is from you. I looked further into your data to find trends, and include graphs to display the trends. There is a centerfold summarizing all the data you collected since 1980 for 16 species; this is intended to provide a ready reference when you wonder about the status of our wonderful raptors.

As we ourselves adapt to our warming environments, we begin here to address the possible impact of climate change on our changing raptor counts. Our investigations in this Report into temperature and winds are still basic, but it is a step towards understanding its impact on our raptor migrations.

Drew Panko has provided us with a comprehensive and insightful update regarding the wonderful recovery of the Bald Eagle, and the paradox of declining Osprey migration counts simultaneous with an increase in breeding populations. Be sure to let him know your thoughts about this most interesting puzzle that reaches beyond the paradox into the core of the relevance of migration data.

I hope that you find much to think about within these pages, and I hope that you will send us your thoughts and ideas. Further, I invite you to write an article for inclusion in the next *Hawk Migration Report*, either about the stats or about your experiences while hawk watching.

I join you in your efforts to understand hawk migration and contribute to raptor conservation.

Trudy Battaly, *Hawk Migration Report* Editor
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From the President:

Thank you to everyone who contributed to the counts for the Spring and Fall 2016 hawk migration seasons. This year's report should remind us all of the value of long-term hawk migration counts; of what you do. This amazing report put together by Trudy Battaly and Iain Macleod reveals both short-term and long-term trends of concern, especially for Sharp-shinned Hawk and American Kestrel. I also look at the Broadwing numbers and have trepidations; 2016 was our lowest HPHH (Hawks per Hundred Hours) Broadwing count of the past twenty years. Drew Panko, in his article, documents what many hawk watchers talk about: the changes in weather patterns and their effects on hawk migration, in examining the trends for Bald Eagles and Ospreys.

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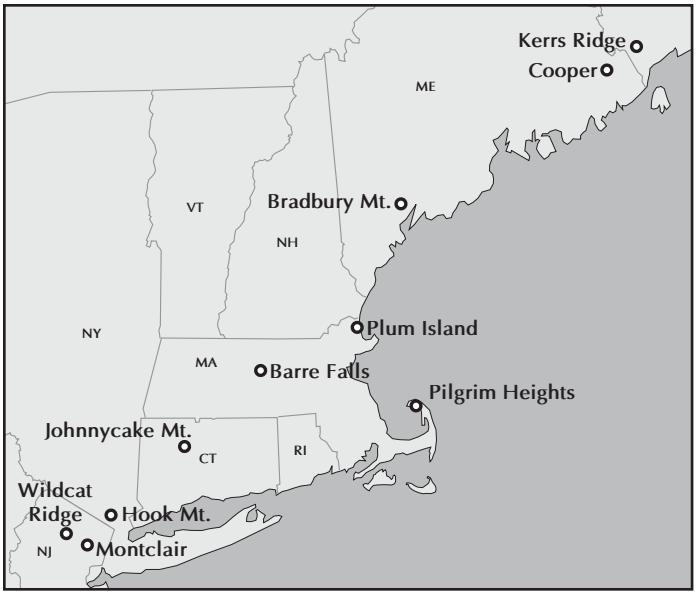


2016 Northeast Spring Season

Sites

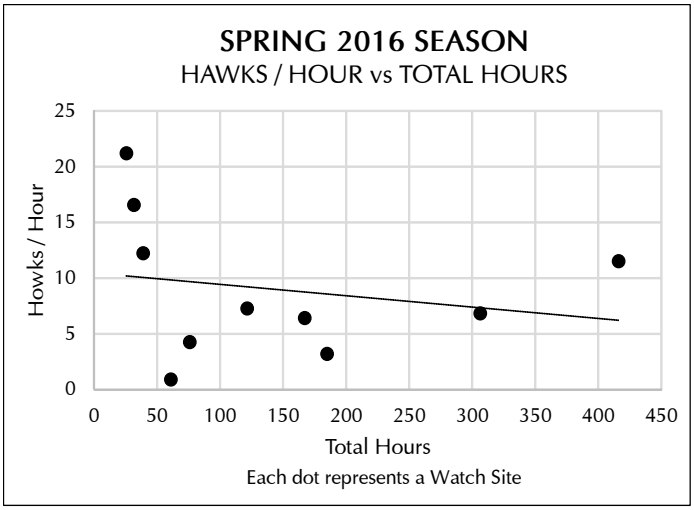
During Spring 2016, hawk watchers with their eyes on the skies counted hawks at 10 watch sites across the northeast, from New Brunswick, in the northeastern portion, to New Jersey, in the southwestern portion of our Northeast region. Kerrs Ridge in New Brunswick and Cooper in Maine are the northernmost of our sites. They are about 25 miles apart and provide important data for hawks that reach those latitudes. Bradbury Mountain, also in Maine, is the only site in the long stretch from Massachusetts to northern Maine. It is 83 miles north-northeast of Plum Island and 157 miles southwest of Cooper. While Kerrs Ridge and Bradbury Mountain are close to the coast, Plum Island and Pilgrim Heights in Massachusetts are on the coast and regularly report significant numbers of hawks. Inland sites include Barre Falls, also in Massachusetts, and Johnnycake Mountain in Connecticut. Well located, at about 70 miles apart and about 65 miles from the other nearest sites, their data provides important information about the hawks in our inland regions. The metropolitan region includes three sites, Hook Mountain in New York, and Wildcat Ridge and Montclair in New Jersey. Although these sites are at least 65 miles from Johnnycake, they are relatively close to each other, only 15 to 30 miles apart. They count different hawks, so their proximity provides for better coverage of an area that needs that coverage, as the continent spreads toward the northeast.

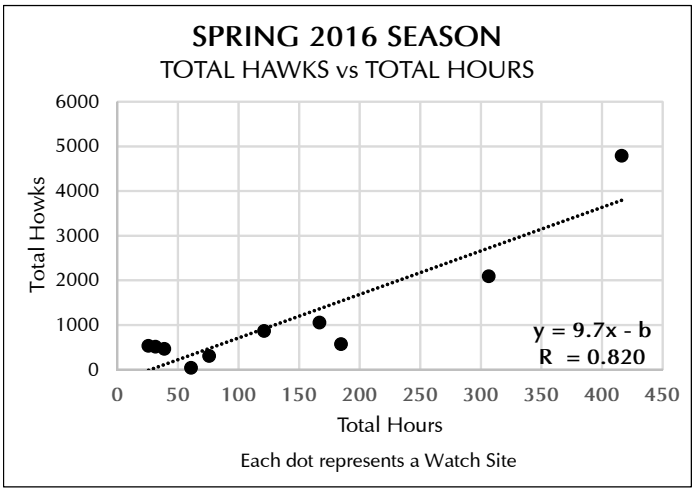
We welcome the addition of more spring watch sites. Our map certainly could use additional data from all of the northeast, but especially from Maine (perhaps near Belfast or Bangor), New Hampshire, Vermont, and Connecticut. Any takers out there?

Coverage

Coverage during the 2016 Spring season varied substantially from 8 to 57 days and from 26 to 416 hours. The two sites with full coverage, Bradbury Mountain to the north and Montclair to the south, each had 50 days or more and 300 hours or more of coverage, jointly representing 51% of the total hours. Together these two sites accounted for 61% of the total hawks and an average of 64 hawks per day. The three other sites with more than 20 days and more than 100 hours of coverage were Plum Island, Pilgrim Heights, and Wildcat Ridge, jointly representing 33% of the total hours. They accounted for 22% of the total hawks and averaged 27 hawks per day. The five sites with less than 20 days of coverage were Kerrs Ridge, Cooper, Barre Falls, Johnnycake Mountain, and Hook Mountain, jointly representing 16% of the total hours. They accounted for 17% of the total hawks and averaged 32 hawks per day.

This year's data indicates there are rewards for all hawk watchers who venture out to spring sites. Those watchers who put in more hours saw more hawks, and provided us with the data for seasonal perspectives and analyses. Those watchers who put in less than 50 hours saw substantially more hawks per hour. The following two graphs show how the number of hawks and the number of hawks per hour relate to the number of hours of effort. One graph shows the strong correlation (r=0.91, p=0.0003) between the number of hawks counted and the number of hours of effort: "The bigger the effort, the bigger the count!" The other graph shows a much less robust inverse relationship between total hours and hawks counted per hour.





We clearly see that the watchers at the sites with less than 50 hours have a good understanding of when the hawks will be flying through their region. All the watchers at all sites, whether they cover a whole season or a part thereof, are contributing to our conservation goal of learning about and monitoring raptor movements during spring migration. Thank you all! The data you collect is important to these goals. You are monitoring the raptors that have survived both migration and winter. You are taking the pulse of our breeding populations!

[The correlation coefficient, r, measures the strength of the linear relationship between two variables, year and species counts. The p-value measures the probability that the outcome will occur assuming r=0. A strong significance occurs when r is larger and p is smaller.]

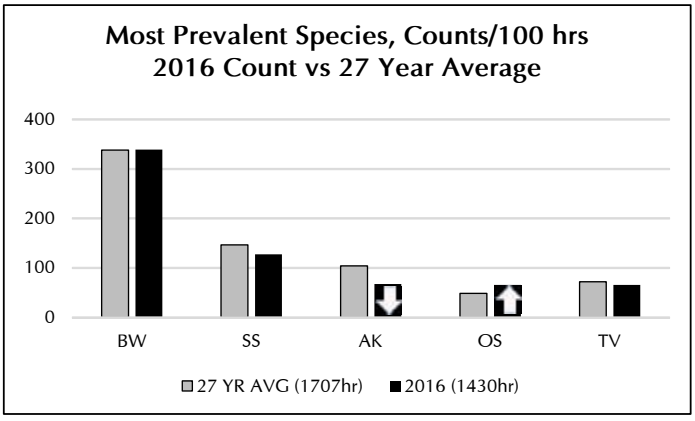
The Count—An Overview

The watchers at our 10 sites counted 11,322 hawks of 17 species. The most prevalent species were Broad-winged Hawk (4849), Sharp-shinned Hawk (1827), American Kestrel (966), Osprey (943) and Turkey Vulture (942). For the second year in a row Mississippi Kite (4) outnumbered the other three least prevalent species: Rough-legged Hawk (1), Golden Eagle (1), and Northern Goshawk (3).

The summary table for the Spring 2016 season is separated into four regions. The Northern Region includes Kerrs Ridge and Cooper; the Coastal Region includes Bradbury Mountain, Plum Island, and Pilgrim Heights; the Inland Region includes Barre Falls and Johnnycake Mountain; and the NY Metro Region includes Hook Mountain, Wildcat Ridge, and Montclair. The table shows us how the hawks were distributed over the northeast. Bradbury Mountain, with the highest counts for 10 species, also had the most hours, so the larger counts would be expected. But, it also had the highest number of hawks per day. This suggests that the flight was further north in 2016 than in other years. The distribution of Black Vultures continues to be more southerly, with high counts at Montclair and Johnnycake, but the Turkey Vultures were most prevalent in the Coastal Region, with a high count at Pilgrim Heights. The Coastal Region counted most of the falcons: 76% of the Kestrels, 77% of the Merlins, and 44% of the Peregrines. Plum Island had the high Merlin count and shared the Peregrine high with Hook Mountain.

For the purpose of comparing the 2016 count to other years, the data has been standardized to counts per 100 hours. Four species were more than 30% above the 27 year average: Osprey (+35%), Northern Harrier (+38%), Bald Eagle (+143%), and Peregrine Falcon (+39%). Both Osprey and Bald Eagle had above average counts in 2015 as well. American Kestrel (-35%) was the only species seen in substantial numbers to be more than 30% below average.

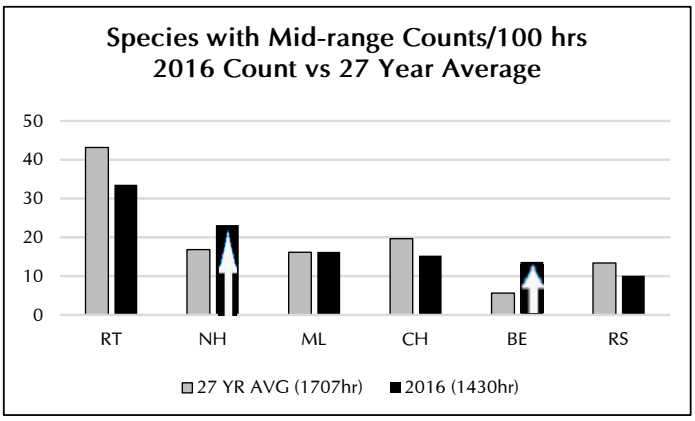
Sightings of our least prevalent species offer extra rewards for hawk watchers. During this 2016 season there were fewer rarities than normal. Generally, we expect species with low counts to vary by larger percentages simply because their numbers are small. Unfortunately 2016 brought low counts for Northern Goshawk (-73%), Rough-legged Hawk (-74%), and Golden Eagle (-54%), and we missed Swallow-tailed Kite completely! The only bright light among our rarities were the Mississippi Kites at 67% above normal. Thank you, Pilgrim Heights!

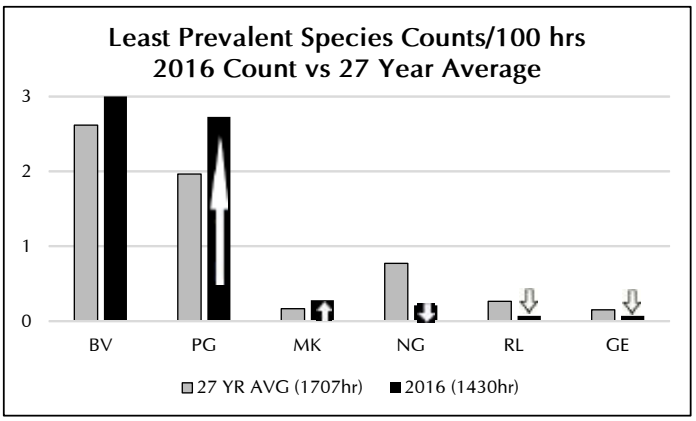


Northeast Spring 2016 Seasonal Totals

SITE	Days	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PG	UR	MK	TOTAL	Hk/Dy
Kerrs Ridge	9	26	0	30	30	10	40	73	0	0	1	256	28	0	0	63	3	4	7	0	545	61
Cooper	16	61	0	20	3	18	3	1	1	0	0	2	0	0	**1**	1	0	1	1	0	52	3
Bradbury Mountain	**57**	**416**	1	260	**513**	**68**	**132**	**746**	**70**	**2**	**75**	**2124**	**245**	0	0	**429**	77	1	**47**	0	**4790**	**84**
Plum Island	28	167.3	2	137	37	8	115	301	51	1	0	1	21	0	0	274	**81**	**10**	27	0	1066	38
Pilgrim Heights	29	121.5	1	**317**	90	2	7	140	12	0	2	200	38	0	0	35	23	6	0	**4**	877	30
Barre Falls	18	76	0	11	22	8	4	23	4	0	3	197	19	0	0	15	1	1	11	0	319	18
Johnnycake Mountain	10	39	16	0	29	13	2	23	24	0	4	252	89	**1**	0	22	0	0	0	0	475	48
Hook Mountain	8	32	0	3	26	16	1	67	10	0	4	344	14	0	0	19	9	**10**	2	0	525	66
Wildcat Ridge	38	185	1	0	34	4	1	54	22	0	6	430	20	0	0	8	0	0	1	0	581	15
Montclair	50	306.5	**22**	164	159	49	26	399	25	0	50	1043	6	0	0	100	39	6	4	0	2092	42
TOTALS	**263**	**1430**	**43**	**942**	**943**	**196**	**331**	**1827**	**219**	**3**	**145**	**4849**	**480**	**1**	**1**	**966**	**233**	**39**	**100**	**4**	**11322**	**43**
27 year Average		1707	45	1231	833	96.2	287	2504	335	13	229	5761	737	5	2.6	1778	275	34	202	5.9	14390	

BV: Black Vulture, TV: Turkey Vulture, OS: Osprey, BE: Bald Eagle, NH: Northern Harrier, SS: Sharp-shinned Hawk, CH: Cooper's Hawk, NG: Northern Goshawk, RS: Red-shouldered Hawk, BW: Broad-winged Hawk, RT: Red-tailed Hawk, RL: Rough-legged Hawk, GE: Golden Eagle, AK: American Kestrel, ML: Merlin, PG: Peregrine Falcon, UR: Unidentified Raptor, MK: Mississippi Kite





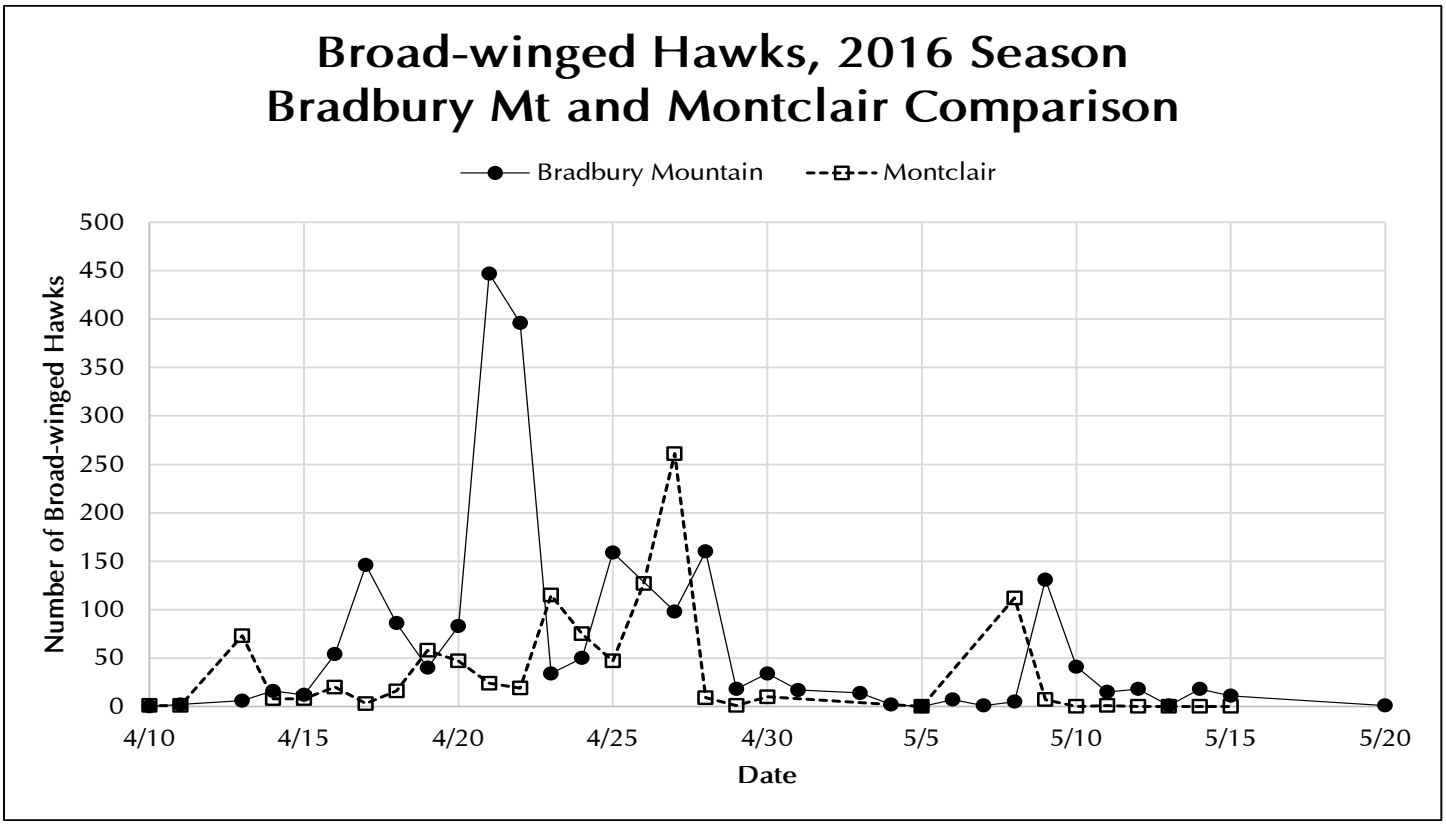
BW: Broad-winged Hawk, SS: Sharp-shinned Hawk, AK: American Kestrel, OS: Osprey, TV: Turkey Vulture, RT: Red-tailed Hawk, NH: Northern Harrier, ML: Merlin, CH: Cooper's Hawk, BE: Bald Eagle, RS: Red-shouldered Hawk, BV: Black Vulture, PG: Peregrine Falcon, MK: Mississippi Kite, NG: Northern Goshawk, RL: Rough-legged Hawk, GE: Golden Eagle. Note: Graphs have different scales. Arrows are placed on species with more than a 30% change above or below the average.

The Species

Broad-winged Hawks—Northward bound, or Not?

There were 4849 Broad-winged Hawks (BW) counted during the Spring 2016 season. This is fewer than last year's 5374, and below the 27 year average of 5761. However, comparing the numbers per 100 hours, the 2016 count was right at average. There were 339 BWs per 100 hours in 2016 compared to the 27 year average of 338.

The geographical timing of migration, however, was a surprise, with both peak and median dates occurring earlier for the more northern sites than for the southern sites! This is the opposite of what we expect, as we watch our BWs moving north from Mexico through the southern states (on BIRDHAWK) and finally arriving in our area by April. Median dates for 2016 were: April 25 in the NY metropolitan region, April 23 for the mid-New England region, early to mid-May for the coastal region, and April 22 for the northern region. The median date for a watch site is the date when half of that



season's BWs have past and the other half is yet to come. Peak dates seemed reversed as well, with the metro peaks occurring later than the northern peaks. This can be readily seen in the graph comparing Montclair in the south and Bradbury Mountain in the north. Both sites have full coverage during the BW season.

So, how is it that the BWs could leapfrog to Maine without being seen at Montclair or any of the other southern sites? On April 21, Allentown PA reported light winds from the S and SW with clear skies. (wunderground.com/history/) Manchester NH reported scattered clouds with calm to W winds that day. Perhaps the BWs flying over Montclair and our southern sites were too high to be seen against a clear blue sky.

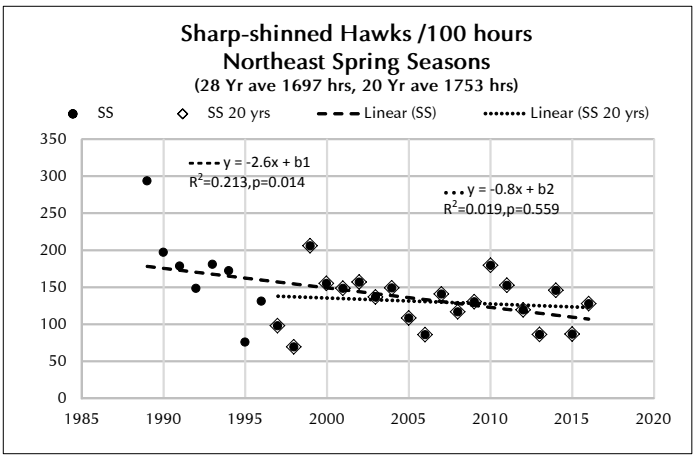
Broad-winged Hawk Peak and Median Days

Site	Date	Count	Median Day
Kerrs Ridge	4/22	123	4/22
Cooper	4/21	1	4/21
Bradbury Mountain	4/21	447	4/22
Plum Island	5/9	1	5/9
Pilgrim Heights	5/17	49	5/21
Barre Falls	4/25	84	4/24
Johnnycake Mountain	4/22	63	4/22
Hook Mountain	4/24	137	4/24
Wildcat Ridge	4/24	162	4/24
Montclair	4/27	261	4/26

Sharp-shinned Hawks—Back in 2nd Place, this time…

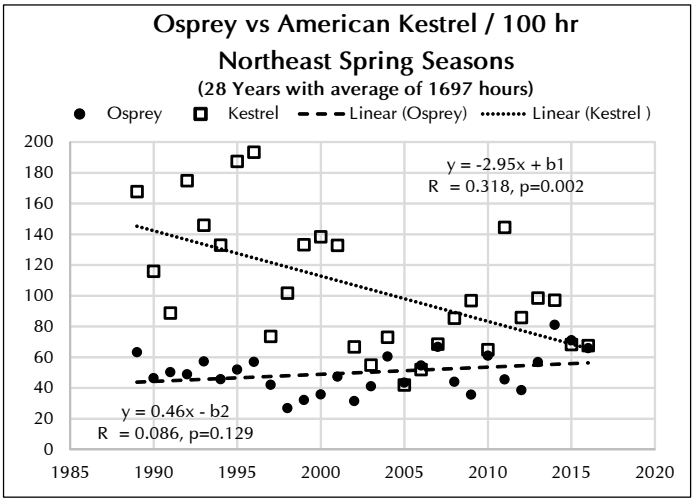
We counted 1827 Sharp-shinned Hawks in 2016. This is 50% more than the 2015 count, and only 11% lower than the 28 year average—very good news! Sharpies regained their 2nd place rank. Does this constitute the beginning of a recovery for our Sharpies? Not quite, not yet. Our Sharpies are still in decline (r = -0.461, p = 0.0135), for the longer 28 year period. We have lost about 45 Sharpies a year, resulting in about 1250 fewer Sharpies today compared to 1989. However, if we focus only on the last 20 years, since 1997, we have good news—there is no significant linear trend! On the graph you can see how the regression line for the last 20 years (dotted) only drops slightly from 1997 to the present. The large variation in the counts, with many quite far from the line, makes it difficult to predict a recovery, or even a status quo.

Yet, we can rejoice that Sharpies are back in 2nd place, and way ahead of the Turkey Vultures (TV) this season. In 2015 the TVs ranked 2nd, but this season they ranked 5th. The TV count of 942 translates to 66 per 100 hours, and is our lowest since 2006 and our 4th lowest since 1989. So, it appears that the Sharpies will hold their rank, at least through this decade. And, we now have hope that it will be even longer.



American Kestrel—Back in 3rd Place, but by only 23 hawks!

Kestrels regained 3rd place by 23 hawks this year. In 2015 Osprey ranked 3rd by 39 hawks. Furthermore, the actual counts in both years were remarkably similar. This strongly suggests that we are on the cusp of exchange in ranking between these two species. Both species have retained their approximate numbers for another season, resulting in somewhat stronger significance. Kestrels continue their significant decline (r=-0.564, p=0.002), while the Osprey, at 35% above average, continues to increase. Although it is not yet significant, the Osprey trend is beginning to approach significance (r=0.294, p=0.129). Statistically, the trend lines for these two species will cross in less than two years. However, variation is the game in hawk counting, so we will just have to wait and see. Thankfully, the Kestrel count did not get lower. Their counts in 2008 to 2014 were higher, recovering from lows in 2002 to 2007, so I vote to defy statistics and look for a Kestrel rebound to higher counts.



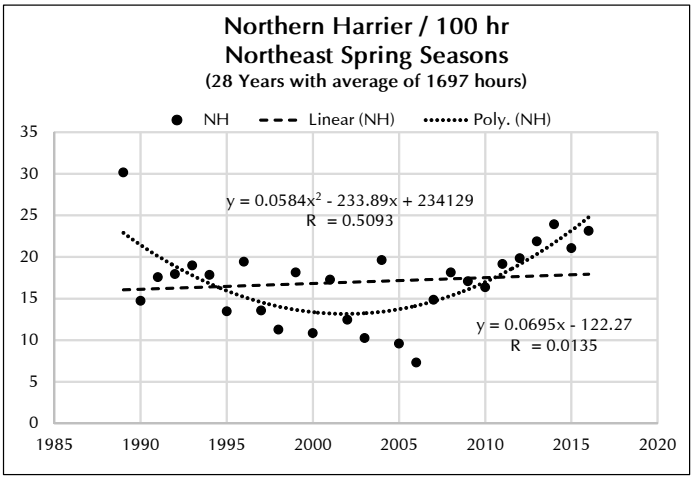
Other Species

Of the remaining species, there are four with very significant continuing trends. Red-tailed Hawks are declining (r= 0.485, p=0.009), and Bald Eagle (r=0.886, p=0.0000), Black Vulture (r=0.620, p=0.0004), and Peregrine Falcon (r=0.622, p=0.0004) are increasing. The reduced numbers of migrating Red-tails may reflect a stronger tendency to overwinter in the region. The increasing numbers of Bald Eagles and Peregrines are undoubtedly a consequence of reduced amounts of DDT in the environment together with reintroduction efforts beginning in the 1970s. Black Vultures have been moving further north over the decades, possibly a consequence of global warming.

There are no significant linear trends for the other species, where a trend up or down can be detected. This is either a consequence of the large year to year variation in those species, or simply that there is no trend for those migrants. However, Northern Harriers stand out as having a different pattern. They are neither increasing nor decreasing over the last 28 years. Instead, they have a peculiar parabolic pattern. During the years from 1995 to 2010 they show more variation, with the eight lowest years included. Before then and after then the numbers have been more consistently high.

So, what happened to Northern Harriers for those 15 years? If anyone has any ideas, let us know. Will it happen again? Keep collecting data so we can find out!

Data for these analyses are noted on the Spring Historical Summary, which follows. Also included are the daily counts at the ten spring watch sites for 2016.



SPRING HISTORICAL SUMMARY PER 100 HOURS: 1989-2016

YEAR	SITES	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PF	UR	MK	SK	TOT
1989	15	1608	0.0	68.3	63.2	1.9	30.2	294.2	20.1	1.2	13.7	695.3	52.5	0.2	0.1	167.7	15.4	1.2	20.0	0.0	0.0	1413.7
1990	20	1927	0.1	45.7	46.4	1.7	14.7	198.0	12.1	1.3	12.6	564.4	47.5	0.3	0.1	116.0	14.5	1.5	27.2	0.0	0.0	1097.4
1991	21	1957	0.7	45.3	50.3	1.5	17.6	179.4	13.1	1.9	14.6	385.7	66.3	0.7	0.3	88.8	14.6	1.6	24.0	0.0	0.0	891.5
1992	21	1638	0.0	38.0	48.9	1.6	17.9	149.3	12.6	1.3	15.1	523.4	62.9	0.7	0.1	174.9	14.5	2.1	16.4	0.0	0.0	1079.9
1993	22	1780	0.0	47.9	57.3	1.7	19.0	181.8	22.4	0.9	19.8	342.4	58.5	0.1	0.3	145.8	17.5	1.4	7.5	0.0	0.0	979.9
1994	33	1564	2.5	68.7	45.7	1.5	17.8	173.0	28.5	1.1	15.3	320.8	47.8	0.4	0.2	132.9	13.9	1.2	14.5	0.0	0.0	903.8
1995	26	914	2.7	84.5	52.0	1.2	13.5	76.8	5.7	0.1	11.1	454.7	29.9	0.0	0.1	187.4	7.1	0.7	9.1	0.0	0.0	936.4
1996	20	1061	2.3	63.7	56.9	2.5	19.4	132.0	8.2	0.4	17.4	187.7	67.1	0.4	0.1	193.4	9.8	1.9	9.9	0.0	0.0	773.0
1997	25	1253	2.6	66.6	42.1	2.2	13.6	98.7	10.1	1.0	7.9	534.5	52.0	0.1	0.3	73.6	5.5	0.3	22.6	0.0	0.0	933.5
1998	21	1235	2.1	59.3	26.9	1.7	11.3	70.4	9.5	0.7	8.1	276.1	27.0	0.0	0.0	101.7	4.6	1.0	11.1	0.0	0.0	611.3
1999	8	1758	2.0	59.2	32.2	3.3	18.1	206.5	23.5	0.5	17.1	444.8	26.4	0.0	0.1	133.2	16.0	1.6	13.1	0.0	0.0	997.6
2000	14	1824	1.3	69.5	35.9	7.9	10.9	155.8	23.7	0.6	9.7	323.1	38.9	0.1	0.1	138.4	22.2	2.7	10.9	0.1	0.0	850.6
2001	10	1881	2.8	88.8	47.3	3.2	17.3	149.2	18.8	0.3	11.2	315.8	40.3	0.0	0.1	132.9	22.3	1.8	13.3	0.0	0.0	866.3
2002	9	1886	2.7	66.0	31.4	3.2	12.5	157.6	30.5	0.7	9.3	383.9	30.1	0.0	0.1	66.8	16.1	2.0	4.4	0.6	0.0	819.7
2003	7	2021	2.5	73.3	41.0	4.2	10.2	137.6	20.4	0.2	10.2	242.0	35.5	0.2	0.2	54.9	17.5	1.4	7.8	0.0	0.0	658.4
2004	8	1803	2.2	99.4	60.5	4.7	19.6	149.8	31.9	0.7	11.0	193.2	52.4	0.4	0.3	73.0	21.5	1.8	7.8	0.3	0.0	730.8
2005	7	1419	3.1	89.9	43.4	4.4	9.6	108.5	20.7	0.8	11.8	240.6	53.3	0.2	0.1	41.9	7.1	1.3	10.6	0.1	0.0	647.1
2006	8	1466	3.0	58.3	54.6	3.5	7.3	85.9	12.8	0.1	8.0	368.1	40.5	0.1	0.2	52.0	7.8	1.5	9.6	0.1	0.0	713.7
2007	12	1711	3.6	80.5	66.7	9.0	14.8	140.9	22.6	0.5	11.8	331.3	46.9	0.6	0.2	68.5	11.8	2.5	8.6	0.6	0.0	821.0
2008	11	2288	2.2	72.6	44.0	7.7	18.1	116.7	17.4	0.7	9.6	170.5	29.3	0.7	0.0	85.4	19.9	3.4	7.5	0.2	0.0	612.5
2009	9	2313	4.2	89.5	35.6	6.5	17.1	130.5	24.4	0.5	18.0	188.0	39.5	0.3	0.2	96.8	13.9	2.9	7.0	0.0	0.0	675.1
2010	14	2329	8.4	106.0	61.1	7.4	16.4	179.6	23.5	0.6	12.5	316.6	33.2	0.0	0.2	64.9	26.3	3.0	8.8	0.4	0.0	869.3
2011	13	2061	5.7	70.1	45.6	13.1	19.2	152.7	21.7	0.8	14.3	278.5	38.6	0.2	0.1	144.4	28.4	2.3	10.0	0.5	0.0	846.3
2012	11	2107	4.0	86.9	38.5	11.5	19.8	119.4	25.7	1.0	11.5	206.3	47.6	0.0	0.2	85.8	17.8	2.3	10.9	0.0	0.0	689.9
2013	10	1568	1.4	69.3	56.9	9.9	21.9	86.3	12.4	1.3	17.9	257.4	37.6	0.4	0.1	98.5	13.1	1.5	9.4	0.3	0.0	695.4
2014	8	1320.92	3.2	73.4	81.2	15.1	23.9	145.9	17.9	0.8	27.0	388.8	42.8	0.3	0.2	97.1	18.6	3.3	9.8	0.5	0.2	949.7
2015	11	1386.25	2.2	92.1	71.1	15.3	21.1	86.9	17.2	0.4	18.1	387.7	30.6	0.6	0.1	68.2	13.4	2.4	11.0	0.7	0.1	839.1
2016	10	1430	3.0	65.9	65.9	13.7	23.1	127.8	15.3	0.2	10.1	339.1	33.6	0.1	0.1	67.6	16.3	2.7	7.0	0.3	0.0	791.7
AVE	**14.4**	**1696.8**	**2.5**	**71.4**	**50.1**	**5.8**	**17.0**	**142.5**	**18.7**	**0.7**	**13.4**	**345.0**	**43.2**	**0.3**	**0.1**	**105.4**	**15.3**	**1.9**	**11.8**	**0.2**	**0.0**	**846.3**

Daily Counts at the Ten Northeastern Watch Sites, Spring 2016

KERRS RIDGE, BOCABEC, NEW BRUNSWICK, CA

Todd Watts

Days	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PG	UR	MK	TOT
3/12	2	0	3	0	3	0	0	0	0	0	0	3	0	0	0	0	0	0	0	**9**
3/27	3	0	6	0	3	1	0	0	0	0	0	3	0	0	1	0	0	0	0	**14**
3/30	2.5	0	3	0	2	0	1	0	0	1	0	4	0	0	0	0	0	1	0	**12**
3/31	2.3	0	9	0	0	0	1	0	0	0	0	8	0	0	1	0	0	1	0	**20**
4/9	2	0	6	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	**9**
4/17	3.8	0	3	9	1	26	25	0	0	0	61	5	0	0	29	0	2	2	0	**163**
4/18	1.5	0	0	2	0	6	7	0	0	0	1	0	0	0	1	0	0	0	0	**17**
4/22	4.8	0	0	14	1	4	31	0	0	0	123	5	0	0	29	0	2	3	0	**212**
4/29	4	0	0	5	0	1	8	0	0	0	70	0	0	0	2	3	0	0	0	**89**
TOT	**25.8**	**0**	**30**	**30**	**10**	**40**	**73**	**0**	**0**	**1**	**256**	**28**	**0**	**0**	**63**	**3**	**4**	**7**	**0**	**545**
2015	23.3	0	10	103	4	15	60	0	0	1	476	6	0	0	18	6	0	13	0	712

COOPER, ME

Karen E. Holmes

Days	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PG	UR	MK	TOT
3/27	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
3/30	8.5	0	4	0	8	0	0	0	0	0	0	0	0	0	0	0	1	0	0	**13**
4/4	6.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4/5	3.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4/6	3	0	4	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**6**
4/9	5	0	5	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**8**
4/10	4.5	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	**4**
4/14	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4/15	2	0	1	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	**4**
4/16	2.5	0	3	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	**7**
4/18	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4/21	4	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	**2**
4/22	4	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	**2**
4/25	3	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	**2**
4/29	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4/30	3	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
TOT	**61**	**0**	**20**	**3**	**18**	**3**	**1**	**1**	**0**	**0**	**2**	**0**	**0**	**1**	**1**	**0**	**1**	**1**	**0**	**52**
5YrAve	50	1	11	4	10	2	6	2	0	0	6	1	0	0	3	1	0	5	0	51

PLUM ISLAND, NEWBURYPORT, MA

Ted Mara, Craig Jackson, Bob Secatore, Mark Schoene, Ursula Goodine, Paul Roberts, Maryellen Stone, others

Date	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PG	UR	MK	TOT
3/18	4.5	0	17	0	4	5	0	0	0	0	0	8	0	0	2	0	0	0		**36**
3/29	7.5	0	6	0	0	7	0	0	0	0	0	0	0	0	0	1	1	0	0	**15**
3/30	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3/31	7.8	0	2	2	0	0	1	1	0	0	0	3	0	0	15	2	0	0	0	**26**
4/2	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
4/5	7.8	2	23	0	0	3	0	0	0	0	0	1	0	0	1	0	0	0	0	**30**
4/6	7	0	0	0	1	10	0	0	0	0	0	0	0	0	2	2	0	0	0	**15**
4/8	9	0	15	9	1	3	2	4	0	0	0	2	0	0	44	4	0	1	0	**85**
4/9	5.8	0	28	1	0	7	1	1	0	0	0	0	0	0	6	0	0	1	0	**45**
4/10	7.5	0	4	0	0	4	1	3	0	0	0	2	0	0	3	2	1	0	0	**20**
4/11	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	**2**
4/13	3.8	0	0	0	0	9	0	1	0	0	0	0	0	0	8	1	0	0	0	**19**
4/16	6.5	0	5	0	0	7	1	0	0	0	0	0	0	0	16	2	0	0	0	**31**
4/17	5.3	0	0	0	0	0	0	1	0	0	0	0	0	0	10	0	0	0	0	**11**
4/18	5.5	0	1	3	0	2	0	1	0	0	0	0	0	0	29	4	0	0	0	**40**
4/19	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	**1**
4/20	7	0	0	0	0	8	2	0	0	0	0	0	0	0	21	4	1	0	0	**36**
4/21	6	0	13	3	0	5	3	1	0	0	0	2	0	0	8	1	0	3	0	**39**
4/22	6.5	0	0	0	1	8	4	0	0	0	0	0	0	0	20	4	2	1	0	**40**
4/23	7.8	0	12	1	0	5	1	2	0	0	0	1	0	0	12	7	0	1	0	**42**
4/24	7.8	0	1	1	0	6	1	1	0	0	0	0	0	0	22	4	0	4	0	**40**
4/25	7.3	0	0	0	0	4	1	2	0	0	0	2	0	0	1	0	0	1	0	**11**
4/27	6.8	0	4	3	0	3	6	2	0	0	0	0	0	0	8	3	1	1	0	**31**
4/28	5.5	0	1	1	0	5	6	4	0	0	0	0	0	0	4	7	0	1	0	**29**
4/30	4.3	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	**3**
5/9	10.3	0	0	7	1	9	224	20	0	0	1	0	0	0	32	25	3	11	0	**333**
5/10	7	0	0	1	0	1	47	6	1	0	0	0	0	0	5	7	0	2	0	**70**
5/15	6.5	0	5	3	0	3	0	1	0	0	0	0	0	0	2	1	0	0	0	**15**
TOT	**167**	**2**	**137**	**37**	**8**	**115**	**301**	**51**	**1**	**0**	**1**	**21**	**0**	**0**	**274**	**81**	**10**	**27**	**0**	**1066**
10YrAv	122	0	38	33	3	94	124	12	0	0	1	4	1	0	543	61	7	14	0	937

BRADBURY MOUNTAIN, POWNAL, ME

Anna Stunkel, Derek Lovitch, Jeannette Lovitch, Tom Downing, Zane Baker, others

Date	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PG	UR	MK	TOT
3/16	7.8	0	16	0	8	0	0	4	1	2	0	4	0	0	0	0	0	0	0	**35**
3/17	6.5	0	10	0	6	0	3	1	0	12	0	29	0	0	0	0	0	2	0	**63**
3/18	8.3	0	9	0	8	0	3	10	0	3	0	51	0	0	0	0	0	1	0	**85**
3/19	8	0	9	0	3	0	1	3	0	2	0	14	0	0	0	0	0	1	0	**33**
3/20	8	0	13	0	1	0	1	2	0	2	1	10	0	0	0	0	0	2	0	**32**
3/21	1.8	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	**3**
3/22	8	0	38	0	1	1	0	1	0	1	0	6	0	0	0	0	0	0	0	**48**
3/23	8	0	16	0	3	0	0	0	0	2	0	0	0	0	0	0	0	0	0	**21**
3/24	6.5	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	**3**
3/26	8.3	0	23	0	3	4	1	4	0	12	0	19	0	0	2	1	0	3	0	**72**
3/27	8	0	19	0	5	2	6	7	0	4	0	17	0	0	1	0	0	0	0	**61**
3/28	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3/29	8	0	9	0	1	0	3	1	1	1	0	4	0	0	0	0	0	0	0	**20**
3/30	8	0	24	0	3	6	12	4	0	4	0	14	0	0	5	0	0	2	0	**74**
3/31	8	0	35	2	3	4	9	6	0	4	0	13	0	0	27	2	0	3	0	**108**
4/1	7.5	0	14	6	0	2	7	1	0	1	0	6	0	0	12	1	0	0	0	**50**
4/2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4/4	3.3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	**1**
4/5	8	0	12	2	0	0	1	0	0	1	0	2	0	0	3	0	0	0	0	**21**
4/6	8	0	5	1	0	0	2	1	0	1	0	0	0	0	2	2	0	1	0	**15**
4/7	2.5	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	**2**
4/8	7.5	0	3	8	1	2	4	1	0	0	0	4	0	0	4	0	0	0	0	**27**
4/9	8	0	2	1	4	0	6	2	0	1	0	1	0	0	7	0	0	0	0	**24**
4/10	8	0	1	3	0	1	6	2	0	3	0	2	0	0	1	1	0	1	0	**21**
4/11	5.8	0	0	5	0	2	5	0	0	0	2	0	0	0	2	1	0	0	0	**17**
4/13	8	0	1	14	2	4	23	1	0	5	6	4	0	0	7	0	0	2	0	**69**
4/14	8.3	0	0	27	0	2	18	0	0	2	16	2	0	0	5	1	0	0	0	**73**
4/15	8	0	0	18	0	2	12	0	0	2	12	1	0	0	6	0	0	1	0	**54**
4/16	8.5	0	0	33	0	8	19	1	0	1	54	0	0	0	9	0	0	3	0	**128**
4/17	8.8	0	0	57	1	7	69	2	0	1	146	14	0	0	43	0	0	3	0	**343**
4/18	8	0	0	36	0	5	30	1	0	2	86	1	0	0	25	0	0	0	0	**186**
4/19	8.3	0	0	30	2	8	26	0	0	0	40	1	0	0	5	2	0	0	0	**114**
4/20	8	0	0	14	0	2	18	0	0	1	83	5	0	0	4	1	0	0	0	**128**
4/21	10.5	0	0	81	1	33	186	2	0	3	447	3	0	0	186	24	1	13	0	**980**
4/22	9	0	0	30	0	22	92	1	0	0	396	4	0	0	32	8	0	0	0	**585**
4/23	8	0	0	12	0	1	4	0	0	0	34	1	0	0	0	0	0	0	0	**52**
4/24	8.3	0	0	20	1	1	12	1	0	1	50	1	0	0	7	2	0	0	0	**96**
4/25	10	0	0	17	1	2	26	1	0	0	159	0	0	0	4	2	0	1	0	**213**
4/27	8.3	0	0	9	0	2	26	0	0	0	98	1	0	0	5	5	0	2	0	**148**
4/28	8	0	0	7	0	0	13	1	0	0	160	0	0	0	4	7	0	0	0	**192**
4/29	8	0	0	10	0	0	5	1	0	0	18	0	0	0	0	1	0	0	0	**35**
4/30	8	0	0	7	0	0	19	0	0	0	34	1	0	0	4	0	0	2	0	**67**
5/1	6.3	0	0	3	0	0	7	1	0	0	17	3	0	0	2	0	0	0	0	**33**
5/3	8	0	0	1	0	0	3	0	0	0	14	0	0	0	1	0	0	0	0	**19**
5/4	8	0	0	4	0	0	1	1	0	0	2	0	0	0	0	0	0	0	0	**8**
5/5	8	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
5/6	8	0	0	8	0	0	5	0	0	0	7	0	0	0	2	0	0	0	0	**22**
5/7	8	0	0	3	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	**5**
5/8	2.8	0	0	2	0	0	2	0	0	0	5	0	0	0	1	5	0	0	0	**15**
5/9	8.3	0	0	12	5	3	31	0	0	0	131	1	0	0	3	3	0	1	0	**190**
5/10	8.3	0	0	9	0	2	9	1	0	0	41	0	0	0	3	0	0	0	0	**65**
5/11	8	0	0	4	1	1	10	0	0	0	15	0	0	0	0	0	0	0	0	**31**
5/12	8	1	0	5	0	0	2	1	0	0	18	0	0	0	1	4	0	1	0	**33**
5/13	5.5	0	0	3	0	0	2	0	0	1	1	1	0	0	0	0	0	0	0	**8**
5/14	8	0	0	3	0	2	2	1	0	0	18	2	0	0	3	2	0	2	0	**35**
5/15	8	0	0	4	3	1	1	0	0	0	11	0	0	0	0	0	0	0	0	**20**
5/20	2	0	0	0	0	0	2	1	0	0	1	0	0	0	0	1	0	0	0	**5**
TOT	**416**	**1**	**260**	**513**	**68**	**132**	**746**	**70**	**2**	**75**	**2124**	**245**	**0**	**0**	**429**	**77**	**1**	**47**	**0**	**4790**
12YrAv	348	1	190	349	56	73	567	54	6	64	1267	200	1	0	286	51	4	37	0.3	3206

PILGRIM HEIGHTS, TRURO, MA

Donald Manchester, Michael Brokenshire, others

Date	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PG	UR	MK	TOT
4/8	3	0	3	0	0	1	1	1	0	0	0	2	0	0	0	1	0	0	0	**9**
4/10	3	0	11	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	**12**
4/11	3	0	10	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	**14**
4/13	4	0	15	0	0	0	2	0	0	0	0	1	0	0	1	0	0	0	0	**19**
4/17	4	0	9	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	**10**
4/18	3	0	8	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	**11**
4/21	6	0	30	0	0	3	7	1	0	0	4	9	0	0	11	3	0	0	0	**68**
4/22	4	0	10	3	0	0	6	1	0	0	0	1	0	0	2	2	0	0	0	**25**
4/24	3	0	8	0	0	0	1	1	0	0	0	0	0	0	5	4	1	0	0	**20**
4/27	4.5	0	5	1	0	0	5	1	0	0	0	7	0	0	2	0	0	0	0	**21**
4/28	4	0	17	3	0	0	2	0	0	0	0	2	0	0	1	1	0	0	0	**26**
4/30	3	0	7	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	**10**
5/9	6	0	3	15	1	1	47	0	0	0	5	0	0	0	1	0	0	0	0	**73**
5/10	7	0	16	9	0	1	26	0	0	1	8	2	0	0	5	8	0	0	0	**76**
5/11	4	0	15	2	0	0	1	0	0	0	0	0	0	0	4	0	0	0	0	**22**
5/14	4	0	18	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	**21**
5/15	4	0	7	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	**10**
5/17	7	0	14	10	0	1	25	0	0	0	49	0	0	0	0	2	2	0	0	**103**
5/18	2	0	10	1	0	0	2	0	0	0	1	0	0	0	0	1	1	0	0	**16**
5/19	4	0	2	4	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	**9**
5/20	6	0	13	3	1	0	0	0	0	0	8	1	0	0	0	0	0	0	0	**26**
5/21	5	0	10	4	0	0	3	0	0	0	31	1	0	0	0	0	1	0	0	**50**
5/26	4	0	16	8	0	0	1	3	0	0	18	2	0	0	0	0	0	0	0	**48**
5/27	4	0	9	7	0	0	1	2	0	1	24	2	0	0	0	0	0	0	0	**46**
5/28	5	0	7	6	0	0	0	1	0	0	11	0	0	0	0	0	0	0	0	**25**
5/29	2	0	6	3	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2	**13**
6/6	5	0	5	0	0	0	1	0	0	0	11	1	0	0	0	0	0	0	1	**19**
6/7	4	0	5	4	0	0	1	0	0	0	22	1	0	0	0	0	0	0	1	**34**
6/15	4	1	28	4	0	0	0	0	0	0	7	1	0	0	0	0	0	0	0	**41**
TOT	**122**	**1**	**317**	**90**	**2**	**7**	**140**	**12**	**0**	**2**	**200**	**38**	**0**	**0**	**35**	**23**	**6**	**0**	**4**	**877**
18YrAv	269	2	571	134	16	27	332	54	2	11	270	96	1	0	190	50	12	24	4	1796

BARRE FALLS, BARRE, MA

Donna Schilling, David Grant, others

Date	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PG	UR	MK	TOT
3/30	4.5	0	4	0	1	0	0	2	0	0	0	2	0	0	0	1	0	0	0	**10**
4/8	3.5	0	0	4	1	0	0	0	0	0	0	3	0	0	0	0	0	0	0	**8**
4/9	4	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
4/13	5	0	3	6	1	0	0	0	0	0	0	3	0	0	2	0	0	1	0	**16**
4/14	4	0	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	1	0	**4**
4/15	5	0	3	0	0	2	0	1	0	1	0	2	0	0	0	0	0	0	0	**9**
4/16	5	0	0	0	0	0	1	1	0	0	0	1	0	0	3	0	1	2	0	**9**
4/17	2	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	**3**
4/18	6	0	0	2	1	0	4	0	0	0	46	1	0	0	1	0	0	2	0	**57**
4/19	5	0	0	2	0	0	6	0	0	0	12	5	0	0	3	0	0	4	0	**32**
4/21	4	0	0	1	0	0	0	0	0	0	18	0	0	0	1	0	0	0	0	**20**
4/22	4	0	0	1	0	1	1	0	0	1	8	0	0	0	1	0	0	0	0	**13**
4/23	5	0	0	1	0	1	3	0	0	1	10	0	0	0	3	0	0	1	0	**20**
4/24	3	0	0	1	0	0	2	0	0	0	4	0	0	0	0	0	0	0	0	**7**
4/25	5	0	0	1	2	0	4	0	0	0	84	0	0	0	0	0	0	0	0	**91**
4/27	3	0	0	1	0	0	0	0	0	0	5	0	0	0	1	0	0	0	0	**7**
4/28	4	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	**4**
4/29	4	0	1	0	2	0	0	0	0	0	4	0	0	0	0	0	0	0	0	**7**
TOT	**76**	**0**	**11**	**22**	**8**	**4**	**23**	**4**	**0**	**3**	**197**	**19**	**0**	**0**	**15**	**1**	**1**	**11**	**0**	**319**
14YrAv	127	0	61	104	17	14	128	14	1	16	693	95	0	0	50	6	1	14	0	1215

JOHNNYCAKE MOUNTAIN, BURLINGTON, CT

Ken Merrifield, Rick Roach, Dana Campbell

Date	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PG	UR	MK	TOT
4/16	3	0	0	0	1	0	3	5	0	0	4	18	0	0	6	0	0	0	0	**37**
4/17	4	7	0	6	4	1	5	0	0	0	31	23	0	0	6	0	0	0	0	**83**
4/18	3	0	0	4	1	0	1	4	0	0	9	18	0	0	1	0	0	0	0	**38**
4/21	5	4	0	5	1	0	4	2	0	1	27	0	0	0	0	0	0	0	0	**44**
4/22	5	0	0	3	2	0	3	4	0	1	63	12	0	0	0	0	0	0	0	**88**
4/23	5	0	0	3	2	0	1	3	0	0	47	12	1	0	3	0	0	0	0	**72**
4/24	4	0	0	0	0	0	0	1	0	0	11	6	0	0	3	0	0	0	0	**21**
4/25	3	0	0	2	2	0	2	2	0	1	20	0	0	0	0	0	0	0	0	**29**
4/27	3	1	0	3	0	0	0	1	0	0	11	0	0	0	0	0	0	0	0	**16**
4/30	4	4	0	3	0	1	4	2	0	1	29	0	0	0	3	0	0	0	0	**47**
TOT	**39**	**16**	**0**	**29**	**13**	**2**	**23**	**24**	**0**	**4**	**252**	**89**	**1**	**0**	**22**	**0**	**0**	**0**	**0**	**475**
5YrAv	16	2	3	9	5	0	10	6	0	0	163	1	1	0	6	1	1	3	0	211

HOOK MOUNTAIN, ROCKLAND LAKE, NY

Ajit I. Antony, Steven Bauer, Liza Antony, Steve Walter, Vince Plogar

Date	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PG	UR	MK	TOT
4/8	2	0	3	0	2	0	0	0	0	0	0	2	0	0	0	0	1	0	0	**8**
4/10	3.25	0	0	2	3	0	1	2	0	0	1	3	0	0	1	0	3	0	0	**16**
4/18	2	0	0	1	1	0	0	2	0	2	12	0	0	0	1	0	0	0	0	**19**
4/19	8	0	0	7	0	0	15	0	0	1	86	2	0	0	11	4	2	0	0	**128**
4/21	2.5	0	0	3	2	1	7	1	0	1	12	0	0	0	2	2	0	1	0	**32**
4/23	4.75	0	0	2	0	0	2	0	0	0	50	0	0	0	0	0	0	0	0	**54**
4/24	6.25	0	0	11	8	0	25	4	0	0	137	7	0	0	0	3	4	1	0	**200**
4/25	3	0	0	0	0	0	17	1	0	0	46	0	0	0	4	0	0	0	0	**68**
TOT	**31.8**	**0**	**3**	**26**	**16**	**1**	**67**	**10**	**0**	**4**	**344**	**14**	**0**	**0**	**19**	**9**	**10**	**2**	**0**	**525**
10YrAv	22	1	9	20	5	7	62	8	0	13	708	20	0	0	28	4	1	6	0	893

MONTCLAIR, NJ

Bruce McWhorter, Ray Gilbert, Alex Bernzweig

Date	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PG	UR	MK	TOT
3/16	7	0	0	1	0	0	4	1	0	1	0	0	0	0	0	0	0	0	0	**7**
3/17	8	0	74	2	0	0	3	4	0	13	0	3	0	0	1	1	1	0	0	**102**
3/18	7	0	0	0	0	0	10	0	0	12	0	0	0	0	4	1	0	0	0	**27**
3/19	7	0	0	1	2	0	11	2	0	10	0	0	0	0	1	0	1	0	0	**28**
3/20	5	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
3/21	7	0	0	0	1	0	9	0	0	0	0	0	0	0	0	0	0	0	0	**10**
3/22	6	7	0	0	0	0	4	1	0	2	0	0	0	0	0	0	0	0	0	**14**
3/23	8	0	10	5	1	3	13	1	0	4	0	0	0	0	5	1	0	0	0	**43**
3/24	5	3	4	3	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	**12**
3/25	3	0	30	7	0	1	2	0	0	1	0	0	0	0	1	0	0	0	0	**42**
3/26	5	0	0	1	1	1	2	1	0	3	0	0	0	0	2	0	0	0	0	**11**
3/27	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
3/30	7	0	0	2	2	0	5	0	0	1	0	0	0	0	1	0	0	0	0	**11**
3/31	6	0	10	7	0	1	2	0	0	0	0	3	0	0	0	0	0	0	0	**23**
4/1	4	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
4/2	6	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	**3**
4/3	2.5	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
4/5	7	0	0	2	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	**5**
4/6	7	0	28	19	4	4	6	1	0	1	0	0	0	0	16	5	0	0	0	**84**
4/8	6	0	0	3	0	1	1	1	0	0	0	0	0	0	1	0	0	0	0	**7**
4/9	4	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
4/10	7	0	0	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	**4**
4/11	5	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	**2**
4/13	8	0	0	2	0	0	7	1	0	0	73	0	0	0	8	4	0	0	0	**95**
4/14	6	0	0	1	0	0	4	0	0	0	8	0	0	0	2	0	0	0	0	**15**
4/15	7	0	0	1	2	0	8	0	0	0	8	0	0	0	2	0	0	0	0	**21**
4/16	7	0	0	8	1	1	9	0	0	0	20	0	0	0	6	2	0	0	0	**47**
4/17	5	0	0	1	0	1	2	0	0	0	3	0	0	0	0	0	0	2	0	**9**
4/18	7	7	0	4	1	0	4	0	0	0	16	0	0	0	3	0	0	0	0	**35**
4/19	7	5	0	9	1	0	30	1	0	0	58	0	0	0	13	3	0	0	0	**120**
4/20	7	0	0	2	1	2	28	1	0	0	47	0	0	0	6	1	0	0	0	**88**
4/21	7	0	0	2	5	2	19	0	0	1	24	0	0	0	2	1	1	0	0	**57**
4/22	7	0	0	5	2	2	11	0	0	0	19	0	0	0	3	0	1	0	0	**43**
4/23	5	0	0	4	0	0	5	2	0	0	115	0	0	0	2	1	2	2	0	**133**
4/24	7	0	0	3	1	1	10	2	0	0	75	0	0	0	4	4	0	0	0	**100**
4/25	6	0	5	9	0	1	20	0	0	0	47	0	0	0	2	2	0	0	0	**86**
4/26	7	0	3	18	0	0	46	1	0	0	127	0	0	0	3	2	0	0	0	**200**
4/27	7	0	0	6	6	2	39	1	0	0	261	0	0	0	1	2	0	0	0	**318**
4/28	7	0	0	3	2	0	7	0	0	0	9	0	0	0	0	3	0	0	0	**24**
4/29	6	0	0	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	**3**
4/30	7	0	0	2	0	0	1	0	0	0	10	0	0	0	2	0	0	0	0	**15**
5/5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	**1**
5/8	7	0	0	15	7	2	60	0	0	0	112	0	0	0	5	5	0	0	0	**206**
5/9	7	0	0	2	7	1	14	0	0	0	7	0	0	0	0	0	0	0	0	**31**
5/10	7	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	**3**
5/11	7	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	**1**
5/12	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5/13	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5/14	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5/15	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
TOT	**307**	**22**	**164**	**159**	**49**	**26**	**399**	**25**	**0**	**50**	**1043**	**6**	**0**	**0**	**100**	**39**	**6**	**4**	**0**	**2092**
27YrAv	332	22	336	188	12	42	430	59	0	61	1625	138	0	0	279	23	5	39	0.1	3265

WILDCAT RIDGE, HIBERNIA, NJ

Tom Gorman, Frank Budney, Kevin McCarthy, Fred Vanderburgh, others

Date	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PG	UR	MK	TOT
3/1	3	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	**4**
3/5	5	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
3/6	5	0	0	6	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	**8**
3/8	5	0	0	0	1	0	4	1	0	1	0	5	0	0	0	0	0	0	0	**12**
3/9	3.5	0	0	0	0	0	1	1	0	2	0	1	0	0	0	0	0	0	0	**5**
3/12	5	0	0	1	0	0	1	0	0	1	0	3	0	0	0	0	0	0	0	**6**
3/13	6	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
3/16	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3/19	4.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3/20	5	0	0	2	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	**5**
3/22	4.5	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	**1**
3/24	4	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	**2**
3/29	3.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3/30	4.75	0	0	0	1	0	2	0	0	1	0	2	0	0	0	0	0	0	0	**6**
4/3	5	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	**2**
4/5	3.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4/9	4.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4/10	6.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4/13	5.25	0	0	3	0	0	3	3	0	0	29	1	0	0	1	0	0	0	0	**40**
4/14	4.25	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	**3**
4/15	4	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	**3**
4/16	9	0	0	1	0	0	2	3	0	0	20	0	0	0	1	0	0	0	0	**27**
4/17	9	0	0	3	0	0	6	3	0	0	56	0	0	0	1	0	0	0	0	**69**
4/18	5	0	0	2	0	0	4	0	0	0	23	0	0	0	0	0	0	0	0	**29**
4/19	6	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	**3**
4/20	5.25	0	0	3	0	0	9	1	0	0	5	0	0	0	1	0	0	0	0	**19**
4/21	6.25	0	0	4	0	0	2	1	0	0	45	0	0	0	1	0	0	0	0	**53**
4/22	4.75	0	0	2	0	0	2	1	0	1	21	0	0	0	1	0	0	0	0	**28**
4/23	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4/24	5	0	0	0	0	0	6	0	0	0	162	0	0	0	0	0	0	0	0	**168**
4/25	6	0	0	5	0	0	2	1	0	0	53	0	0	0	0	0	0	0	0	**61**
4/28	4	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	**3**
4/30	7	0	0	2	0	0	1	0	0	0	11	1	0	0	0	0	0	0	0	**15**
5/8	4	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	**3**
5/9	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
5/12	5	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
5/14	4	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	**2**
5/15	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
TOT	**185**	**1**	**0**	**34**	**4**	**1**	**54**	**22**	**0**	**6**	**430**	**20**	**0**	**0**	**8**	**0**	**0**	**1**	**0**	**581**
14YrAv	209	8	17	43	9	7	104	25	0	11	446	64	0	0	28	1	1	13	0	779

2016 Northeast Fall Season

During the Fall 2016 hawk watch season, dedicated watchers at 37 sites from Greenlaw Mountain in New Brunswick to Chimney Rock in New Jersey searched the skies for 9,976 hours and counted 141,113 hawks, averaging 87 hawks per day of coverage. This represents an effort equivalent to the last ten years, but 50% greater than the 35 year average.

The Sites

The watch sites span latitudes from N 45.1 in the north to N 40.5 in the south, and are organized here into six regions, named for their southern-most latitudes. Thus, Region 44 includes sites north of latitude N 44, Region 43 north of latitude N 43, Region 42 north of latitude N 42, etc. Regions 44 and 43 have five sites each. Region 42 has nine sites, Region 41 has 11 watch sites, and Region 40 has four sites. In addition to these five regions is the Coastal Region, which includes three sites along the southern coastline, overlapping Regions 40 and 41.

Note: **XBWV**=Total Hawks minus BW, BV & TV

Region 44

21% of hawks, 12% of XBWV, 161 hawks/day, 30 hawks/hour, 30 XBWV/day

Along with Greenlaw Mountain, Region 44 includes four sites in Maine: Cooper, Cadillac Mountain, Clarry Hill, and Harpswell Peninsula. This region counted 21% of all hawks in the Northeast and averaged 161 total hawks/day, both higher than in 2015, and 30 hawks/day without Broadwings and Vultures (XBWV). **Greenlaw** increased their hours of coverage by 25% and were rewarded with their highest counts for Turkey Vultures, Bald Eagles, Northern Harriers, and Broad-winged Hawks, and had three specialties—22 Northern Goshawks, one Rough-legged Hawk, and two Golden Eagles. **Cooper** increased effort for the 2nd year in a row, added their first Osprey, and counted record numbers of eagles for the site—15 Bald Eagles and one Golden. **Cadillac Mountain** decreased their effort by 25%, resulting in below average counts for most species, with two exceptions—a record 57 Bald Eagles and above average 1490 Broad-winged Hawks. Although their 330 American Kestrels were well below their average, it was the second highest count in the Northeast. **Clarry Hill** had another season with exceptional counts. Their counts were lower than last year, yet they had the highest regional total count of 15,089 hawks, and the highest counts for three species—313 Bald Eagles, 12,526 Broad-winged Hawks, and eight Golden Eagles. In addition, they counted four Northern Goshawk, one Rough-legged Hawk, and a Swainson's Hawk on Sep. 27, the 2nd seen in the Northeast in 2016. With fewer days and hours than last year, **Harpswell Peninsula** had their third highest count for Broad-winged Hawks since 1981. While all other species were below average, the Broadwing numbers brought the count for total hawks up to the 10 year average.

Region 43

21% of hawks, 15% of XBWV, 138 hawks/day, 19 hawks/hour, 32 XBWV/day

Region 43 includes Putney Mountain in Vermont and four sites in New Hampshire: Interlakes School, Concord School, Carter Hill, and Pack Monadnock. Region 43 counted 21% of all hawks in the Northeast, averaging 138 total hawks/day and 32 XBWV/day. Both schools continued the same level of coverage in 2016 as in other years. **Interlakes School** had above average Broadwings, while counts at **Concord School** were slightly below average. Once again, these sites just missed the big flights this year, which were south of their locations. With 5045 Broad-winged Hawks, **Carter Hill** was once again at the northern edge of this year's Broadwing flight. While Osprey and Sharp-shinned Hawk were below average, all other species were at or above average, and they topped off their season with 12 Goshawk, a Roughleg, and a record three Golden Eagles. **Pack Monadnock** had another good season, with 10530 Broad-winged Hawks, the second

highest count in the Northeast. This was their fourth highest Broadwing count and the fourth year since 2011 with more than 10000 Broadwings. They set new site records for two species: 322 Turkey Vultures and 136 Bald Eagles. Their 48 Northern Goshawks tied the 2015 count, and was the maximum for the Northeast. They also counted one Roughleg and five Goldens. **Putney Mountain**, also at the northern edge of the Broadwing flight, had a good season with a site record Broadwing count of 6434, and other site records of 132 Bald Eagles, and 46 Northern Goshawks. They counted an impressive 590 Red-tailed Hawks and three Roughlegs, both the highest for the Northeast.

Region 42

13% of hawks, 7% of XBWV, 95 hawks/day, 18 hawks/hour, 18 XBWV/day

Region 42 includes Helderberg in New York, Booth Hill and Suffield WMA in Connecticut, and six sites in Massachusetts: Mount Watatic, Wachusett, Pinnacle Rock, Barre Falls, Shatterack Mountain, and Blueberry Hill. Region 42 counted 13% of all hawks in the Northeast, averaging 95 total hawks/day and 18 XBWV/day. In contrast to 2015, **Mount Watatic** had a below average season for most species. The two exceptions with numbers well above their 10 year average were Turkey Vultures (168) and Bald Eagles (51). **Helderberg** had only half the coverage of recent years, resulting in below average counts for all species. **Wachussett** had a good season with above average counts for Turkey Vultures (215), Bald Eagles (163), Red-shouldered Hawks (18), and Peregrine Falcons (35). Their Merlin (32) and Peregrine counts were their 2nd highest since 1980. In addition, they counted a Swainson's Hawk on Sep 20, the first of only two seen in the Northeast for the whole season. **Pinnacle Rock** had below average counts for most species, with two exceptions. Their counts for Bald Eagle (10) and Cooper's Hawks (42) were their 2nd highest since 1998. **Barre Falls** had below average counts for all species except Turkey Vulture. They had low counts for the site for three species—267 Sharp-shinned Hawks, 45 Osprey, and 36 American Kestrel. They did count a Goshawk to highlight the season. **Shatterack Mountain** had below average counts for most species, but set a new site record of 491 Turkey Vultures. They also counted 3 Northern Goshawk and 1 Golden Eagle. On Sep 21, they counted the only Mississippi Kite in the Northeast for the Fall 2016 season. Unfortunately, coverage at **Blueberry Hill** was nominal compared to other years, resulting in very low counts compared to average. Their highlight, however, was a Golden Eagle. **Suffield WMA** counted hawks in the 2016 season with a comparable effort as their last count in 2011. With only two counts at five years apart, 2016 brought five species with higher counts than in 2011. We look forward to future data from Suffield. **Booth Hill**, our lowest latitude site in Region 42, set a new site record for Turkey Vulture (21) and tied the record for Bald Eagle (17). They also counted a Northern Goshawk.

Region 41

26% of hawks, 27% of XBWV, 67 hawks/day, 11 hawks/hour, 23 XBWV/day

Region 41 includes eleven sites, six in Connecticut and five in New York. The Connecticut sites include Middle School, Johnnycake Mountain, Chestnut Hill, White Memorial, Botsford Hill, and Quaker Ridge. The New York sites include Mohonk Preserve, Bear Mountain, Mt. Peter, Chestnut Ridge, and Hook Mountain. Region 41 counted 26% of all hawks in the Northeast, averaging 67 total hawks/day and 23 XBWV/day. **Middle School** had below average counts for most species and record low counts for Broad-winged Hawks and total hawks. **Johnnycake** had above average counts for eight species, with record highs for four: Black Vulture (35), Turkey Vulture (109), Cooper's Hawk (42), and Red-tailed Hawk (18). **Mohonk** put in greater effort than in any year since 1987 and were rewarded with record counts for six species: Black Vulture (17), Turkey Vulture (236), Bald Eagle (106), Cooper's Hawk (137), Merlin (32), and Peregrine Falcon (33). Their Broadwing count was their third highest at 3776. Other highlights included three Goshawks and one Golden. **Chestnut Hill** had above average counts for Bald Eagle (36), Sharpshins (59) and Kestrels (24), but their Broadwings were less than half of their average. White **Memorial** had another year with below average counts, with total hawks at 97. But, they also had a Golden Eagle, and a record high for Red-shouldered Hawks (27) for the 3rd year in a row. **Botsford Hill** also had below average counts for almost all species. Their exception was a record 5 Merlin for the 2nd year in a row. **Bear Mountain** had five site records, including 142 Bald Eagles, which is 25% above their previous high. Their other four records, however, were all record lows: Northern Harrier (5), Sharp-shinned Hawk (141), Broad-winged Hawk (333), and Red-tailed Hawks (40). Thankfully, they also had above average Peregrines, a Goshawk and four Golden Eagles! **Mount Peter** had a mixed year with several species above average and several below. Their 84 Black Vultures was the highest count in the Northeast, and their 5894 Broadwings ranked 6th in the Northeast. They were above average for Turkey Vulture (337) and Bald Eagle (95), but below average for Northern Harrier (35) and Merlin (15). They had record lows for both Osprey (98) and American kestrel (52), which was balanced somewhat by three Goldens. **Chestnut Ridge** put in more hours than other sites, yet had below average counts for most species, with record lows for four: Northern Harrier (39), Sharpies (473), Broadwings (945) and Kestrels (85). Their 3555 total hawks is their lowest since 1980, their first year. Their big highlights were seven Goshawks and two Goldens. **Hook Mountain** had above average counts for Osprey (353) and Merlin (81), another near record year for Bald Eagle (194) and a remarkable 19 Goshawks, the 4th highest since 1980 but far from the record of 112 Gos in 1972. Unfortunately, for the 2nd year in a row, they had a record low of 1424 Sharpies. Five

Goldens were an added highlight to the season. **Quaker Ridge** had the highest Red-shouldered Hawks (566) in the Northeast. This continues their exceptional Shoulder counts of recent years. They also counted eight Goshawks and seven Goldens, but the counts for other species were below average.

Region 40

12% of hawks, 20% of XBWV, 56 hawks/day, 9 hawks/hr, 31 XBWV/day

Region 40 includes four sites in New Jersey: State Line, Wildcat Ridge, Montclair, and Chimney Rock. Region 40 counted 12% of all hawks in the Northeast, averaging 56 total hawks/day and 31 XBWV/day. In its ninth year, **State Line** had Northeastern highs for two species—1311 Turkey Vultures and 856 Osprey, and above average counts for all species except Broad-winged Hawks and Kestrels. Season highlights were a Rough-legged Hawk, one of nine counted in the Northeast, along with five Goshawks and one Golden. **Wildcat Ridge** had record low counts for total hawks (1944) and for four species: Osprey (62), Northern Harrier (6), Sharpies (313) and Kestrels (32). Their Bald Eagles (62) and Merlins (9) were at average, and they counted three Goshawks and one Golden. **Montclair** had another slow season, with a total hawk count at one third of average and record lows for six species—182 Osprey, 31 Northern Harrier, 671 Sharp-shinned Hawk, 1074 Broad-winged Hawk, 75 Red-tailed Hawks, and 127 American Kestrel. The highlights were the two Goshawks and one Golden Eagle. **Chimney Rock** also had a slow season, with a total hawk count at one third of average and record lows for three species: Sharpies (1350), Broadwings (1807), and Kestrels (316). Nevertheless, they tied Clarry Hill for the most Golden Eagles (8) in the Northeast, and also counted 7 Goshawks

Coastal Region

7% of hawks, 19% of XBWV, 55 hawks/day, 9 hawks/hr, 51 XBWV/day

This region includes three watch sites—one on Fire Island, New York, and two along the southern shoreline of Connecticut—Lighthouse Point and Boothe Memorial Park. The Coastal Region counted 7% of all hawks in the Northeast and 19% of XBWV, averaging 55 total hawks/day and 51 XBWV/day. **Lighthouse Point** was below average for all species except Black Vulture, Turkey Vulture and Bald Eagles. In spite of this, they still achieved high counts for the Northeast for five species—294 Northern Harrier, 2434 Sharp-shinned Hawks, 1013 Cooper's Hawks, 460 American Kestrels, and 148 Peregrine Falcons. They further enjoyed counting seven Goshawks, one Roughleg, and three Goldens. **Boothe Park** had only nominal coverage this season, resulting in very low numbers. **Fire Island** had three record highs and one record low this season. The record highs include: two Black Vultures—the first ever seen at the site, six Red-tailed Hawks, and 10 Bald Eagles. The record low was 300 American Kestrels, painfully low numbers compare to years with more than 3000. Highlights included two Goshawks, but the Fire story is all about Merlins. The Merlin count of 1016 was 25% below the 10-year site average. Yet, this was not only the highest in the Northeast, it accounts for 43% of all the migrating Merlins seen in the Northeast!

Osprey. Photo by Iain MacLeod

Northeast Fall 2016 Seasonal Totals

Reg	Site	Days	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PG	UR	Othr	TOTAL	XBWV
	Greenlaw Mt NB	46	324	0	249	110	92	120	514	16	22	3	6990	211	1	2	147	34	11	87	0	8609	1370
	Cooper ME	12	57	0	31	3	15	4	6	6	0	0	20	0	0	1	6	3	0	0	0	95	44
44	Cadillac Mt ME	42	192	0	49	126	57	80	582	25	3	1	1490	37	0	1	330	54	17	55	0	2907	1368
	Clarry Hill ME	39	296	0	594	310	**313**	89	597	67	4	27	**12526**	280	1	**8**	178	38	30	26	1SW	**15089**	1969
	Harpswell ME	42	98	0	32	44	17	51	351	14	1	3	1695	12	0	0	83	73	15	32	0	2423	696
	Interlakes School NH	2	6	0	10	2	5	0	5	0	0	0	163	0	0	0	0	0	0	7	0	192	19
	Concord School NH	6	8	0	15	0	0	0	2	0	0	0	24	2	0	0	0	0	0	5	0	48	9
43	Carter Hill NH	71	527	0	244	90	98	71	551	130	12	28	5045	169	1	3	172	62	22	130	0	6828	1539
	Pack Monadnock NH	70	527	0	322	242	136	92	1126	163	**48**	117	10530	294	1	5	167	96	49	78	0	13466	2614
	Putney Mt VT	69	554	4	425	120	132	73	1385	101	46	30	6434	**590**	**3**	7	146	36	25	0	0	9557	2694
	Mount Watatic MA	14	92	0	168	75	51	7	157	24	0	1	3040	2	0	0	30	6	2	30	0	3593	385
	Helderberg NY	7	65	0	0	11	6	1	4	4	0	0	203	5	0	0	3	0	0	24	0	261	58
	Wachusett Mt MA	42	261	3	215	166	163	17	451	106	0	18	6962	64	0	0	107	32	35	125	1 SW	8465	1285
	Pinnacle Rock MA	18	72	0	6	6	10	5	103	42	0	1	9	0	0	0	6	6	1	10	0	205	190
42	Barre Falls MA	55	243	0	290	45	43	27	267	60	1	10	1123	145	0	0	36	22	8	49	0	2126	713
	Shatterack Mt MA	39	190	0	491	46	15	8	299	38	3	33	1755	132	0	1	32	11	5	12	1 MK	2882	636
	Blueberry Hill MA	9	44	0	59	3	5	2	12	8	0	3	3	17	0	1	8	0	0	2	0	123	61
	Suffield WMA CT	7	59	0	24	10	4	29	11	5	0	2	101	7	0	0	20	5	5	0	0	223	98
	Booth Hill CT	3	18	0	21	11	17	0	18	0	1	0	414	0	0	0	3	0	0	0	0	485	50
	Middle School CT	18	78	1	0	9	1	1	7	7	0	0	277	0	0	0	3	3	0	17	0	326	48
	Johnnycake Mt CT	15	66	35	109	48	49	2	56	42	0	5	1010	18	0	0	46	2	2	0	0	1424	270
	Mohonk NY	67	303	17	236	94	106	48	740	137	3	35	3776	250	0	1	74	32	33	16	0	5598	1569
	Chestnut Hill CT	19	83	0	0	18	36	2	59	5	0	0	1509	1	0	0	24	0	1	16	0	1671	162
	White Memorial CT	12	20	0	0	4	7	2	7	18	0	27	15	4	0	1	7	4	0	1	0	97	82
41	Botsford Hill CT	13	54	0	0	14	9	3	51	4	0	0	885	0	0	0	7	5	0	11	0	989	104
	Bear Mt NY	63	338	0	0	46	142	5	141	27	1	6	333	40	0	4	35	7	11	11	0	809	476
	Mount Peter NY	69	488	**84**	337	98	95	35	1104	94	0	104	5894	478	0	3	52	15	13	42	0	8448	2133
	Chestnut Ridge NY	**100**	670	64	1308	104	47	39	473	148	7	78	945	129	0	2	85	22	14	90	0	3555	1238
	Hook Mt NY	77	461	46	245	353	194	91	1424	207	19	165	2777	159	0	5	156	81	30	22	0	5974	2906
	Quaker Ridge CT	98	**733**	24	673	461	159	104	1600	343	8	**566**	3484	197	0	7	284	75	28	62	0	8075	3894
	State Line NJ	82	450	60	**1311**	**856**	160	74	1258	239	5	353	1010	539	1	1	227	61	61	106	0	6322	3941
40	Wildcat Ridge NJ	62	316	15	0	62	62	6	313	100	3	15	1264	60	0	1	32	9	2	0	0	1944	665
	Montclair NJ	83	572	21	1044	182	102	31	671	167	2	174	1074	75	0	1	127	53	23	24	0	3771	1632
	Chimney Rock NJ	75	614	0	0	272	234	73	1350	149	7	347	1807	188	0	**8**	316	188	0	21	0	4960	3153
	Lighthouse Point CT	96	611	10	496	764	234	**294**	**2434**	**1013**	7	155	213	433	1	3	**460**	305	**148**	**344**	0	7314	**6595**
CO	Boothe Memorial CT	4	13	0	0	27	2	0	2	0	0	0	1	0	0	0	0	1	0	2	0	35	34
	Fire Island NY	75	475	2	1	349	10	159	195	55	2	0	0	6	0	0	300	**1016**	121	8	0	2224	2221
	TOTALS	**1621**	**9976**	**386**	**9005**	**5181**	**2828**	**1645**	**18326**	**3564**	**205**	**2307**	**84801**	**4544**	**9**	**66**	**3709**	**2357**	**712**	**1465**	**3**	**141113**	**46921**

BV: Black Vulture, TV: Turkey Vulture, OS: Osprey, BE: Bald Eagle, NH: Northern Harrier, SS: Sharp-shinned Hawk, CH: Cooper's Hawk, NG: Northern Goshawk, RS: Red-shouldered Hawk, BW: Broad-winged Hawk, RT: Red-tailed Hawk, RL: Rough-legged Hawk, GE: Golden Eagle, AK: American Kestrel, ML: Merlin, PG: Peregrine Falcon, UR: Unidentified Raptor, XBWV: Total Hawks minus BW, BV & TV.

Note: The upcoming tables included for major sites have data for 2011 to 2016. The 10 year averages have been computed for the years 2006 to 2015, and the data from 2016 is compared as a percent change from that average. Negative numbers in the bottom row represent decreases; positive numbers represent increases. An * indicates that the numbers are too small for meaningful computation.

RECENT YEARS for MAJOR SITES, 2006-2015 AVERAGES, and % CHANGE in 2016

XBWV=Total Hawks minus BW, BV & TV; PH=Total Hawks/Hr.; XPH=XBWV/Hr.

REGION 44

Greenlaw Mountain - St. Andrews, New Brunswick (ave for 2009 - 2015, % change in 2016)

YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	M	PF	UR	TOT	XBWV	PH	XPH
2011	42	258	0	144	132	44	60	848	11	19	7	5835	241	0	1	199	33	24	73	7672	1693	29.74	6.6
2012	49	257	0	239	245	50	61	602	13	9	5	2100	332	0	0	173	48	23	79	3979	1640	15.48	6.4
2013	49	259.5	0	173	166	41	52	520	9	15	3	5405	132	0	0	200	42	12	71	6841	1263	26.36	4.9
2014	40	257.8	0	197	130	42	63	496	6	12	2	1704	148	0	1	155	44	24	70	3094	1193	12	4.6
2015	42	264.8	0	218	132	58	76	524	7	11	1	3791	106	0	1	158	35	24	83	5225	1216	19.74	4.6
2016	46	324.3	0	249	110	92	120	514	16	22	3	6990	211	1	2	147	34	11	87	8609	1370	26.55	4.2
ave 7	46	260	0	166	152	47.6	61	606	10.1	12.9	4.71	3219	190	0	0.43	172.4	40.43	20.6	77.3	4781.3	1397	18.39	5.37
%chg	1	25	*	50	-28	93	97	-15	58	71	-36	117	11	*	367	-15	-16	-47	13	80	-2	44	-21

Cadillac Mountain - Acadia National Park, Maine (ave for 2006 - 2015, % change in 2016)

YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PF	UR	TOT	XBWV	PH	XPH
2011	54	240	0	144	135	42	110	981	19	15	0	3285	93	2	0	431	77	31	57	5422	1993	22.6	8.3
2012	56	247	0	43	200	58	106	750	20	10	0	665	49	2	0	634	74	28	83	2722	2014	11.0	8.2
2013	39	174	0	27	125	53	124	1007	9	5	1	1865	43	0	1	262	39	10	88	3659	1767	21.0	10.2
2014	63	315	0	148	143	73	94	762	16	8	1	646	40	1	0	481	62	31	99	2605	1811	8.3	5.8
2015	67	281	0	79	150	27	137	1127	25	5	3	360	15	0	0	613	96	18	100	2755	2316	9.8	8.2
2016	42	192.3	0	49	126	57	80	582	25	3	1	1490	37	0	1	330	54	17	55	2907	1368	15.1	7.1
ave	56	255	0	81	168	45	140	1177	21	12	1	860	74	1	1	590	77	25	93	3364	2423	14	10
%chg	-25	-25	*	-40	-25	27	-43	-51	17	-74	0	73	-50	*	100	-44	-30	-32	-41	-14	-44	11	-26

Clarry Hill - Union, Maine (ave for 2011 - 2015, % change in 2016)

YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PF	UR	TOT	XBWV	PH	XPH
2011	34	241	0	64	268	81	60	614	51	2	15	10798	111	2	2	78	26	20	5	12197	1335	50.6	5.5
2012	24	175	0	341	195	131	37	499	53	5	44	6074	182	0	2	85	27	12	22	7709	1294	44.1	7.4
2013	23	174	0	504	220	180	81	547	36	3	31	13314	150	0	2	91	15	21	14	15209	1391	87.4	8.0
2014	27	227	0	422	245	192	113	749	84	4	40	8650	254	0	2	155	37	39	39	11025	1953	48.6	8.6
2015	35	248	0	569	215	334	126	792	59	7	47	17369	369	0	9	113	27	20	20	20076	2138	81.0	8.6
2016	39	296	0	594	310	313	89	597	67	4	27	12526	280	1	8	178	38	30	26	15089	1969	51.0	6.7
ave5	29	213	0	380	229	184	83	640	57	4	35	11241	213	0	3	104	26	22	20	13243	1622	62	8
%chg	36	39	*	56	36	70	7	-7	18	-5	-24	11	31	150	135	70	44	34	30	14	21	-18	-13

Harpswell Peninsula - Casco Bay, Maine (ave for 2004-06, 2009-2015, % change in 2016)

YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	M	PF	UR	TOT	XBWV	PH	XPH
2011	56	120.5	0	50	157	35	41	979	49	4	8	339	24	2	0	304	82	33	41	2148	1759	17.8	14.6
2012	51	114	0	24	122	30	54	790	33	2	3	263	36	0	0	158	101	37	18	1671	1384	14.7	12.2
2013	63	90	0	17	113	21	35	436	20	0	1	1724	13	0	0	84	53	13	26	2556	815	28.3	9.0
2014	59	107	0	36	40	8	35	504	11	0	5	43	17	0	0	77	59	15	53	903	824	8.5	7.7
2015	66	130	0	63	16	7	37	464	7	0	8	10	20	0	0	81	41	12	27	793	720	6.1	5.6
2016	42	97.75	0	32	44	17	51	351	14	1	3	1695	12	0	0	83	73	15	32	2423	696	24.8	7.1
ave10	57	134	0	50	143	29	69	998	35	4	9	523	37	0	1	256	129	40	44	2367	1794	18	13
%chg	-26	-27	*	-36	-69	-42	-26	-65	-60	-77	-68	224	-68	*	*	-68	-44	-62	-27	2	-61	39	-45

REGION 43

Carter Hill - Concord, New Hampshire (ave for 2008-2015, % change in 2016)

YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PF	UR	TOT	XBWV	PH	XPH
2011	54	320	0	149	107	78	32	300	117	15	13	10763	65	0	1	94	59	19	205	12017	1105	37.6	3.5
2012	65	372	1	224	234	152	86	1276	207	28	100	3671	273	2	2	305	65	44	472	7142	3246	19.2	8.7
2013	75	490	0	333	165	94	66	1197	137	18	59	8915	356	0	0	307	78	17	154	11896	2648	24.3	5.4
2014	73	471	0	170	202	82	87	1151	124	14	25	4237	221	0	0	243	64	36	222	6878	2471	14.6	5.2
2015	71	553.8	0	299	134	91	81	1164	140	21	45	6274	345	0	3	171	41	23	55	8887	2314	16.0	4.2
2016	71	527	0	244	90	98	71	551	130	12	28	5045	169	1	3	172	62	22	130	6828	1539	13.0	2.9
ave8	58	370	1	231	129	75	51	739	145	16	32	4861	179	1	1	171	52	22	258	6962	1870	18	5
%chg	22	42	*	6	-30	31	39	-25	-10	-23	-14	4	-6	*	243	1	20	-1	-50	-2	-18	-29	-40

Pack Monadnock - Peterboro, New Hampshire (ave for 2006 - 2015, % change in 2016)

YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PF	UR	TOT	XBWV	PH	XPH
2011	50	368	0	127	271	54	58	1124	145	21	43	11831	202	0	9	170	68	40	93	14256	2298	38.74	6.24
2012	76	600.8	0	164	314	105	91	1388	181	63	209	8848	522	1	7	194	108	54	75	12324	3312	20.51	5.51
2013	79	575	0	142	193	101	100	1254	146	25	118	8221	378	1	11	166	89	48	37	11030	2667	19.18	4.64
2014	71	497	0	99	213	120	85	1094	126	22	123	11043	348	1	7	112	80	39	53	13565	2423	27.29	4.88
2015	78	586.9	0	137	201	132	125	1443	115	48	141	16593	546	1	13	118	120	54	58	19845	3115	33.81	5.31
2016	70	527	0	322	242	136	92	1126	163	48	117	10530	294	1	5	167	96	49	78	13466	2614	25.55	4.96
ave10	66	495	0	116	248	81	95	1248	158	42	110	9067	375	0	8	164	87	41	73	11910	2727	24	6
%chg	7	6	*	177	-2	69	-3	-10	3	16	7	16	-22	150	-39	2	11	20	8	13	-4	4	-11

Putney Mountain - Putney, Vermont (ave for 2006 - 2015, % change in 2016)

YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PF	UR	TOT	XBWV	PH	XPH
2011	59	410	0	306	172	55	41	1510	146	34	31	4029	319	3	12	191	44	19	2	6914	2579	17	6
2012	60	454	0	143	267	95	86	1611	201	33	57	6123	824	1	9	300	63	52	1	9866	3600	22	8
2013	75	501	0	262	157	60	51	1193	106	22	35	3772	414	8	4	122	34	24	0	6264	2230	12	4
2014	68	477	0	357	131	74	76	1560	176	28	31	2297	580	1	6	219	44	43	0	5623	2969	12	6
2015	73	554	0	603	149	109	81	1624	129	19	28	5831	482	5	10	122	36	22	0	9250	2816	17	5
2016	69	554	4	425	120	132	73	1385	101	46	30	6434	590	3	7	146	36	25	0	9557	2694	17	5
ave10	64	427	0	219	171	60	63	1269	123	21	35	3818	456	3	7	171	37	32	2	6487	2449	15	6
%chg	9	30	*	94	-30	119	16	9	-18	116	-13	68	29	-6	-5	-15	-2	-22	-100	47	10	14	-16

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Mount Watatic - Ashby, Massachusetts (ave for 2006 - 2015, % change in 2016)

YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	M	PF	UR	TOT	XBWV	PH	XPH
2011	6	44	0	0	42	20	5	92	15	0	0	3195	1	0	0	17	4	1	23	3415	220	77.2	5.0
2012	9	49	0	15	29	18	4	149	30	0	2	2126	2	0	0	19	5	1	15	2415	274	49.5	5.6
2013	4	30	0	4	22	17	1	19	11	0	0	3776	0	0	0	0	0	0	1	3851	71	127.3	2.3
2014	4	23	0	0	8	12	3	32	0	0	8	3388	17	0	0	13	0	1	4	3486	98	153.2	4.3
2015	16	107	0	11	72	60	8	282	79	0	2	5723	4	0	0	38	45	8	28	6360	626	59.4	5.9
2016	14	91.75	0	168	75	51	7	157	24	0	1	3040	2	0	0	30	6	2	30	3593	385	39.2	4.2
ave10	11	76	0	16	67	25	11	217	29	1	7	4985	33	0	1	45	13	2	13	5463	462	83	6
%chg	28	20	*	931	11	107	-33	-27	-17	-100	-85	-39	-94	*	-100	-34	-53	-9	126	-34	-17	-53	-26

Helderberg Escarpment - Voorheesville, New York (ave for 2005-09, 2011-2015, % change in 2016)

YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PF	UR	TOT	XBWV	PH	XPH
2011	11	100	0	0	21	17	6	30	3	0	0	1054	8	0	0	25	3	2	35	1204	150	12.04	1.5
2012	13	100	13	17	23	21	3	24	3	1	4	2981	9	0	0	14	7	7	43	3170	159	31.7	1.6
2013	7	52	29	26	23	25	4	17	3	1	0	2164	7	0	0	5	2	2	14	2322	103	44.65	2.0
2014	15	109	7	0	21	29	5	30	2	2	0	2600	4	0	0	4	1	4	65	2774	167	25.45	1.5
2015	15	104	0	0	16	35	7	27	10	0	0	1714	20	0	0	9	2	1	49	1890	176	18.17	1.7
2016	7	65	0	0	11	6	1	4	4	0	0	203	5	0	0	3	0	0	24	261	58	4.015	0.9
ave10	14	106	6	28	20	17	4	30	5	1	0	1505	10	0	0	11	3	2	25	1668	128	17.8	1.28
%chg	-49	-39	-100	-100	-44	-64	-77	-87	-17	-100	-100	-87	-48	-100	-100	-74	-100	-100	-2	-84	-55	-77.4	-30

Wachusett - Princeton, Massachusetts (ave for 2006 - 2015, % change in 2016)

YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	M	PF	UR	TOT	XBWV	PH	XPH
2011	13	75.5	4	1	55	18	6	77	9	0	0	2364	0	0	0	5	3	2	20	2564	195	33.96	2.58
2012	32	148.5	0	0	157	48	17	223	97	0	2	7777	4	0	0	57	16	6	99	8503	726	57.26	4.89
2013	44	269.8	1	99	169	102	30	350	75	3	5	35070	46	1	0	125	29	24	100	36229	1059	134.3	3.93
2014	48	324	5	157	239	189	29	573	115	8	12	16750	50	1	3	157	35	39	113	18475	1563	57.02	4.82
2015	49	319	2	62	205	159	23	406	86	0	18	11205	52	0	5	121	30	34	81	12489	1220	39.15	3.82
2016	42	260.8	3	215	166	163	17	451	106	0	18	6962	64	0	0	107	32	35	125	8465	1285	32.46	4.93
ave10	28	177	1	32	147	66	16	251	59	1	4	8934	18	0	1	75	17	13	101	9737	770	47	4
%chg	49	47	150	570	13	146	8	80	80	-100	339	-22	248	-100	-100	43	88	171	23	-13	67	-30	14

Pinnacle Rock - Medford, Massachusetts (ave for 2006 - 2015, % change in 2016)

YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	M	PF	UR	TOT	XBWV	PH	XPH
2011	21	79.5	0	10	7	13	6	121	27	0	1	0	15	0	0	11	0	2	27	240	230	3.0	2.9
2012	16	78.5	0	7	28	5	2	58	24	0	1	1	9	0	0	14	7	5	11	172	164	2.2	2.1
2013	18	72.5	0	4	3	0	0	67	13	0	0	0	14	0	0	2	4	1	7	115	111	1.6	1.5
2014	22	99.25	0	8	9	5	4	146	28	0	3	0	11	0	0	8	5	4	20	251	243	2.5	2.4
2015	14	41.25	0	5	4	1	1	40	10	0	0	14	9	0	1	3	3	0	2	93	74	2.3	1.8
2016	18	71.5	0	6	6	10	5	103	42	0	1	9	0	0	0	6	6	1	10	205	190	2.9	2.7
ave10	18	84	0	7	19	3	7	111	23	1	2	5	19	0	0	12	6	3	22	239	227	3	3
%chg	2	-15	*	-13	-68	223	-25	-7	84	-100	-44	88	-100	*	-100	-50	-5	-69	-55	-14	-16	7	6

Barre Falls - Barre, Massachusetts (ave for 2006 - 2015, % change in 2016)

YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PF	UR	TOT	XBWV	PH	XPH
2011	49	252.8	0	254	165	78	50	1189	198	4	41	5902	322	0	5	158	49	15	37	8467	2311	33.5	9.1
2012	48	249.8	0	361	198	61	28	846	179	5	53	4730	378	1	1	174	37	20	69	7141	2050	28.6	8.2
2013	41	192.3	0	150	110	47	12	431	89	3	16	16112	59	0	1	76	15	13	27	17161	899	89.3	4.7
2014	51	238.5	0	141	75	73	20	484	84	6	25	6839	151	0	1	82	17	11	46	8055	1075	33.8	4.5
2015	53	234.8	0	94	62	48	20	273	55	3	4	3131	113	0	3	38	11	9	23	3887	756	16.6	3.2
2016	55	243	0	290	45	43	27	267	60	1	10	1123	145	0	0	36	22	8	49	2126	1003	8.7	4.1
ave10	51	261	0	250	159	62	34	870	116	6	35	5868	236	0	2	137	37	14	41	7866	1757	32	7
%chg	8	-7	-100	16	-72	-30	-20	-69	-48	-82	-71	-81	-38	-100	-100	-74	-41	-42	20	-73	-43	-73	-38

Shatterack Mountain - Russell, Massachusetts (ave for 2006 - 2015, % change in 2016)

YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PF	UR	TOT	XBWV	PH	XPH
2011	23	129.3		191	38	17	19	508	33	0	10	1230	119	0	1	42	5	3	17	2233	812	17.28	6.28
2012	18	112	0	288	124	25	12	424	29	2	7	906	52	0	0	54	14	13	15	1965	771	17.54	6.88
2013	28	141.9	0	76	45	28	13	293	37	2	13	3216	19	0	0	47	10	8	24	3831	539	26.99	3.8
2014	32	169.3	0	170	63	15	27	517	47	2	20	8942	78	0	0	58	13	16	21	9989	877	59.02	5.18
2015	43	203	0	176	32	40	19	467	34	2	23	3009	110	0	3	47	19	5	19	4005	820	19.73	4.04
2016	39	190.3	0	491	46	15	8	299	38	3	33	1755	132	0	1	32	11	5	12	2882	636	15.15	3.34
ave10	31	163	1	140	79	24	25	499	31	2	15	3091	84	0	1	61	11	8	18	4088	856	27	5
%chg	26	17	-100	251	-42	-36	-68	-40	22	88	128	-43	57	*	0	-47	5	-38	-32	-29	-26	-44	-34

Blueberry Hill - Granville, Massachusetts (ave for 2006 - 2015, % change in 2016)

YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PF	UR	TOT	XBWV	PH	XPH
2011	74	422.3	0	306	200	53	60	794	95	4	23	3339	224	0	3	310	31	18	20	5480	1835	12.98	4.35
2012	48	315	1	199	128	23	28	623	67	7	30	2158	168	0	4	247	21	6	35	3745	1387	11.89	4.4
2013	70	277	1	226	94	39	34	357	51	5	31	6346	124	0	1	142	21	6	25	7503	930	27.09	3.36
2014	44	212	0	128	49	32	49	373	77	1	40	4658	224	0	2	128	10	5	30	5804	1018	27.38	4.8
2015	47	205	0	190	46	32	28	327	39	1	24	1694	87	0	5	111	13	4	7	2608	724	12.72	3.53
2016	9	44.25	0	59	3	5	2	12	8	0	3	3	17	0	1	8	0	0	2	123	61	2.78	1.38
ave10	67	363	0	229	135	46	63	660	86	6	44	3786	264	1	5	255	25	9	34	5647	1632	16	4
%chg	-87	-88	-100	-74	-98	-89	-97	-98	-91	-100	-93	-100	-94	-100	-79	-97	-100	-100	-94	-98	-96	-79	156

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Middle School - Torrington, Connecticut (ave for 2006 - 2015, % change in 2016)

YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PF	UR	TOT	XBWV	PH	XPH
2011	18	84.3	4	2	28	7	5	34	18	1	6	2488	4	0	0	7	10	1	28	2643	149	31.4	1.8
2012	17	62.8	0	0	23	9	1	28	5	0	0	2009	0	0	0	15	4	0	19	2113	104	33.7	1.7
2013	16	72.0	0	0	13	13	0	23	11	0	0	8987	0	0	0	7	3	1	14	9072	85	126.0	1.2
2014	17	53.8	4	0	4	7	0	13	10	0	2	2185	1	0	0	4	2	0	10	2242	53	41.7	1.0
2015	15	49.8	2	7	9	7	0	4	2	0	1	1409	1	0	0	2	0	0	7	1451	33	29.2	0.7
2016	18	77.5	1	0	9	1	1	7	7	0	0	277	0	0	0	3	3	0	17	326	48	4.2	0.6
ave10	19	74	3	2	23	8	3	38	14	1	3	2896	4	0	0	15	5	1	19	3033	132	42	2
%chg	-3	4	-70	-100	-61	-87	-60	-82	-49	-100	-100	-90	-100	-100	-100	-79	-38	-100	-11	-89	-64	-90	-63

Johnnycake Mountain - Burlington, Connecticut (ave for 2006 - 2015, % change in 2016)

YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PF	UR	TOT	XBWV	PH	XPH
2011	8	42	7	0	39	22	7	72	15	1	0	5196	0	0	1	20	2	3	0	5385	182	128	4
2012	10	50	5	0	86	30	5	146	12	0	1	5905	0	0	1	47	2	2	0	6242	332	125	7
2013	11	49	0	8	59	37	0	58	3	0	0	3895	0	0	1	19	4	2	0	4086	183	83	4
2014	13	59	24	67	59	50	10	81	8	0	1	3239	6	0	0	63	2	0	0	3610	280	62	5
2015	14	58	2	4	59	40	2	58	9	0	5	1430	0	0	2	49	1	3	2	1666	230	29	4
2016	15	66	35	109	48	49	2	56	42	0	5	1010	18	0	0	46	2	2	0	1424	270	22	4
ave10	8	38	4	8	41	25	4	73	7	0	1	2892	1	0	1	32	3	2	0	3094	190	83	6
%chg	9	74	754	1280	17	94	-47	-24	500	-100	614	-65	2900	-100	-100	42	-38	18	-100	-54	42	-74	-27

Mohonk Preserve - New Paltz, New York (ave for 2004 - 2012, 2015, % change in 2016)

YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PF	UR	TOT	XBWV	PH	XPH
2009	8	28.5	0	0	11	1	5	19	4	0	0	204	12	0	0	7	0	0	26	289	85	10.1	3.0
2010	13	40.3	0	45	15	1	11	73	14	1	0	584	6	0	0	23	2	0	17	792	163	19.7	4.0
2011	1	4.0	0	0	0	1	0	20	4	0	1	1	1	0	0	1	0	2	0	31	30	7.8	7.5
2012	3	11	0	0	6	1	2	12	3	0	0	353	3	0	0	3	0	0	0	383	30	34.0	2.7
2015	39	150.0	0	0	46	36	12	221	20	0	10	2307	47	0	2	46	16	2	43	2808	501	18.7	3.3
2016	67	302.9	17	236	94	106	48	740	137	3	35	3776	250	0	1	74	32	33	16	5598	1569	18.5	5.2
ave10	18	75	0	20	25	8	12	144	16	1	3	681	39	0	1	20	3	4	21	996	294	16	4
%chg	264	306	*	1068	284	*	317	414	751	500	*	455	538	*	67	274	932	686	-22	462	433	14	26

Chestnut Hill - Litchfield, Connecticut (ave for 2006 - 2015, % change in 2016)

YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PF	UR	TOT	XBWV	PH	XPH
2011	11	43.5	0	0	24	11	0	40	1	0	0	2623	0	0	0	2	0	0	4	2705	82	62.2	1.9
2012	14	61	0	0	31	21	0	48	12	0	0	4048	0	0	0	18	1	0	8	4187	139	68.6	2.3
2013	15	58	0	1	26	22	0	25	3	0	0	5603	13	0	0	4	0	0	14	5711	107	98.5	1.8
2014	14	64	0	0	34	12	7	49	9	2	0	7712	12	0	1	8	1	0	10	7857	145	122.8	2.3
2015	19	89	0	2	20	39	5	39	8	0	0	4011	6	0	1	9	1	0	15	4156	143	46.7	1.6
2016	19	83.25	0	0	18	36	2	59	5	0	0	1509	1	0	0	24	0	1	16	1671	162	20.1	1.9
ave10	13	59	0	0	27	15	3	48	6	0	0	3822	3	0	0	11	1	0	11	3948	125	68	2
%chg	50	41	*	*	-32	143	-23	22	-19	-100	*	-61	-68	*	-100	116	-100	900	40	-58	29	-71	-10

White Memorial - Litchfield, Connecticut (ave for 2006 - 2015, % change in 2016)

YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PF	UR	TOT	XBWV	PH	XPH
2011	4	21	4	0	8	9	1	14	8	0	4	354	8	0	0	0	0	2	0	412	54	19.6	2.6
2012	23	53.97	0	65	9	9	9	2	7	2	21	155	15	0	1	13	33	0	11	352	132	6.5	2.4
2013	18	51.84	7	49	17	25	4	9	9	3	15	3704	10	0	0	6	37	5	17	3917	157	75.6	3.0
2014	13	23.03	0	34	8	12	0	7	21	1	23	1253	5	0	0	4	2	0	8	1378	91	59.8	4.0
2015	11	22	1	51	4	16	0	5	7	2	23	33	4	0	0	2	0	1	5	154	69	7.0	3.1
2016	12	20.42	0	0	4	7	2	7	18	0	27	15	4	0	1	7	4	0	1	97	82	4.751	4.02
ave10	12	33	6	21	15	14	3	17	12	1	9	924	5	0	0	7	8	2	4	1048	97	30	3
%chg	-2	-39	-100	-100	-73	-49	-38	-58	49	-100	187	-98	-15	*	400	1	-50	-100	-76	-91	-15	-84	42

Botsford Hill - Bridgewater, Connecticut (ave for 2006 - 2015, % change in 2016)

YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PF	UR	TOT	XBWV	PH	XPH
2011	16	67	0	0	34	13	2	135	26	0	0	1258	2	0	0	26	1	0	12	1509	251	22.7	3.8
2012	13	68	0	0	67	12	7	176	2	0	0	2827	0	0	0	22	2	0	10	3125	298	46.0	4.4
2013	19	79	0	0	24	23	1	75	10	0	0	11167	0	0	0	16	4	0	18	11338	171	143.1	2.2
2014	16	68	0	0	28	21	7	74	12	0	0	3993	0	0	0	7	4	0	22	4168	175	61.1	2.6
2015	14	66	0	0	20	16	5	101	1	0	0	2778	0	0	0	4	5	1	7	2938	160	44.5	2.4
2016	13	53.5	0	0	14	9	3	51	4	0	0	885	0	0	0	7	5	0	11	989	104	18.49	1.94
ave10	17	75	0	0	49	17	6	137	13	0	0	3699	0	0	0	24	3	0	18	3964	266	53	4
%chg	-22	-28	*	*	-71	-46	-46	-63	-70	*	-100	-76	-100	*	-100	-71	92	-100	-38	-75	-61	-65	-45

Bear Mountain - Fort Montgomery, New York (ave for 2006 - 2015, % change in 2016)

YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PF	UR	TOT	XBWV	PH	XPH
2011	60	318.5	0	0	54	35	6	208	13	1	3	1584	66	0	1	14	4	8	12	2011	427	6.3	1.3
2012	54	311	0	0	95	74	14	416	41	0	11	1080	105	0	2	57	7	5	20	1928	848	6.2	2.7
2013	62	357	0	0	27	74	11	290	42	3	44	2208	126	0	1	42	13	3	7	2900	692	8.1	1.9
2014	62	335	0	0	29	76	7	287	25	0	9	727	69	2	7	40	12	1	8	1299	572	3.9	1.7
2015	70	400	0	0	56	81	10	262	27	3	9	421	102	0	7	29	5	7	17	1036	615	2.6	1.5
2016	63	338	0	0	46	142	5	141	27	1	6	333	40	0	4	35	7	11	11	809	476	2.4	1.4
ave10	63	362	1	3	87	68	14	346	32	1	11	1448	124	0	5	42	8	5	16	2211	759	6	2
%chg	0	-7	-100	-100	-47	110	-64	-59	-16	11	-44	-77	-68	-100	-15	-17	-11	124	-29	-63	-37	-61	-33

Mount Peter - Warwick, New York (ave for 2006 - 2015, % change in 2016)

YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PF	UR	TOT	XBWV	PH	XPH
2011	70	410.5	38	221	187	70	41	1334	152	2	94	7417	248	0	4	153	25	18	61	10065	2389	24.5	5.8
2012	66	412.5	4	112	191	130	47	1826	165	1	131	6073	437	0	3	232	23	20	68	9463	3274	22.9	7.9
2013	74	479.3	104	121	124	119	51	1028	64	0	118	7611	582	0	5	112	14	15	37	10105	2269	21.1	4.7
2014	72	467.8	232	570	111	79	46	1119	122	1	136	5685	658	0	10	139	23	12	69	9012	2525	19.3	5.4
2015	71	464.5	107	292	114	70	28	1017	74	0	85	11256	289	0	5	75	24	11	34	13481	1826	29.0	3.9
2016	69	487.8	84	337	98	95	35	1104	94	0	104	5894	478	0	3	52	15	13	42	8448	2133	17.3	4.4
ave10	68	424	70	219	160	71	50	1253	102	1	88	7113	425	0	5	154	19	14	51	9795	2393	23	6
%chg	2	15	20	54	-39	34	-30	-12	-8	-100	18	-17	12	-100	-44	-66	-20	-8	-18	-14	-11	-25	-23

Chestnut Ridge - Bedford, New York (ave for 2006 - 2015, % change in 2016)

YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PF	UR	TOT	XBWV	PH	XPH
2011	89	634.8	69	4445	558	102	124	3000	771	6	130	13020	733	1	4	410	70	40	368	23851	6317	37.6	10.0
2012	102	723.3	70	1599	406	113	107	2122	313	12	187	6267	364	0	13	488	49	19	253	12382	4446	17.1	6.1
2013	109	747	72	2429	255	104	86	1824	258	6	499	12239	213	0	16	367	46	25	113	18552	3812	24.8	5.1
2014	93	628	102	2804	289	96	156	2216	276	6	341	6100	434	0	13	260	24	31	105	13254	4248	21.1	6.8
2015	103	702.5	119	2717	362	100	82	1532	290	4	319	6138	216	0	8	225	26	28	103	12269	3295	17.5	4.7
2016	100	670.4	64	1308	104	47	39	473	148	7	78	945	129	0	2	85	22	14	90	3555	1238	5.3	1.8
ave 9	96	667	65	2152	364	91	115	2110	375	7	216	7244	318	0	8	336	43	26	160	13630	4169	21	6
%chg	5	1	-1	-39	-71	-48	-66	-78	-61	-5	-64	-87	-59	-100	-74	-75	-48	-45	-44	-74	-70	-74	-71

Hook Mountain - Nyack, New York (ave for 2006 - 2015, % change in 2016)

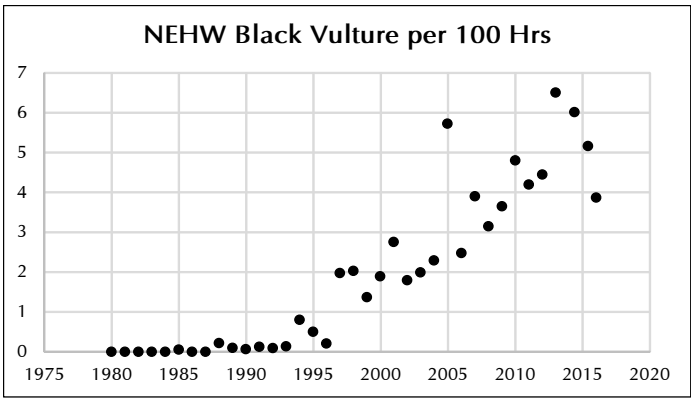
YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PF	UR	TOT	XBWV	PH	XPH
2011	71	383	53	57	309	88	98	2064	251	6	96	16023	105	0	0	196	74	32	16	19468	3335	50.8	8.7
2012	66	385	64	410	410	134	79	1872	197	4	177	2832	136	0	5	323	38	39	10	6732	3426	17.5	8.9
2013	82	506.5	48	163	272	162	125	2048	182	0	180	4933	127	0	8	208	67	39	20	8582	3438	16.9	6.8
2014	77	448	69	288	213	170	131	1910	185	3	308	5428	148	0	6	239	73	32	8	9211	3426	20.6	7.6
2015	76	432	32	416	319	197	97	1433	161	3	130	2296	79	0	10	210	82	28	12	5505	2761	12.7	6.4
2016	77	461	46	245	353	194	91	1424	207	19	165	2777	159	0	5	156	81	30	22	5974	2906	13.0	6.3
ave10	73	428	48	305	295	123	122	1926	203	4	147	4991	158	0	7	232	59	30	23	8672	3328	21	8
%chg	6	8	-5	-20	20	58	-25	-26	2	342	12	-44	1	-100	-29	-33	37	1	-5	-31	-13	-37	-19

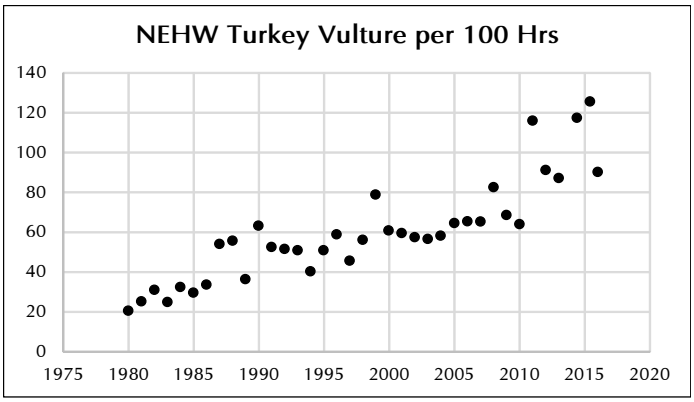
Quaker Ridge - Greenwich, Connecticut (ave for 2006 - 2015, % change in 2016)

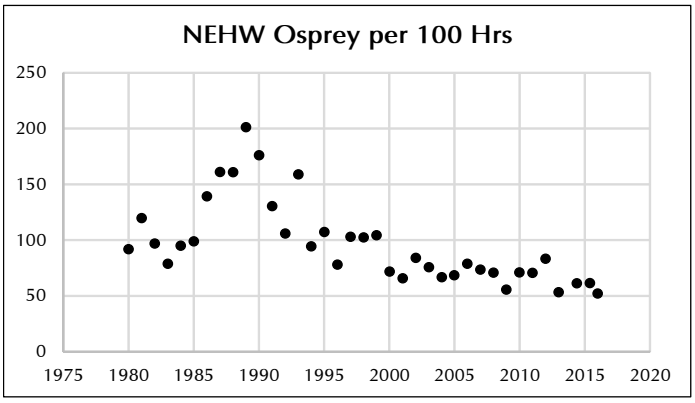
YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PF	UR	TOT	XBWV	PH	XPH
2011	82	616.5	11	659	552	149	115	3005	429	7	235	8464	106	0	9	390	119	29	17	14296	5162	23.2	8.4
2012	76	578.5	20	1138	557	239	159	3316	502	3	437	18347	433	0	5	474	82	24	9	25745	6240	44.5	10.8
2013	92	760.8	15	928	470	177	165	2147	424	6	425	16188	223	0	10	484	83	33	171	21949	4818	28.9	6.3
2014	98	812	61	1661	586	210	202	3319	564	7	1046	7046	528	1	14	536	103	36	219	16139	7371	19.9	9.1
2015	102	821	47	1469	594	191	156	2160	403	4	406	5745	228	0	17	374	101	40	141	12076	4815	14.7	5.9
2016	98	732.8	24	673	461	159	104	1600	343	8	566	3484	197	0	7	284	75	28	62	8075	3894	11.0	5.3
ave10	88	668	31	990	629	181	197	3293	487	9	410	11510	305	1	13	525	103	33	128	18843	6313	29	10
%chg	12	10	-22	-32	-27	-12	-47	-51	-30	-6	38	-70	-35	-100	-46	-46	-27	-16	-51	-57	-38	-62	-45

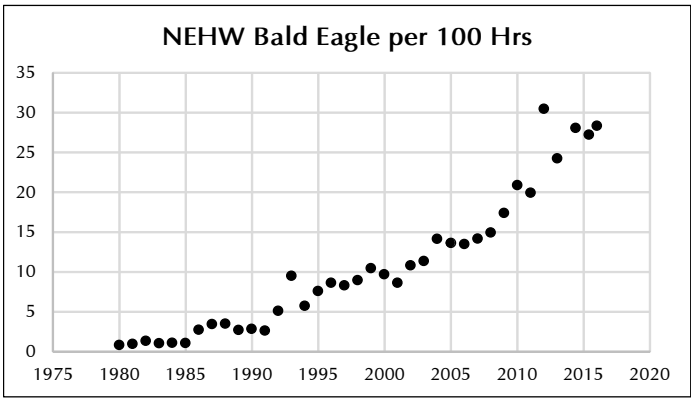
Region tables continue on page 20

NorthEast Hawk Watch Fall Migration Trends, 1980–2016: Vultures, Osprey, Bald Eagle

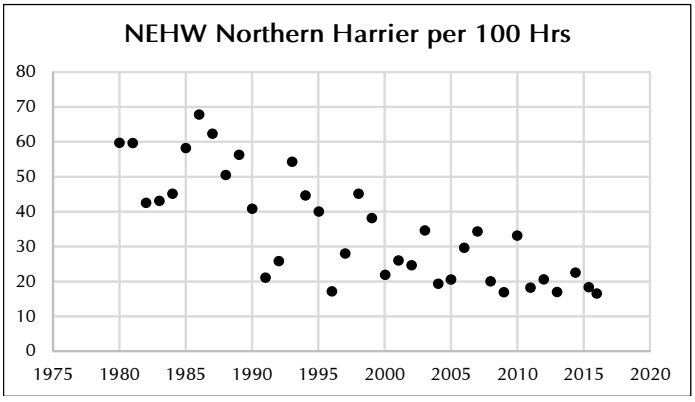


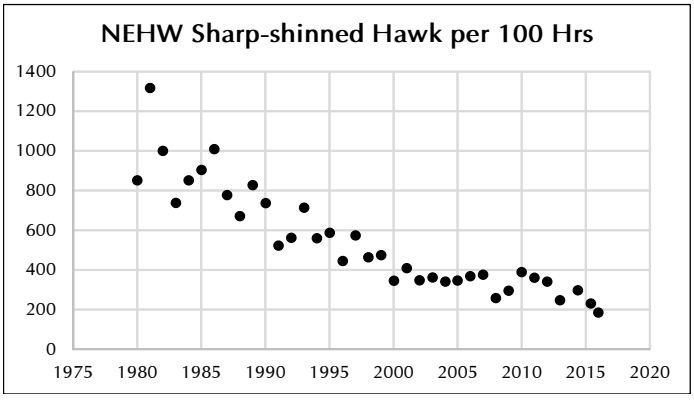


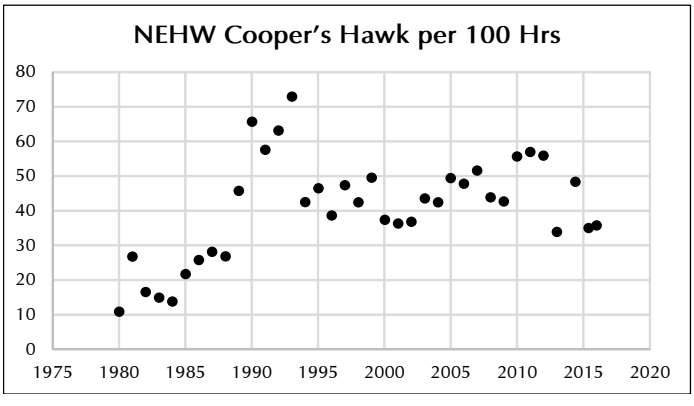


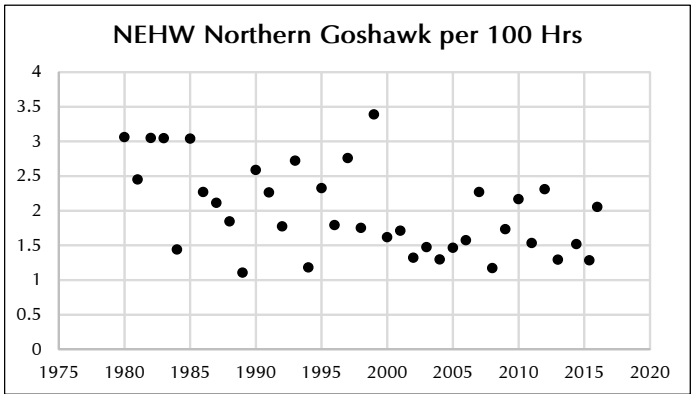


Harrier, Accipiters



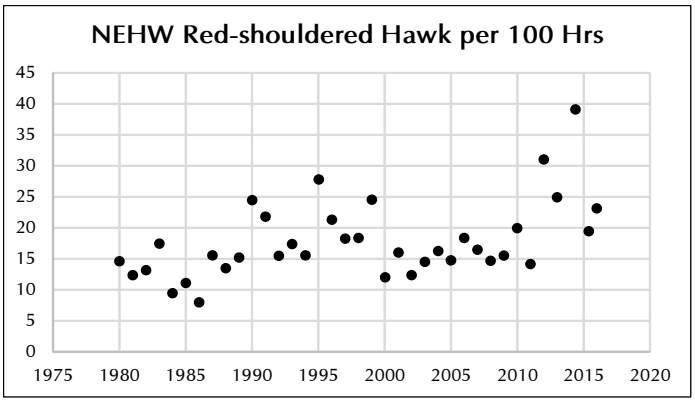


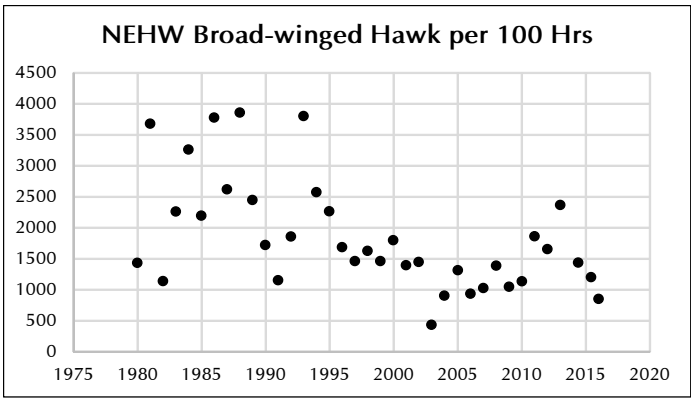


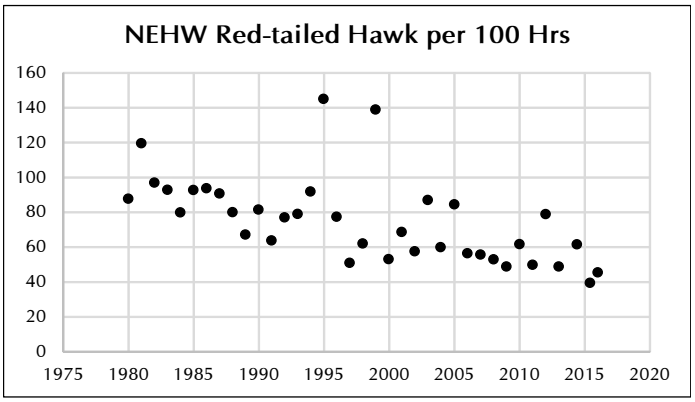


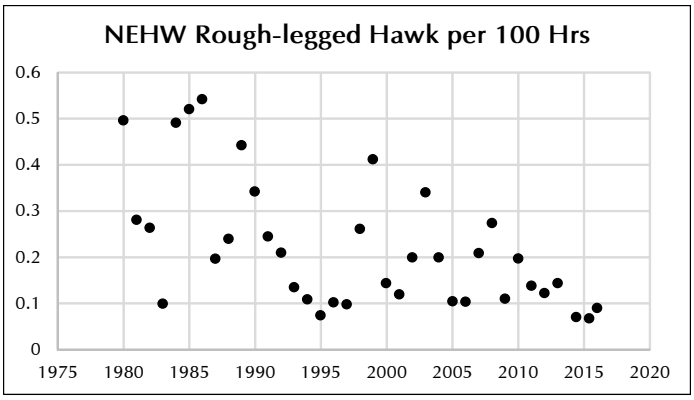
NorthEast Hawk Watch Fall Migration Trends, 1980–2016:

Buteos

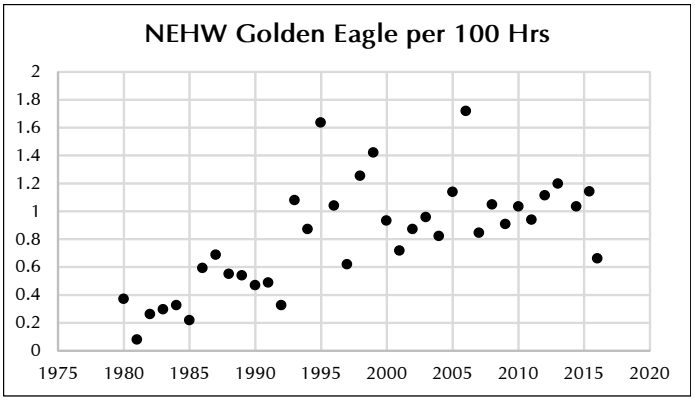


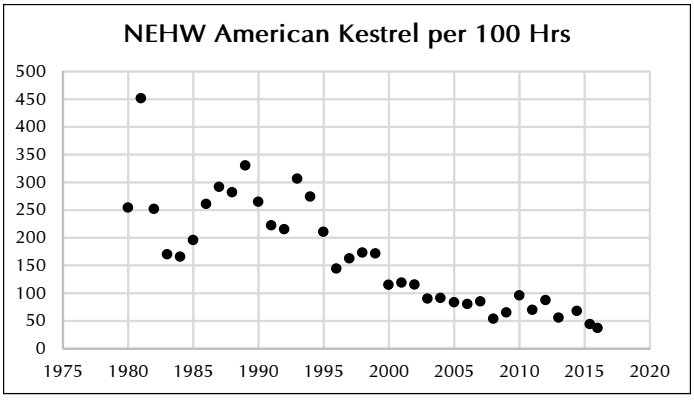


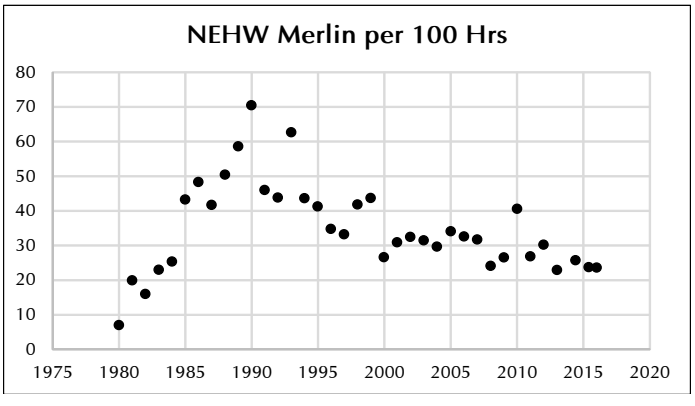


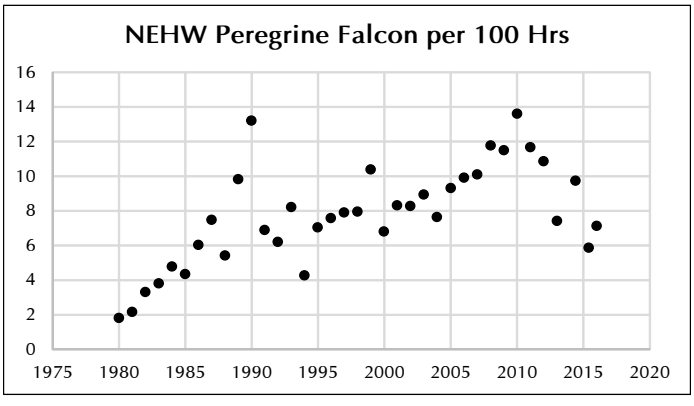


Golden Eagle, Falcons









REGION 40

State Line - Alpine, New Jersey (ave for 2006 - 2015, % change in 2016)

YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PF	UR	TOT	XBWV	PH	XPH
2011	60	399	12	355	445	46	50	1933	227	0	80	2877	93	0	1	386	57	136	191	6889	3645	17.3	9.1
2012	56	355	62	287	331	101	48	1482	254	9	129	4544	534	0	2	340	44	23	173	8363	3470	23.6	9.8
2013	71	455	196	1126	423	93	71	1656	164	1	190	4896	304	0	4	372	37	37	155	9725	3507	21.4	7.7
2014	73	451.8	15	2428	447	78	126	2221	299	5	512	2654	634	0	1	468	59	56	185	10188	5091	22.6	11.3
2015	77	478	127	2278	857	151	86	1433	284	0	144	1613	395	0	1	333	49	52	128	7931	3913	16.6	8.2
2016	82	450	60	1311	856	160	74	1258	239	5	353	1010	539	1	1	227	61	61	106	6322	3941	14.0	8.8
ave 8	48	300	53	873	348	65	52	1265	171	2	135	2473	250	0	1	274	34	40	114	6150	2751	21	9
%chg	71	50	13	50	146	145	42	-1	40	150	162	-59	115	*	-20	-17	81	52	-7	3	43	-35	-3

Wildcat Ridge - Hibernia, New Jersey (ave for 2006 - 2015, % change in 2016)

YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PF	UR	TOT	XBWV	PH	XPH
2011	54	317	63	206	215	80	20	847	145	1	16	8899	70	0	1	79	12	10	4	10668	1500	33.7	4.7
2012	45	307	28	44	138	89	17	741	135	0	14	5904	26		0	82	16	7	8	7249	1273	23.6	4.1
2013	48	266	28	0	84	59	11	474	71	1	22	4314	62	0	4	49	10	8	11	5208	866	19.6	3.3
2014	47	277.5	0	0	76	72	20	409	121	1	17	6465	52	0	0	77	7	5	18	7340	875	26.5	3.2
2015	54	321	11	0	82	66	15	418	107	0	16	2332	56		0	39	13	3	6	3164	821	9.9	2.6
2016	62	316	15	0	62	62	6	313	100	3	15	1264	60	0	1	32	9	2	0	1944	665	6.2	2.1
ave10	51	303	44	73	125	61	24	765	131	1	17	4542	84	0	1	75	10	7	14	5973	1313	20	4
%chg	23	4	-66	-100	-51	1	-74	-59	-23	400	-11	-72	-28	*	-9	-57	-10	-70	-100	-67	-49	-69	-51

Montclair Hawk Lookout - Montclair, New Jersey (ave for 2006 - 2015, % change in 2016)

YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PF	UR	TOT	XBWV	PH	XPH
2011	84	603.5	66	1255	421	124	56	1569	183	0	102	4714	174	0	3	322	85	38	78	9190	3155	15.2	5.2
2012	79	520.5	58	1514	474	194	72	1631	382	0	525	8949	489	0	2	419	108	49	100	14966	4445	28.8	8.5
2013	85	556.8	51	775	200	117	41	1178	161	0	157	8383	145	0	5	259	74	25	46	11617	2408	20.9	4.3
2014	79	534	45	757	414	182	77	1749	288	3	472	6192	165	0	1	415	87	61	21	10929	3935	20.5	7.4
2015	91	590.2	56	2067	302	120	39	1259	289	1	239	1223	118	0	1	207	107	55	59	6142	2796	10.4	4.7
2016	83	571.8	21	1044	182	102	31	671	167	2	174	1074	75	0	1	127	53	23	24	3771	1632	6.6	2.9
ave10	84	549	61	1253	448	132	94	1840	340	2	282	6371	323	0	3	372	96	52	65	11734	4049	22	7
%chg	-1	4	-65	-17	-59	-23	-67	-64	-51	-13	-38	-83	-77	-100	-63	-66	-45	-56	-63	-68	-60	-69	-62

Chimney Rock - Brunswick, New Jersey (ave for 2006 - 2015, % change in 2016)

YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PF	UR	TOT	XBWV	PH	XPH
2011	76	570.6	0	0	535	197	139	2874	375	0	123	7639	130	1	6	700	179	97	16	13011	5372	22.8	9.4
2012	76	556	23	89	547	310	137	2401	406	5	438	16392	454	0	15	741	237	55	24	22274	5770	40.1	10.4
2013	92	644.8	0	0	423	189	108	1948	300	2	298	17895	249	0	22	596	227	31	21	22309	4414	34.6	6.8
2014	76	613.3	0	0	362	220	164	2591	255	2	367	6472	291	0	21	880	268	3	34	11930	5458	19.5	8.9
2015	73	623	0	0	242	210	118	2083	204	0	186	2420	44	1	7	428	181	0	25	6149	3729	9.9	6.0
2016	75	614.3	0	0	272	234	73	1350	149	7	347	1807	188	0	8	316	188	0	21	4960	3153	8.1	5.1
ave10	74	571	12	82	455	182	164	2365	360	3	227	8661	196	1	12	708	210	82	25	13745	4990	24	9
%chg	2	8	-100	-100	-40	28	-55	-43	-59	133	53	-79	-4	-100	-32	-55	-11	-100	-17	-64	-37	-66	-42

COASTAL REGION

Lighthouse Point - New Haven, Connecticut (ave for 2006 - 2015, % change in 2016)

YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PF	UR	TOT	XBWV	PH	XPH
2011	95	568.8	13	713	844	114	258	4721	1544	4	154	3365	550	3	5	1235	216	212	369	14320	10229	25.2	18.0
2012	97	593.3	3	297	1055	226	343	4105	1440	9	154	1724	449	2	4	1267	286	244	328	11936	9912	20.1	16.7
2013	95	681.8	39	416	715	173	282	3077	843	6	209	2676	486	3	10	906	393	147	459	10840	7709	15.9	11.3
2014	101	729.5	17	373	1190	290	403	3706	1548	9	259	475	518	0	4	1046	389	232	566	11025	10160	15.1	13.9
2015	82	631	6	696	1027	164	291	2325	849	0	62	133	186	0	4	428	250	61	297	6779	5944	10.7	9.4
2016	96	610.8	10	496	764	234	294	2434	1013	7	155	213	433	1	3	460	305	148	344	7314	6595	12.0	10.8
ave10	94	633	9	484	1129	157	407	4709	1260	8	191	1331	549	2	6	1122	340	162	386	12251	10427	20	17
%chg	2	-3	15	3	-32	49	-28	-48	-20	-14	-19	-84	-21	-38	-52	-59	-10	-9	-11	-40	-37	-39	-35

Boothe Park - Stratford, Connecticut (ave for 2009-2014, % change in 2015) (ave for 2006 - 2015, % change in 2016)

YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PF	UR	TOT	XBWV	PH	XPH
2011	34	115.5	8	847	146	57	38	1522	247	2	57	8645	456	0	1	111	33	10	35	12215	2715	105.8	23.5
2012	35	140.5	16	135	372	134	25	839	177	0	95	4545	203	0	0	120	23	11	68	6763	2067	48.1	14.7
2013	41	129.9	19	200	173	92	16	334	70	0	22	2339	55	0	0	41	14	14	37	3426	868	26.4	6.7
2014	22	86.42	2	333	97	89	14	527	45	0	13	182	73	0	0	61	17	6	21	1480	963	17.1	11.1
2015	20	82	2	37	413	105	8	278	28	0	0	351	7	0	0	57	17	5	14	1322	932	16.1	11.4
2016	4	12.5	0	0	27	2	0	2	0	0	0	1	0	0	0	0	1	0	2	35	34	2.8	2.7
ave 6	31	115	9	333	223	84	28	815	135	1	40	3101	185	0	1	101	23	11	49	5137	1695	43	15
%chg	-87	-89	-100	-100	-88	-98	-100	-100	-100	-100	-100	-100	-100	0	-100	-100	-96	-100	-96	-99	-98	-93	-81

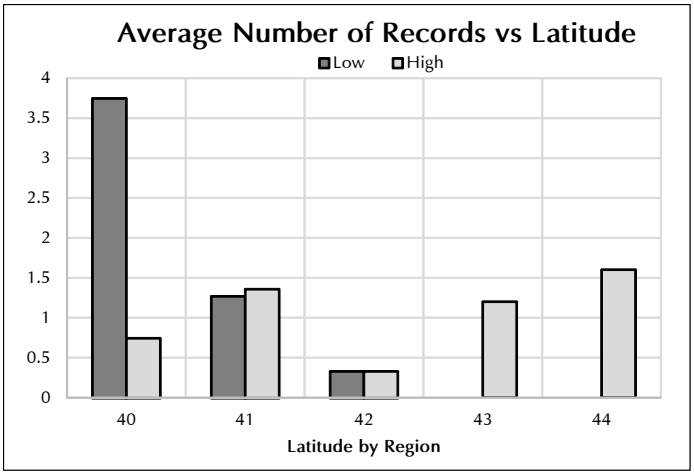
Fire Island - Islip, New York (ave for 2006 - 2015, % change in 2016)

YR	DYS	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PF	UR	TOT	XBWV	PH	XPH
2011	63	439	0	0	294	3	149	394	59	1	0	0	4	0	0	539	1268	164	16	2891	2891	6.6	6.6
2012	56	352	0	0	458	3	199	179	40	0	0	1	1	0	0	1027	1346	220	6	3480	3479	9.9	9.9
2013	68	451.3	0	1	337	5	136	111	28	0	1	0	1	2	0	484	916	156	9	2187	2186	4.8	4.8
2014	68	420	0	0	423	5	144	187	34	0	0	0	2	0	1	500	1010	177	6	2489	2489	5.9	5.9
2015	65	409.5	0	0	378	6	164	220	41	0	0	0	1	0	0	344	1064	73	2	2293	2293	5.6	5.6
2016	75	474.8	2	1	349	10	159	195	55	2	0	0	6	0	0	300	1016	121	8	2224	2221	4.7	4.7
ave10	64	431	0	0	379	4	245	303	45	1	0	0	1.3	0	0	720	1349	214	10	3273	3272	8	8
%chg	17	10	*	150	-8	156	-35	-36	22	300	-100	-100	362	-100	-100	-58	-25	-44	-18	-32	-32	-38	-38

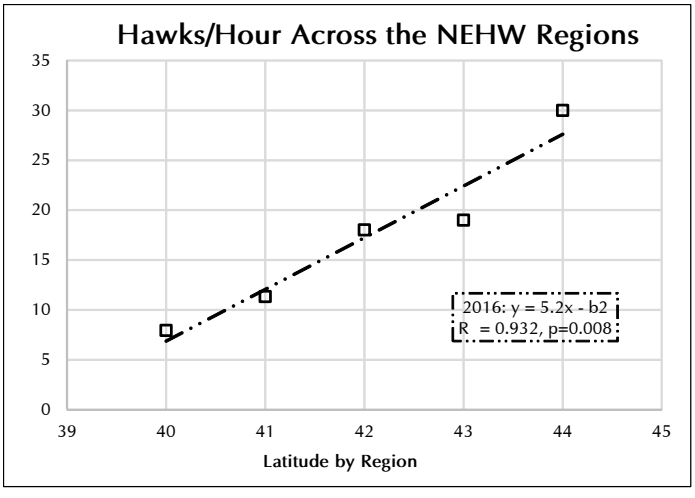
The Count: 2016 Compared to History Should We Sound an Alarm?

In 2016 there were 141,113 Total Hawks counted. When compared to the 193,018 hawks counted in 2015, this amounts to 51,905 fewer hawks! That seems like a big difference, but is it cause for alarm? The difference is a drop of 27% in actual counts and 24% when adjusted for hours of effort. But, hawk count data is inherently variable, so this is not very unusual. Previous changes from year to year dropped 44% in 2003 and 49% in 1986. So, this year's drop is not very excessive in comparison. No real cause for alarm here.

However, as we looked at the site accounts, there were a number of site records, with many of them record lows. Record highs occur more often for young watch sites as each year brings new numbers and often greater effort. Record lows at sites with years of data and consistent effort may be cause for concern, and multiple sites with record lows could very well be cause for alarm. Our 2016 data suggests it is time to sound an alarm: two record lows at Mount Peter, three at Chimney Rock, four at Chestnut Ridge, and six at Montclair. To organize and compare the site records with different numbers of sites in each region, and different effort at each site, the average number of records for each region was computed (number of site records / number of sites). The Coastal sites were included in their corresponding latitude. The results show that record highs occurred across the regions from south to north, but the record lows occurred only at the lower latitudes. Furthermore, the lows were greatest at the lowest latitudes. This brings forth the question: if the 27% drop from 2015 to 2016 is generally within the observed variation of hawk counts over the years, why are there so many record lows? With more lows in the south than in the north, is the distribution of migrating hawks across the Northeast changing?



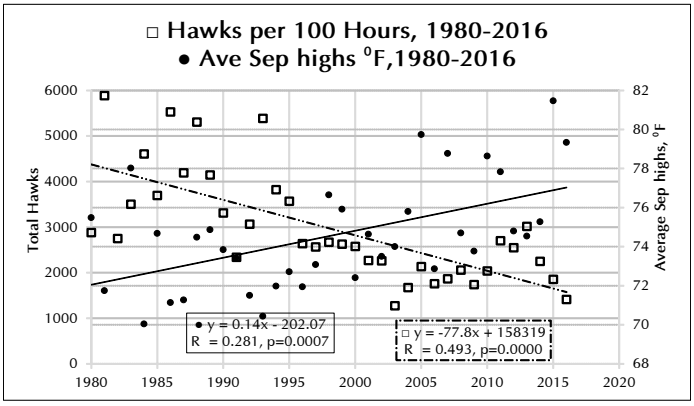
To further explore regional (latitudinal) differences within the Northeast, the number of hawks per hour within each regional was computed and compared to the lowest latitude for that region. In this instance a strong significance is seen with a definite pattern: sites further north had more hawks per hour in 2016. (r=0.965, p=0.0077)

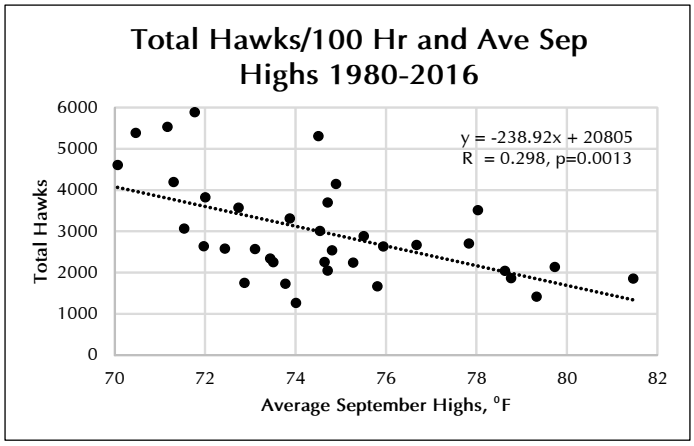


So, our Total Hawks dropped, our southern regions are getting record lows, and those record lows are in the species that were once so prevalent: Broad-winged Hawks, Sharp-shinned Hawks, and American Kestrels. Why? Why are the skies so empty at these sites compared to the 1980's, 1990's, and 2000's? The answer could be 1) declining populations for the historically most prevalent species, 2) a change in migration routes, 3) changes in behavior that results in reduced detection, or some mix of the above. When you are watching for hawks atop a mountain, and the rocks beneath your feet reach temperatures of 110 F or more, and there is no wind to cool them off as the sun beats down, and you are desperate for shade, it is easy to blame empty skies on global warming. A change in climate could impact our numbers in various ways. Fewer and weaker west winds could encourage hawks to fly west at latitudes that are further north, resulting in fewer hawks migrating through the southeastern portions of the Northeast. (Option 2 above) This would result in higher counts to the north and lower counts to the south. Even though this is what we experienced in 2016 (and in 2015), we also have more watch sites in the north now than we did historically—Clarry Hill with its high Broadwing counts only started in 2011, Greenlaw Mt in 2009, Carter Hill in 2008. So, a change in migration routes seems possible, but we have insufficient evidence to support that at this time.

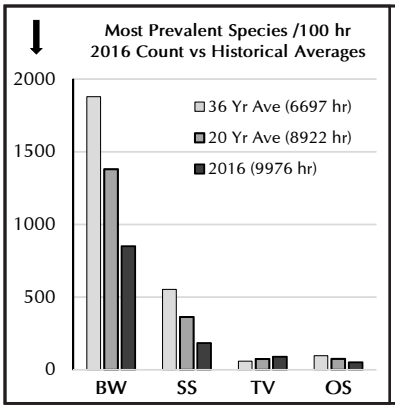
Another possibility is that warmer temperatures and changing atmospheric conditions might enable the hawks to fly through the regions at higher elevations, resulting in fewer hawks being detected. (Option 3 above) A comparison of total hawks per 100 hours to the average high temperatures in the month of September in Hartford, CT for the years 1980 to 2016 (Wunderground history) shows an interesting relationship between these two variables. A look at the trend for our Total Hawks together with the trend in temperature for those years, on the same graph provides a good comparison. (Note the two vertical axes: total hawks on the left and temperature on the right.) This shows the decline of total hawks from 1980 to 2016, and the increase in average September high temperatures over the years.

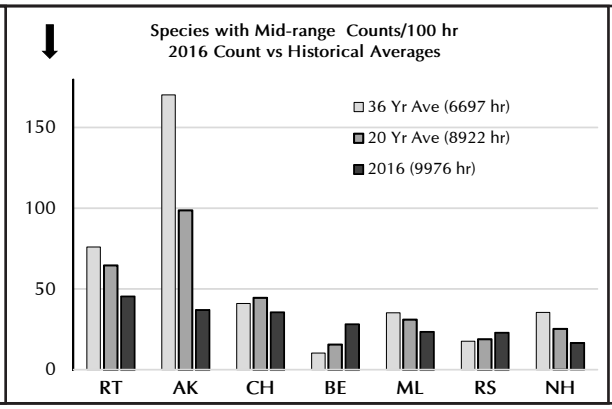
A direct comparison of the average September Highs and Total Hawks results in a strong negative correlation between the two variables. (r= - 0.529, p=0.0013) On the graph, each dot represents one year from 1980 to 2016. As the average September high increases from 70° F to 82° F, the number of hawks per hundred hours (h/100) decreases from 4000 to 1200! Of course, this does not mean that higher temperatures directly cause fewer hawks in migration. But it does suggest that Option 3, behavior/detection changes, might also be possible—higher temperatures are usually associated with clearer skies, and in clear skies hawks fly at higher altitudes and are more difficult to see.

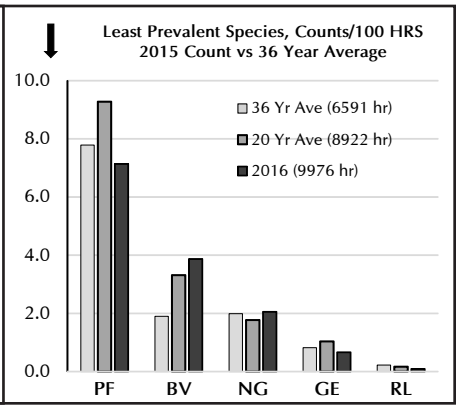




So, does this mean that the drop in total hawks does not represent a declining population? No. Populations can still be declining, but climate change has made detection of population trends more difficult to assess. Nevertheless, when I'm on the mountain in September and it feels like August, I hanker for those cool fall Northwest wind days of the 1980s, and I blame the empty skies on the oven-like temperatures that stagnate the air, and I wait for the cooler October days to come. I also hope, perhaps in vain, that next year will bring cooler temperatures and stronger west winds in September! But, while waiting in the heat, one of the best of the 2016 experiences occurred: an immature Goshawk in hunting mode flew out of from the trees and swung around the edge of the forest—only for a few seconds, but in clear view, and in September! Our numbers of Broadwings and Sharpies may be dropping, but the thrills of hawk watching still abound!







The Hawks—2016 and Species Trends

To compare the species to each other and to our history, we arrange them (above) in sequence from our most prevalent Broad-wings and Sharpies on the left to the least prevalent Golden Eagles and Rough-legged Hawks on the right. (Note the different scales.) Included for each species are the 2016 count (darkest bar) along with both the 36 year and 20 year averages.

Of the most prevalent species, we see a declining trend for Broad-winged Hawk, Sharp-shinned Hawk, and Osprey. For these species the 36 year average is larger than the 20 year average, and the 2016 count is lower than both. Other species with this same trend include Red-tailed Hawk, American Kestrel, Merlin, Northern Harrier, and Rough-legged Hawk. The reverse is true for Turkey Vulture for which the 36 year average is lower than the 20 year average, and the 2016 count is higher than both. This increasing trend is also evident for Bald Eagle, Red-shouldered Hawk, and Black Vulture. Cooper's Hawk, Peregrine Falcon, and Golden Eagle have different patterns. These species increased from the 36 year average to a peak at the 20 year average, but had lower than average counts in 2016. A notable change from 2015 is a switch in rank with more Red-tailed Hawks counted in 2016 than Kestrels. In 2015 it was the reverse.

The Fall Regional Totals Table contains the 20 year counts used in the charts above. Also included in the Table is the 20 year average and the percent difference of the 2016 count from that average.

NORTHEAST FALL REGIONAL TOTALS, 1996-2016

COUNTS PER 100 HOURS

YEAR	Sites	HRS	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PG	UR	TOT	XBWV
1996	26	5858	0.2	58.9	78.0	8.6	17.0	446.2	38.6	1.8	21.3	1688.1	77.5	0.1	1.0	144.6	34.8	7.6	22	2646	899
1997	25	6126	2.0	45.7	102.9	8.3	27.8	574.6	47.3	2.8	18.2	1462.4	51.0	0.1	0.6	163.0	33.2	7.9	28	2576	1066
1998	29	7650	2.0	56.2	102.4	9.0	45.0	464.4	42.4	1.8	18.3	1628.3	62.0	0.3	1.3	173.6	41.8	8.0	22	2678	992
1999	31	7526	1.4	78.9	104.1	10.5	38.0	475.2	49.5	3.4	24.5	1461.0	139.0	0.4	1.4	171.6	43.7	10.4	25	2638	1097
2000	32	8349	1.9	60.9	71.7	9.7	21.8	346.5	37.3	1.6	12.0	1797.9	53.2	0.1	0.9	115.4	26.6	6.8	22	2586	726
2001	33	8349	2.8	59.6	65.7	8.6	25.9	410.0	36.3	1.7	16.0	1395.6	68.7	0.1	0.7	119.1	30.9	8.3	17	2267	809
2002	38	8020	1.8	57.5	83.9	10.8	24.5	349.3	36.8	1.3	12.3	1447.7	57.6	0.2	0.9	115.8	32.5	8.3	19	2260	753
2003	40	7930	2.0	56.6	75.6	11.4	34.5	363.6	43.5	1.5	14.5	434.8	87.0	0.3	1.0	90.2	31.5	8.9	19	1276	782
2004	39	8024	2.3	58.3	66.6	14.2	19.2	341.9	42.4	1.3	16.2	905.2	59.9	0.2	0.8	91.6	29.7	7.6	17	1674	709
2005	44	8596	5.7	64.5	68.3	13.6	20.5	345.9	49.4	1.5	14.7	1316.2	84.5	0.1	1.1	83.8	34.1	9.3	21	2134	747
2006	45	9658	2.5	65.5	78.8	13.5	29.6	367.0	47.8	1.6	18.3	936.7	56.4	0.1	1.7	80.6	32.6	9.9	17	1759	754
2007	43	10048	3.9	65.4	73.5	14.2	34.3	375.4	51.6	2.3	16.5	1027.1	55.7	0.2	0.8	85.1	31.7	10.1	17	1865	769
2008	44	10589	3.1	82.6	70.6	14.9	20.0	257.0	43.8	1.2	14.6	1388.3	53.0	0.3	1.0	54.0	24.1	11.8	15	2055	581
2009	51	10902	3.7	68.6	55.5	17.4	16.9	294.0	42.7	1.7	15.5	1049.5	48.9	0.1	0.9	65.3	26.5	11.5	19	1739	617
2010	41	10149	4.8	64.1	70.9	20.9	33.1	388.2	55.6	2.2	19.9	1136.2	61.7	0.2	1.0	96.2	40.6	13.6	28	2038	833
2011	44	10104	4.2	116.0	70.4	19.9	18.2	359.7	57.0	1.5	14.1	1861.1	49.8	0.1	0.9	70.0	26.9	11.7	20	2702	720
2012	44	9784	4.4	91.3	83.2	30.5	20.6	340.7	55.9	2.3	31.0	1655.7	78.9	0.1	1.1	87.6	30.2	10.9	23	2548	797
2013	40	10428	6.5	87.2	53.2	24.2	17.0	246.1	33.9	1.3	24.9	2366.9	48.8	0.1	1.2	55.9	23.0	7.4	18	3015	553
2014	39	9948	6.0	117.5	61.1	28.1	22.5	296.8	48.3	1.5	39.1	1438.8	61.6	0.1	1.0	68.0	25.8	9.7	22	2248	686
2015	38	10409	5.2	125.6	61.4	27.2	18.3	230.0	35.0	1.3	19.4	1201.9	39.5	0.1	1.1	44.4	23.7	5.9	14	1854	522
2016	37	9976	3.9	90.3	51.9	28.3	16.5	183.7	35.7	2.1	23.1	850.1	45.6	0.1	0.7	37.2	23.6	7.1	15	1415	470
20yrAv	38	8922	3	74	75	16	25	364	45	2	19	1380	65	0.2	1	99	31	9.3	20	2228	771
% diff, 2016	-3	12	17	22	-31	80	-35	-49	-20	16	21.3	-38	-30	-47	-36	-62	-24	-23	-27	-37	-39

BV Black Vulture, TV Turkey Vulture, OS Osprey, BE Bald Eagle, NH Northern Harrier, SS Sharp-shinned Hawk, CH Cooper's Hawk, NG Northern Goshawk, RS Red-shouldered Hawk, BW Broad-winged Hawk, RT Red-tailed Hawk, RL Rough-legged Hawk, GE Golden Eagle, AK American Kestrel, ML Merlin, PG Peregrine Falcon, UR Unidentified Raptor, XBWV Total without Broad-winged Hawks and Vultures

To find the original counts, divide by 100 and multiple by the hours. Eg: AK totals for 2016 = 37.2 / 100 * 9976 = 3711

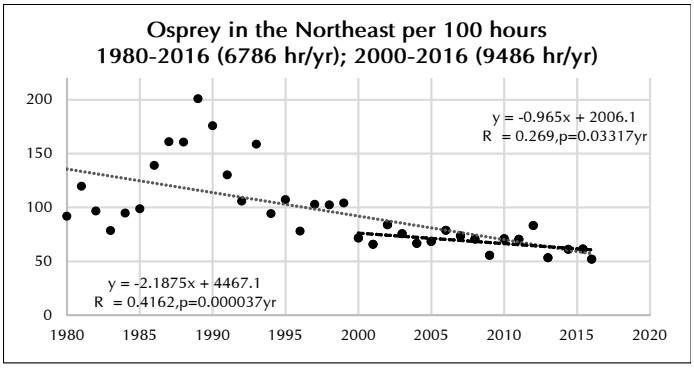
Species in Decline—Record Low Counts for 4 Species

We see from the percent difference on the Fall Regional Totals Table that 11 species are below average. A closer inspection of the table reveals that there are four species for which the 2016 count was the lowest of the 20 years: Osprey (51.9 h/100), Northern Harrier (16.5 h/100), Sharp-shinned Hawk (183.7 h/100), and American Kestrel (37.2 h/100). Furthermore, these are actually Record Lows since 1980. That's four species with Record Lows for the whole Northeast! Is it time to sound the alarm? First, it should be noted that these are Record Lows for the counts/100 hours. In actual counts, there were fewer Osprey and Harrier in the years 1980 to 1984, but the coverage then varied from 2400 to 3000 hours, which is less than 1/3rd of the coverage in 2016. The counts/100 hours adjusts for this disparity, enabling us to recognize just how low the 2016 counts are. If the Record Lows are part of a steady decline, we should sound the alarm, especially if the decline represents a rapid loss.

Trends for all four Record Low species were evaluated for the 37 years of history, and also for a 17 year period since 2000 to represent more recent trends. For the long term, all four species had very strong significantly declining trends, suggesting a total annual decline of 2200 hawks of these species. For the short term, all trends were still declining, but less so, suggesting 1300 fewer hawks of these species annually. The analyses for the four species are summarized on the table below, including the correlation coefficient r, the observed significance p-value, and the annual and net loss for the years of regression (slope of graph/100 x average hours). [Note that these statistics have not been standardized to flight periods of each species, so are used here as a guideline, not as an absolute measure of trend.]

Osprey—no alarm, cautious concern

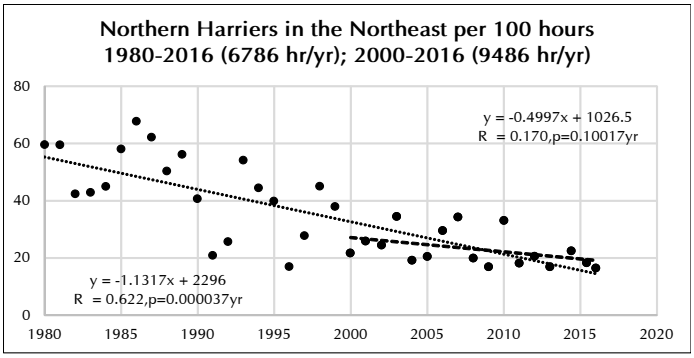
Migrating Osprey are declining in the Northeast for the long term, with an average loss of 150 each year (2.188/100*6786), accumulating to 5493 fewer Osprey in 2016 compared to 1980. The short term trend, though still significant, is less so, and shows a lower annual loss of 92 each year (0.965/100*9486). This is less than 2% of the total Osprey count in the Northeast



in 2016, so at this point, we will not sound the alarm. See Drew Panko's article in the 2015 Report and in this Report regarding the paradox of this decline compared with increasing nesters in the Northeast.

Northern Harrier—no alarm, keep watch

Migrating Harriers are declining in the Northeast for the long term, with an average loss of 77 each year, accumulating to 2840 fewer in 2016 compared to 1980. However, the short term trend shows an annual loss of 47 Harriers and is not statistically significant. So, we need to keep watch, but not sound the alarm.



Sharp-shinned Hawk—sound the alarm!

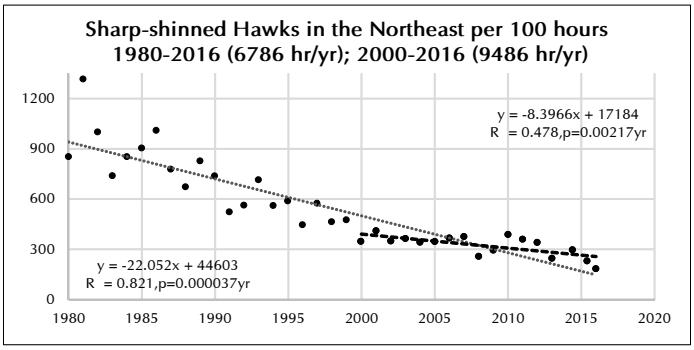
Migrating Sharpies are declining in the Northeast for the long term, with an average loss of 1500 each year, resulting in 55,000 fewer in 2016 compared to 1980! For the short term, the decline remains very strongly significant, with an average loss of 800 each year, resulting in 13,500 fewer hawks in

	Osprey		Harrier		Sharpie		Kestrel	
	37 Years	17 Years	37 Years	17 Years	37 Years	17 Years	37 Years	17 Years
r	-0.6451	-0.5183	-0.7884	-0.4126	-0.9062	-0.6912	-0.8459	-0.839
p-value	0.0000	0.0331	0.0000	0.0998	0.0000	0.0021	0.0000	0.0000
Significance	V Strong	Strong	V Strong	none	V Strong	V Strong	V Strong	V Strong
Annual Loss	150	92	77	47	1496	797	513	379
Net Loss	5493	1556	2841	806	55368	13541	18976	6437

Average Hours: 6786 for 37 years; 9486 for 17 years

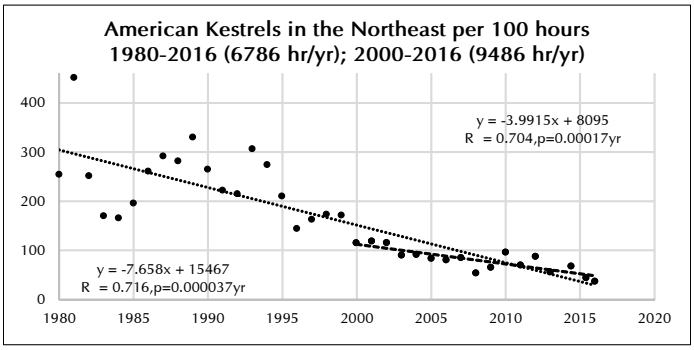
larger values of r and smaller values of p indicate greater significance and better linear fit

2016 compared to 2000. A loss of 800 Sharpies each year is quite alarming! It represents about 4.4 % of this year's total Northeast count (18326), and suggests a continued decline. If the decline continues at this rate, Sharpies will become rarities, like Rough-legged Hawks or Swallow-tailed Kites are now. It is definitely time to sound the alarm.



American Kestrel—sound a very loud alarm!

Migrating Kestrels are declining in the Northeast for the long term, with an average loss of 510 each year, resulting in 19,000 fewer in 2016 compared to 1980. For the short term, the decline remains very strongly significant, with an average loss of 380 each year, resulting in 6400 fewer hawks in 2016 compared to 2000. A loss of 380 Kestrels each year represents about 10.2 % of this year's total Northeast count (3709)! Imagine losing 10% of our Kestrels every year! Are Kestrels in the Northeast approaching a point of no return? Could we lose our jewel-winged falcon? It is definitely time to sound the alarm, very loudly!



These forecasts are not definitive, but they are a warning of what is ahead. What can we do to prevent further declines of these species? There are so many possible reasons for raptor declines, where do we begin? Will our efforts make any difference? You have already begun—you counted and provided the data that is sounding the alarm. If the decline is a consequence of changing migration routes or a trend away from migration to overwintering in the Northeast, there will be little that we can do and no need for alarm. But if the decline represents real population changes, we need to spread the word, and enhance conservation efforts to return our environment and habitats to a natural balance.

What can we learn from the species that are doing well—Turkey Vulture, Bald Eagle, Red-shouldered Hawk, and Black Vulture? Why are they doing well? It is interesting to note that eastern individuals of all of these species either migrate relatively short distances within the North American continent, or do not migrate at all. This suggests that global warming has contributed to their expansion into our region, which is certainly true for the vultures, and may be true for the Red-shoulders, which are more numerous in southern states. It also suggests that the reasons for the steady decline of our Record Low hawks could very well be related to their wintering grounds or stopover locations along the migration route. Both Sharpies and Kestrels winter from the southern US into Central America. Harriers winter further south in Central America and northern South America, and Osprey winter even further south into central South America. Conservation groups with a global reach, like HMANA and Raptor Research Foundation, may be the best means of protecting our dwindling raptors.

As we continue our counts to monitor the hawks, we are thankful for the special experiences we encounter along the way. What a thrill to see an Eagle harass an Osprey for its fish or a local Peregrine chase after any Eagle that dares to pass through his territory! These experiences are why we return to the hawk watch from day to day and from season to season. Now we have added motive—count all the Sharpies and Kestrels we can find, and cherish every view of hovering Kestrels and zooming Sharpies, while they last!

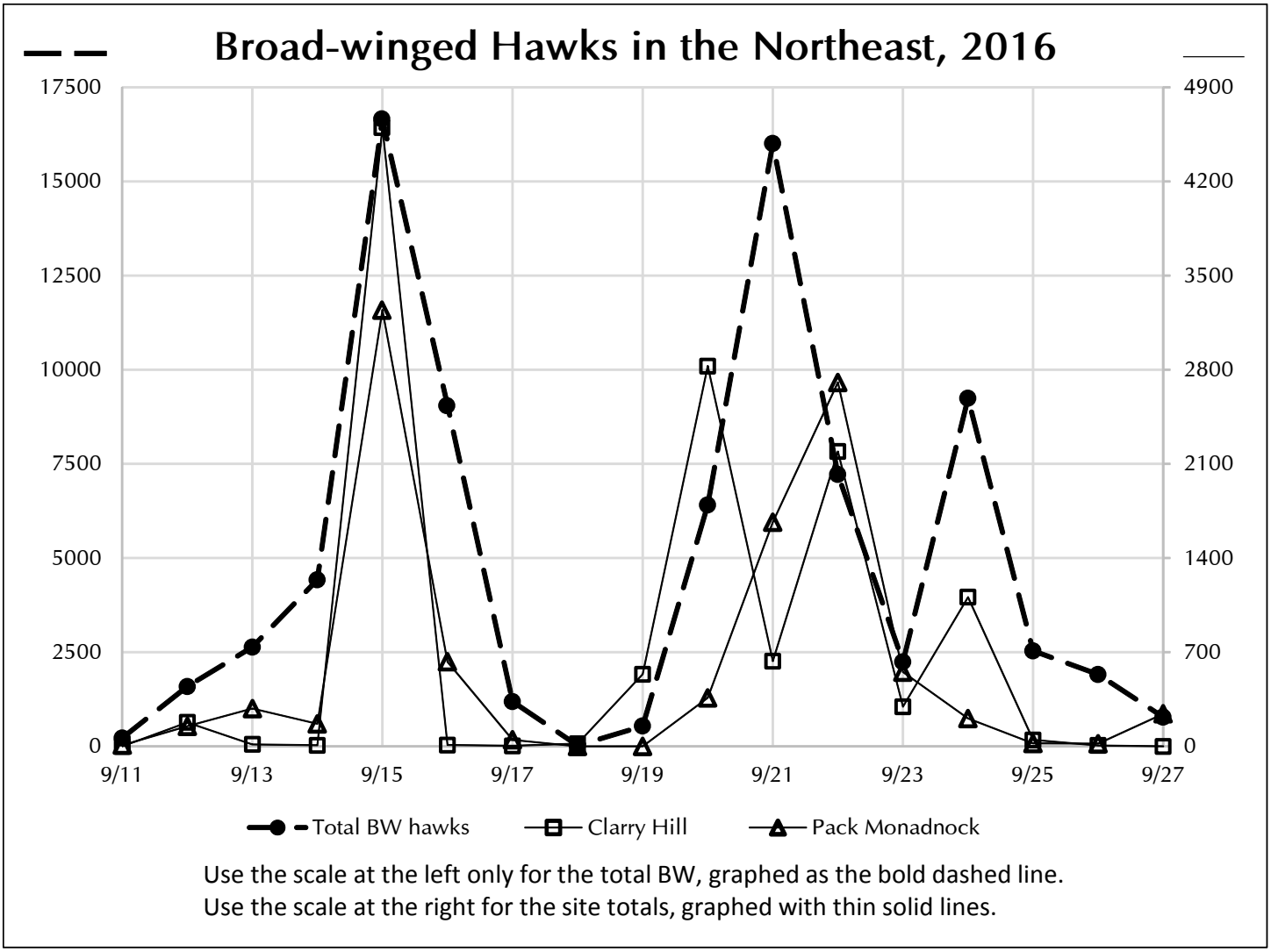

Northern Harrier. Photo by Iain MacLeod

Broad-winged Hawks—When? Where? Mystery?

Broad-winged Hawks comprised 60% of all the hawks counted in 2016, and almost all of them migrated past the NorthEast watch sites between September 12 and September 26. Those are the days when counts across the region totaled more than 1,000 Broad-wings each day, except for two days in the middle, September 18 and 19, when the Northeast experienced overcast skies and rain. Totals of more than 10,000 Broad-wings occurred on two days, September 15 and September 21, accounting for 32,666 Broad-wings. This is more than 1/3rd of all the Broad-wings (84,801) and almost 1/4th of all hawks counted for the whole season. Of course, hawk watchers across the NorthEast are familiar with concentrations of Broad-wings—some days with many and some days with few. The peak flight day was September 15, when 16,659 Broad-wings flew past our watches: 4602 at Clarry Hill, 3245 at Pack Monadnock, and more than 1000 at three other sites: Mount Watatic, Wachusett, and Quaker Ridge. September 21 was a close second with 16,007 Broad-wings: 4292 at Greenlaw Mountain, more than 2000 at Mount Peter and Hook Mountain, and 1667 at Pack Monadnock. Both 9/15 and 9/21 had N and NNE winds at 6 to 7 mph at Hartford, CT (KHFD). The Broad-wing counts for peak days across the NorthEast is seen in the Flight Period table, which includes all sites with 50 or more Broad-wings for the season.

BROAD-WINGED HAWK COMPARATIVE COUNTS DURING FLIGHT PERIOD, FALL 2016

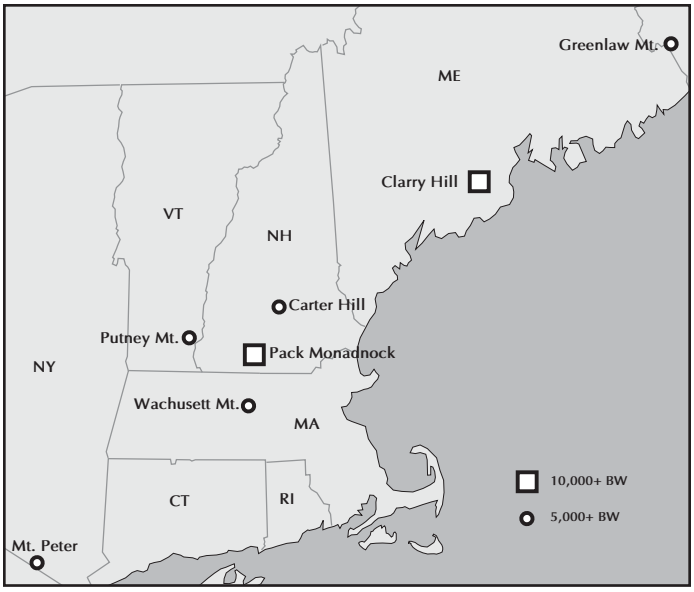
Reg	Site (total BW>50)	9/12	9/13	9/14	9/15	9/16	9/17	9/20	9/21	9/22	9/23	9/24	9/25	9/26
44	Greenlaw Mt NB	15		1624	34	0		11	4292		422	241	85	
	Cadillac Mt ME	0	0	0	118	7	0	0	0	8		501	162	641
	Clarry Hill ME	179	15	8	4602	10	4	2827	634	2192	295	1110	48	7
	Harpswell ME				0	0	0		1	1	0	1153	299	230
43	Interlakes School NH		131		32									
	Carter Hill NH	9	54	50	408	3026	209	442	102	81	116	311	4	1
	Pack Monadnock NH	150	281	168	3245	629	49	361	1667	2706	552	208	22	20
	Putney Mt VT	200	143	186	504	2271	698	1844	125	126	54	20	10	3
42	Mount Watatic MA	315	254	71	1699	156	7					497	6	
	Helderberg NY	21	64	11	85									
	Wachusett Mt MA	358	929	67	1581	89	0	31	870	361	10	2281	47	246
	Barre Falls MA	11	34	36	157	22	2	7	148	301		79	4	10
	Shatterack Mt MA	2	28	670	243	58	0	13	593	33	16	53	2	3
	Suffield WMA CT							4	44	0	0	53	0	
	Booth Hill CT			398				11						
41	Middle School CT	25	2	183	18	15	2	5	2	6	4	13	0	0
	Johnnycake Mt CT	33	91	12	246	44	31	11	239	59	8	134	21	
	Mohonk NY	1	3	2	23	1644	132	469	651	61	596	18	6	2
	Chestnut Hill CT	13	0	380	254	51	21	25	403	88	23	115	11	100
	Botsford Hill CT	12	0	47	288	0		9	421	74	0	27	5	
	Bear Mt NY	2	67	0	1	33	3	0	33	96	2	0	0	52
	Mount Peter NY	0	522	114	696	882	12	76	2279	430	36	407	2	14
	Chestnut Ridge NY	17	9	36	129	11	1	61	197	119	5	35	34	237
	Hook Mt NY	11	0	0	54	13	6	66	2212	88	0	176	32	50
	Quaker Ridge CT	189	0	331	1014	16	1	59	691	19	1	667	381	14
40	State Line NJ	10	3	11	322	3	0	20	76	28	3	145	304	41
	Wildcat Ridge NJ	0	3	0	227	67	5	15	86	328	19	289	18	146
	Montclair NJ	1	0	5	485	8	0	25	113	10	0	197	114	70
	Chimney Rock NJ	5	2	13	169	3	0	18	114	1	81	476	835	11
CO	Lighthouse Point CT	0	0	0	25	0	0	0	1	0	0	30	82	2
	TOTALS	**1587**	**2635**	**4423**	**16659**	**9058**	**1191**	**6410**	**16007**	**7222**	**2244**	**9240**	**2534**	**1909**



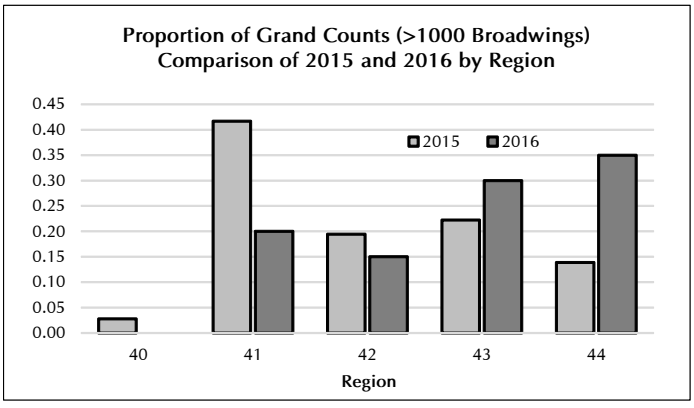
The flight began on September 12 with counts of more than 100, mostly in Regions 42 and 43. From September 13 to 17 the flight moved further north into Regions 43 and 44, and stayed there for the remainder of the period, except for 9/21 when the flight was spread across the Northeast, from north to south.

A graph of this day-to-day distribution makes it easier to see how the flight was distributed temporally. The graph includes Total Broad-winged Hawks as a bold broken line and the two sites with totals of more than 10,000 Broad-wings, Clarry Hill and Pack Monadnock, as thin solid lines. The two Total peaks are obvious on 9/15 and 9/21, and a third peak of about 9000 is readily seen on 9/24. (Read the left axis for the Total.) Both Clarry Hill (4600) and Pack Monadnock (3200) peaked on 9/15. (Read the right axis for the sites.) After the lull on the 18th and 19th, Clarry Hill had 2 more big number days, on 9/20 and 9/22, as did Pack Monadnock, on 9/21 and 9/22. This temporal distribution, with three peaks, is very similar to 2015. It differs substantially from 2015 in the magnitude of the counts. In 2015 there were almost 31,000 Broad-wings on 9/16, compared to the maximum of 17,000 on 9/15 this season. So, in 2015 the early peak was about twice the later peak, while in 2016 the two peaks are about equal. If the early peak represents immatures, then it is possible that 2016 was a poor breeding year for Broad-winged Hawks. But, it is also possible that the hawks flew along a different pathway or were simply not detected. In all, the grand total count for Broad-wings in 2016 was 40,302 fewer than in 2015.

The flight map shows the Broad-wing path using the seven sites that counted 5000 or more Broad-wings during the 2016 season. Included are Clarry Hill (12526), Pack Monadnock (10530), Greenlaw Mountain (6990), Wachusett (6962), Putney Mountain (6434), Mount Peter (5894), and Carter Hill (5045). These seven sites clearly show a line of flight from northeast to southwest that is remarkably similar to the path reported in Bill Welch's Hawks in Flight back in 1987. More recently, this flight closely matches the 2015 path, except that Greenlaw Mountain, our most northerly site, was added, and the two most southern sites from last year, Chestnut Ridge and Quaker Ridge, did not reach 5000 this season and are not included. So, the map shows a shift northward from last year. For the second year in a row, the sites fall within a band of about 50 to 60 miles wide that extends from northeast to southwest in the direction of 237° from North.



The sparsity of Broad-wings south of this band was felt by those of us at the southern watches. We expected a push of Broad-wings around the 15th or 16th, as is the norm for the region, but it just never came. We waited, hoping they were just late, but to no avail. This is reflected in the absence of Grand Counts in Region 41, those counts of more than 1000 Broad-wings. In 2015 Region 41 had 15 Grand Counts during the flight period. This season there were only 4 such counts! With the overall Broad-wing count being lower, Regions 40 and 42 also had fewer Grand Counts. For a comparison, a look at the proportion of Grand Counts for each season shows how the flight shifted north from 2015 to 2016. Assuming that the breeding season was adequate, and that the hawks did in fact migrate, I searched through hawkcount for watches west of the Northeast, and found low numbers of Broad-wings there as well. So it is a mystery just where the missing Broad-winged Hawks actually passed in 2016. Is it possible that they were so high in clear blue skies that we did not detect them? An examination of the weather for 9/15 tends to support this hypothesis. The winds in the southwestern region were NNE 8mph switching to South and the skies were clear (White Plains, NY - KHPN), while the winds in the northeastern region were N 5 mph and the skies were scattered to partly cloudy (Manchester, NH – KMHT). On that day only one site in the southern regions had a Grand Count, compared to four sites in the northern regions. It seems likely that clear skies could be a factor. Bill Welch found migrating Broad-wings at elevations of 1000 to 3000 feet in his motorglider study, conducted in conjunction with our early NorthEast Hawk Watch founders. However, the hawks that we see and count are usually off in the distance when found, rarely directly overhead, putting them at distances that are likely further than a mile away. Also, efforts to discern just how far we humans can actually see with acuity shows that, with unaided vision, humans can distinguish "two headlights on a car" at just under two miles away (http://www.livescience.com/33895-human-eye.html).



So, the question is, did we miss Broad-wings in 2016 because we did not detect them or because they were not there? Just how far away can we see a Broad-winged Hawk, and how much of a difference does a blue sky make? Thermals are supposed to occur where warm air rises and then cools to form clouds. If the sky is clear blue (no clouds) does that mean there are no thermals? If there are no thermals, does the behavior of Broad-wings change in ways we do not expect? For example, without thermals, is there any way for Broad-wings to concentrate in the kettles we expect to see? If not, they could be migrating at very low elevations where not expected. If they are moving through at lower elevations, over the tree tops and between mountains and hills, we would expect to see individuals or small groups low to the ground and dispersed across the landscape. We would expect numbers in the tens and hundreds, not thousands, with many of the Broad-wings undetected by watchers on mountaintops. Numbers of these magnitudes are what we experienced this season in our southern Regions. So, our 2016 data supports this hypothesis. An alternative to the low flight hypothesis is a high elevation alternative. This would require either cloudless thermals or powered flight to reach and some advantage to sustain—maybe there are tail winds aloft? If anyone has any ideas or answers, please send your thoughts to merlin@pipeline.com. At Hook Mountain on 9/21, we had evidence of both low elevation and high elevation flight:

Are They Specks of Dust or Broad-wings?

"I was not prepared for what took place, which I recall seeing maybe just twice before in my days of hawk-watching [circa 1991] . . . At 4:30, when I thought I would throw in the towel . . ., I saw . . . ONE broad-wing . . . coming towards the Hook—it gained a bit, & went past on the north side, with Rockland Lake below . . . it went past the "quarry" . . . N-NW of Hook, and that's when I got MORE birds in my bins—MANY more! These were not close birds . . . but wow, I was able to get some semblance of a count as they kettled over the far mountains that are west of Bear Mt.—that's a long way, & this was in 12x50 bin's—these BW Hawks, . . . came ..[until]..5:22 pm [when] . . . at least 100 more BW's, streaming after going high from the farthest-of-all kettles, that at first just looked like "dust" but came close enough to see shapes & count them." Tom Fiore, email [The quarry is 4.3 miles away; Bear Mountain is 14 miles away.]

PEAK DAILY SITE COUNTS - Fall 2016

BROAD-WINGED HAWK		
Clarry Hill	9/15	4602
Greenlaw Mt	9/21	4292
Pack Monadnock	9/15	3245
Carter Hill	9/16	3026
Clarry Hill	9/22	2827
Pack Monadnock	9/22	2706
Wachusett Mt	9/24	2281
Mount Peter	9/21	2279
Putney Mt	9/16	2271
Hook Mt	9/21	2212
Clarry Hill	9/24	2192
Putney Mt	9/20	1844
Mount Watatic	9/15	1699
Pack Monadnock	9/21	1667
Mohonk	9/16	1644
Greenlaw Mt	9/14	1624
Wachusett Mt	9/15	1581
Harpswell	9/24	1153
Clarry Hill	9/26	1110
Quaker Ridge	9/15	1014
Wachusett Mt	9/13	929
Mount Peter	9/16	882
Wachusett Mt	9/21	870
Chimney Rock	9/25	835
Putney Mt	9/17	698
Mount Peter	9/15	696
Quaker Ridge	9/21	691
Shatterack Mt	9/14	670
Quaker Ridge	9/24	667
Mohonk	9/21	651
Cadillac Mt	9/26	641
Clarry Hill	9/23	634
Pack Monadnock	9/16	629
Mohonk	9/23	596
Shatterack Mt	9/21	593
Pack Monadnock	9/23	552
Clarry Hill	9/21	537

RED-TAILED HAWK		
Lighthouse Pt	11/7	137
Putney Mt	10/31	95
Mount Peter	11/4	71
Chimney Rock	10/26	69
Mount Peter	11/6	58
Clarry Hill	10/30	49
State Line	10/31	46
Mount Peter	10/26	46
Lighthouse Pt	11/6	45
Mount Peter	10/31	42
State Line	11/10	41
Putney Mt	10/26	41
Putney Mt	10/19	40
Putney Mt	10/30	40
Putney Mt	10/24	38
Putney Mt	10/25	37
Hook Mt	10/31	37

SWAINSON'S HAWK		
Wachusett Mt	9/20	1
Clarry Hill	9/27	1

RED-SHOULDERED HAWK		
Quaker Ridge	10/26	82
Chimney Rock	10/26	65
Chimney Rock	10/31	62
Quaker Ridge	10/31	55
Quaker Ridge	11/7	46
State Line	11/10	39
Quaker Ridge	11/1	39
State Line	11/7	36
Quaker Ridge	11/23	35
State Line	10/31	35
Montclair	10/26	35
State Line	11/8	33
Quaker Ridge	11/14	32
Quaker Ridge	10/30	32
Chimney Rock	11/6	30
Montclair	10/31	30
Chimney Rock	11/5	28
Chimney Rock	11/8	27
Quaker Ridge	11/8	23
Montclair	11/6	23
Hook Mt	11/8	22
Lighthouse Pt	11/6	21
State Line	11/4	21
Quaker Ridge	11/5	20

ROUGH-LEGGED HAWK		
Pack Monadnock	10/26	1
Carter Hill	10/26	1
Clarry Hill	10/30	1
Putney Mt	10/30	1
Putney Mt	10/31	1
Greenlaw Mt	11/5	1
Lighthouse Pt	11/6	1
Putney Mt	11/10	1
State Line	11/12	1

GOLDEN EAGLE		
Putney Mt	10/11	2
Chimney Rock	10/26	2
Hook Mt	11/6	2
Bear Mt.	11/16	2
Hook Mt	11/23	2

BALD EAGLE		
Clarry Hill	10/19	43
Lighthouse Pt	9/25	36
Clarry Hill	10/25	28
Chimney Rock	9/24	25
State Line	9/30	24
Chimney Rock	9/25	23
Lighthouse Pt	10/4	22
Bear Mt.	9/28	22
Clarry Hill	9/15	21
Clarry Hill	10/30	21
Clarry Hill	10/24	19
Johnnycake Mt	9/15	17
Lighthouse Pt	9/15	16
Wachusett Mt	9/16	16
Wachusett Mt	9/12	16
Bear Mt.	9/29	15

SHARP-SHINNED HAWK		
Lighthouse Pt	10/10	445
Quaker Ridge	9/21	240
Lighthouse Pt	10/25	175
Hook Mt	10/11	135
Lighthouse Pt	10/26	127
Lighthouse Pt	9/24	125
Quaker Ridge	9/24	123
Lighthouse Pt	10/14	119
Putney Mt	10/19	118
Harpswell	9/25	114
Lighthouse Pt	10/24	113
Chimney Rock	10/4	112
Chimney Rock	10/9	101
Lighthouse Pt	9/21	96
Hook Mt	10/7	90
Quaker Ridge	9/25	89
Lighthouse Pt	10/28	86
Pack Monadnock	9/21	86
Putney Mt	10/10	85
Hook Mt	9/26	83

COOPER'S HAWK		
Lighthouse Pt	10/10	107
Lighthouse Pt	10/25	77
Lighthouse Pt	10/14	75
Lighthouse Pt	10/4	64
Lighthouse Pt	10/26	46
Lighthouse Pt	9/29	42
Lighthouse Pt	11/6	39
Lighthouse Pt	11/4	35
Lighthouse Pt	9/24	32
Lighthouse Pt	10/31	31
Lighthouse Pt	10/20	31
Quaker Ridge	10/4	30
Lighthouse Pt	10/5	29
Lighthouse Pt	9/28	27
Montclair	10/3	24
Hook Mt	10/15	23
Lighthouse Pt	10/11	23
Quaker Ridge	10/25	22
Lighthouse Pt	11/7	22

NORTHERN GOSHAWK		
Putney Mt	10/19	5
Greenlaw Mt	10/19	5
Pack Monadnock	10/31	5
Hook Mt	11/4	5
Putney Mt	10/10	4
Putney Mt	10/11	4
Pack Monadnock	10/15	4
Pack Monadnock	10/19	4
Pack Monadnock	10/20	4
Pack Monadnock	10/5	3
Pack Monadnock	10/10	3
Putney Mt	10/26	3
Putney Mt	11/4	3
Putney Mt	11/7	3

MISSISSIPPI KITE		
Shatterack Mt	9/21	1

AMERICAN KESTREL		
Lighthouse Pt	10/10	161
Fire Island	10/10	110
Cadillac Mt	9/15	85
Cadillac Mt	9/24	83
Fire Island	9/25	52
Cadillac Mt	9/25	51
Chimney Rock	9/21	50
Lighthouse Pt	9/24	48
Chimney Rock	9/24	37
Quaker Ridge	9/21	37
Harpswell	9/25	36
Chimney Rock	9/15	34
Fire Island	10/14	32
Clarry Hill	9/22	31
Clarry Hill	9/28	29
Cadillac Mt	9/2	28
Chimney Rock	9/25	28
Wachusett Mt	9/24	28
Quaker Ridge	9/29	25

MERLIN		
Fire Island	10/10	215
Fire Island	10/4	85
Fire Island	10/1	52
Fire Island	10/24	49
Fire Island	9/24	43
Lighthouse Pt	10/10	43
Fire Island	10/3	42
Fire Island	10/25	40
Lighthouse Pt	10/23	36
Fire Island	9/21	34
Fire Island	9/25	33
Chimney Rock	9/20	33
Fire Island	10/14	32
Harpswell	9/25	26
Fire Island	9/30	26
Fire Island	10/23	23

PEREGRINE FALCON		
Lighthouse Pt	10/4	15
Fire Island	9/27	11
Lighthouse Pt	10/5	11
Fire Island	10/10	11
Fire Island	10/3	10
Lighthouse Pt	10/14	10
Fire Island	10/4	9
Fire Island	10/9	9
Putney Mt	10/10	8
Lighthouse Pt	9/24	7
Lighthouse Pt	9/25	7
Lighthouse Pt	9/29	7
Mohonk	9/29	7
State Line	10/4	7
Lighthouse Pt	10/10	7
Fire Island	10/1	6
Fire Island	10/28	6
Pack Monadnock	10/7	6
Pack Monadnock	9/16	6
Lighthouse Pt	10/31	6
State Line	10/20	6

OSPREY		
Lighthouse Pt	9/24	121
State Line	9/28	108
Fire Island	9/24	101
Lighthouse Pt	9/15	76
State Line	9/29	60
Lighthouse Pt	9/21	55
Quaker Ridge	9/24	51
Quaker Ridge	9/12	46
Clarry Hill	9/16	46
Lighthouse Pt	9/28	45
State Line	10/4	44
Chimney Rock	9/24	42
State Line	9/21	40
Lighthouse Pt	9/25	39
State Line	9/26	39
State Line	10/8	39
Fire Island	9/25	38
Pack Monadnock	9/23	36
Clarry Hill	9/27	36
Quaker Ridge	9/16	36

NORTHERN HARRIER		
Harpswell	9/25	27
Lighthouse Pt	9/25	21
Fire Island	9/25	19
Fire Island	10/31	19
Lighthouse Pt	10/10	18
Lighthouse Pt	10/23	18
Lighthouse Pt	10/25	16
Lighthouse Pt	10/28	16
Fire Island	9/24	14
Fire Island	10/26	14
Fire Island	11/6	13
Lighthouse Pt	9/24	12
Lighthouse Pt	11/6	12
Cadillac Mt	9/15	11
Cadillac Mt	9/25	11

TURKEY VULTURE		
Mohonk	10/19	200
Chestnut Ridge	11/1	190
Chestnut Ridge	10/16	154
Mount Watatic	10/15	151
Montclair	10/15	143
Wachusett Mt	10/11	134
Clarry Hill	10/15	120
Chestnut Ridge	10/15	117
State Line	10/23	116

BLACK VULTURE		
Johnnycake Mt	9/21	30
Hook Mt	11/18	25
Mount Peter	9/20	17
Mount Peter	10/10	15
Mount Peter	10/20	12
Wildcat Ridge	10/25	12
Mohonk	9/17	11
Chestnut Ridge	10/25	11
State Line	10/20	9
State Line	11/10	9

Two Very Similar Species, Two Very Different Migration Count Trends: Bald Eagles and Osprey Revisited

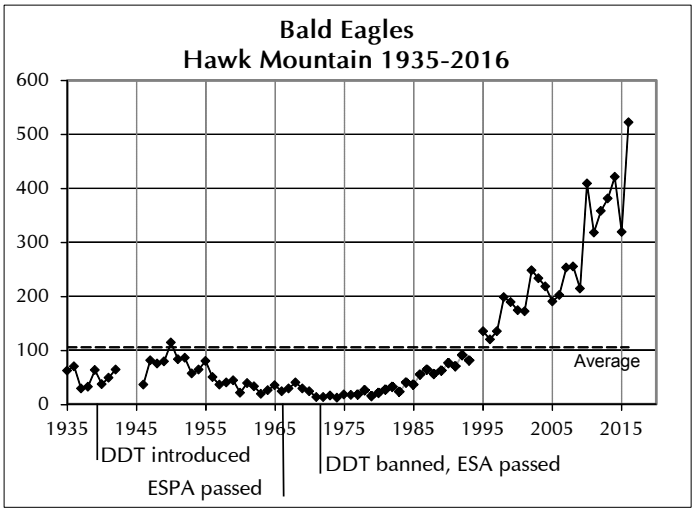
Drew Panko, Coordinator, Fire Island Hawk Watch

Bald Eagles:

Last year in this Report I reviewed some thoughts and questions I had regarding Osprey and Bald Eagle (BE) populations as reflected in local NY metropolitan region hawk migration counts. Your insightful responses helped me to further clarify the paradox and stimulated further exploration of available studies from multiple resources.

Last year I compared trends for BE in the NY metropolitan region with trends at Hawk Mountain PA and found they were essentially the same for our years of coverage. Since Hawk Mountain data includes more years historically, I use that to further understand the BE population trend.

As in the graph for Hawk Mountain PA, there has been a remarkable increase in Bald Eagle (BE) counts at all hawk watches in the Northeast. If asked why the numbers are increasing so markedly, many informed commentators would say that it is because they are recovering after the banning of DDT. While that is part of the reason, and likely they wouldn't be increasing without the ban, it is probably the smallest part of the story of their continuing recovery.



Considering the graph, how many BEs would have been counted at Hawk Mountain in 1800? 1700? 1600? I have no idea. However, it is inconceivable to me that the counts would have been below those seen in 2016! So why did the counts decline from 500+ in the 1600s to approximately 50 in 1930s? While DDT was introduced in 1939 to control pests and disease among humans, it wasn't until its widespread use for agriculture after World War II that its concentration in the environment rose and its insidious side effects began to be noted.

Rachel Carson's "Silent Spring" in 1962 touched off an intense public debate that was finally resolved in 1972 when the EPA banned its use. A quick look at the graph shows the average number of BEs migrating past Hawk Mountain in 1946-1955 was higher than the average from 1935-1942. But DDT was not in use during 1935-42, while it was in 1946-55. It looks like WW II was good for BE populations in the northeast. An obvious explanation suggests itself, namely men in the northeast were too busy fighting WW II to persecute BEs. The huge decline from before 1600 to at least 1955 was due to human persecution of BEs. Direct shooting, trapping, poisoning, egg collecting, feather collecting and simple vandalism by Europeans with guns and axes was the reason for the huge decline in BEs before 1955. Undoubtedly, some of the decline from 1955 to 1975 was due to the presence of DDT in the environment, but it is likely that human persecution continued as well. Poisoning from pesticides, other than DDT, continues to this day. And new hazards such as wind turbines and electric power lines continue to take a toll.

What accounts for their striking recovery from around 1975 to the present? First the banning of DDT in 1972 and its consequent decline in the environment is partly responsible. By 1966, congress, alarmed at the decline of our nation's symbol, passed the Endangered Species Preservation Act (ESPA). In 1972 this was expanded and improved as the Endangered Species Act (ESA), enforced by the newly formed EPA in 1972. But certainly as important in the eagles' recovery, was the transformation of the attitudes of the citizens of the US towards all wildlife, arising out of the publication of Silent Spring, the science it is based on, and the research and controversy it stimulated. And because the BE is our national symbol. The consequent banning of DDT saved BEs from extirpation in the northeast. Still, the low reproductive rate of the Bald Eagle would have delayed its recovery for many years if it wasn't for the dedication, fund raising and hard work of those in the ornithological community that introduced and hacked BEs into the wild. Without the hacking programs to "jump start" the population increase, the recovery would have been much slower. Another effect of the reintroduction of these Bald Eagles may be an increase in their tolerance of human activities. They were introduced in places where humans on foot and in vehicles were visible, but benign, i.e. they did not shoot at the eagles. This may play a part in the size of the population that the BEs finally achieve in the future.

So the changes in the human population's attitudes and behavior toward wildlife is what allowed the population of BEs to turn around and reach the levels we see today.

Although the change in the public's attitude allowed the recovery, it by no means guaranteed it. The eagles still needed habitat and a prey base. We have irreversibly stolen some BE habitat with our cities and surrounding communities. But I believe a lot of empty habitat remains. The decrease in farming in the northeast and the return of mature woodland has to be a plus for the eagles. In addition, we have created some ideal habitat, that wasn't present in 1900—the extensive system of reservoirs with wooded watersheds and controlled human access created to supply water to the developed areas. The prey base in these reservoirs and other freshwater habitat has likely improved with the introduction of Common Carp and its relatives. While their introduction has been disastrous for native fish, aquatic insects and aquatic plants I can't think of a fish that would be easier for a BE to catch. The Birds of North America does not mention the Carp as prey, but its size and its tendency to forage in shallow waters should make it particularly available to eagles. The prey base in salt waters is much more problematical and must be carefully tracked in the future. But recent data on Menhaden is encouraging (NOAA 2015, National Geo 2015).

Now we are in a better position to answer the questions posed in last year's *Hawk Migration Report*, namely:

1) What was the BEs original population level in colonial times?

2) Compared to pre-colonial times, is there more available habitat for Bald Eagles?

3) When will the growth curve for BEs level off?

Firm answers to these questions are hard to come by, but the "Proposal to Delist" the BE from the Endangered Species List suggests that the pre-colonial population was between 250,000 and 500,000 (FWS 1999). Estimates are that there are well over 100,000 today with significantly more than 10,000 breeding pairs in the lower 48 (FWS 1999). The enormous decrease in populations from the pre-colonial period to their nadir in the 1950's was due to direct persecution by humans. Their recovery from the 1950's to today is due to the reduction of the same human persecution that caused their decline as well as the reduction/control of DDT (Buehler 2000).

Suitable habitat has likely decreased since pre-colonial times due to direct occupancy by humans. While the percentage of people that directly persecute eagles today is much lower, the human population continues to increase and impact eagles negatively through expansions: power lines, for example.

Current estimates of the growth rate of BEs is 8-13% (Buehler 2000) in the lower 48. This growth rate, if maintained, will double the population every 10 years. My best guess is that we can double the population once more but will then start to run into limiting factors in the following 10 or 20 years. So, on the basis of informed speculation and unbridled audacity, I'll go out on a limb and predict exponential growth of the BEs to continue for about 10 years—say to 2030, and to begin to slow after that.

Why will they continue to increase? The transition of land from farms to woodland, and the large reservoirs suppling both good breeding habitat and good feeding stations (fish are killed when pumped through the system) will increase the number of BEs that the northeast will support—provided the human population continues its positive attitudes toward this species and does not introduce high levels of any new pollutants that threaten their welfare. Eventually we may well support a larger population of BEs then were present in pre-colonial North America and are present today.

Major unknown factors remain: What about the coastal population of BEs, their disturbance by human activities and their relation to Osprey and the dependence of both on overfished coastal waters?

Osprey:

With our Bald Eagle numbers growing exponentially, we turn to the paradox of migration numbers and population of Osprey (OS). For the six hawk watches in the NY region that have data since 1982, there seems to be no overall trend for all the watches over the years (http://www.battaly.com/nehw/2015/panko/), and 2016 continues with mixed trends.

Fire Island and Hook Mountain had an above average year, while Lighthouse Point, Quaker Ridge, Mount Peter and Montclair had counts that were below average.

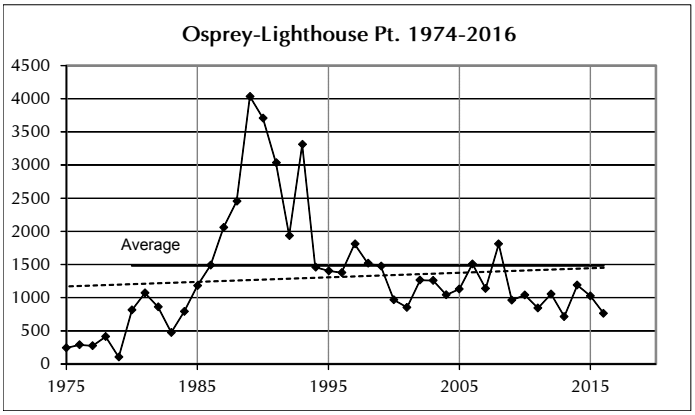
Fire Island	somewhat above average
Lighthouse Pt	much below average
Quaker Ridge	somewhat below average
Hook Mountain	much above average
Mount Peter	much below average
Montclair	much below average

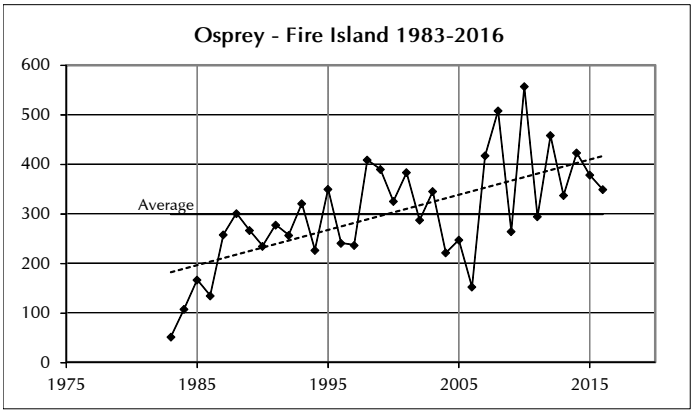
To see if counts outside the NY Metropolitan region were similar, a comparison was made to the 2016 data from Cape May and Hawk Mountain. The results were similarly mixed.

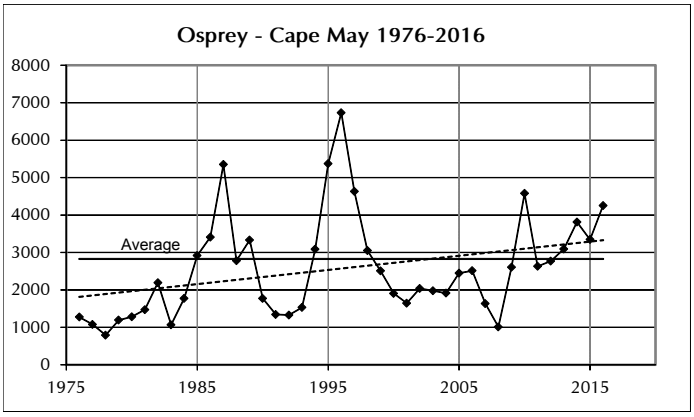
Cape May	much above average
Hawk Mountain	much below average

In her analysis of all the hawk watches in the northeast, Trudy notes: "Migrating Osprey are declining in the Northeast for the long term…and...the short term trend shows a loss of 92 each year." (p 24) Yet, any birder in the northeast will tell you that they have been seeing more breeding Ospreys in recent years than in the past. So it is a very mixed bag for the migration counts. Some are increasing by substantial amounts and others are decreasing, also by substantial amounts. A comparison of coastal vs inland sites doesn't seem to explain it. Below are three coastal sites and two inland sites:

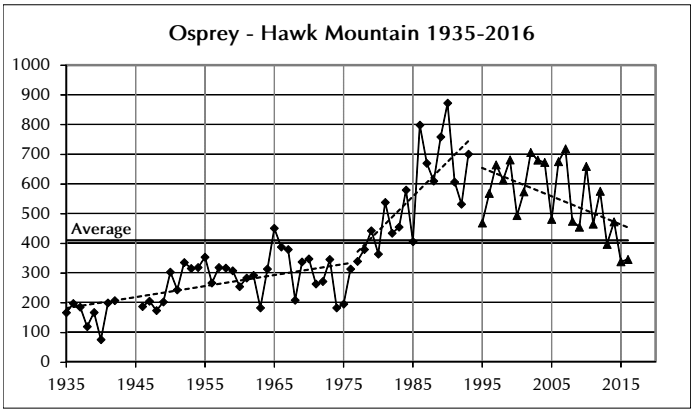
Coastal:

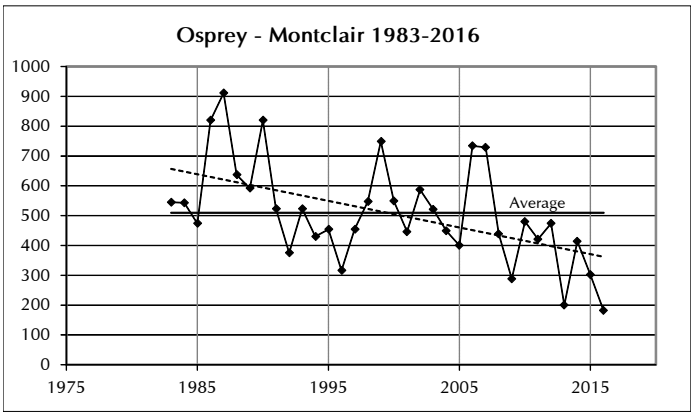






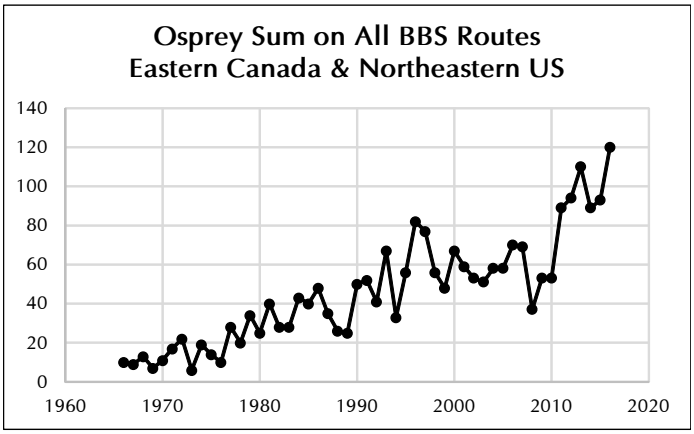
Inland:

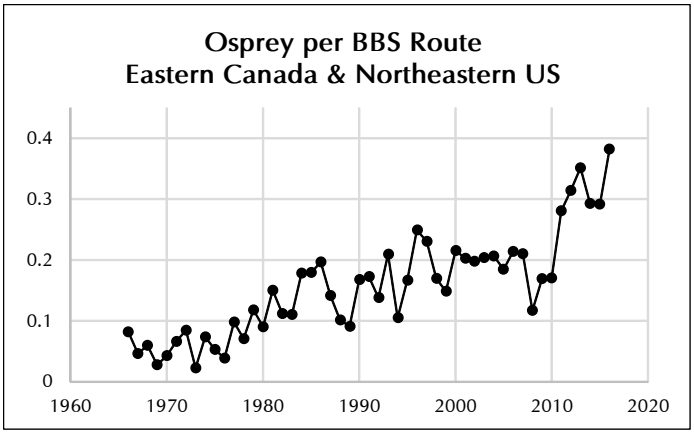




There are many ways to explain a decline in OS. Overfishing may be destroying their prey base, the post-DDT pesticides (PCBs, Deldrin, Glyphosates, etc.) may be poisoning them, Bald Eagles may be disrupting their breeding, and a host of other factors. But what about the wide spread belief that they are, in fact, increasing, not decreasing as the migration counts would imply?

Bierregaard (2014b) reports an increase in breeding in the northeast. He also reports that their reproductive rates are above replacement levels. The "Osprey Nation" (Nuttall, 2017) CT Audubon project, which has taken over the monitoring of Osprey nests in CT, reports a growth of nesting Osprey from less than 10 in the 1970's to 337 in 2016. To confirm, or disconfirm the fact that breeding OS were, in fact, increasing in the northeast, I went to the Breed Bird Survey (BBS) data from the USGS (USGS 2017). I wanted to see if bird surveys, not focused on OS, and mostly inland, have seen a change in OS during the breeding season. I compiled the following by adding all the OS seen on BBS surveys and dividing by the number of routes surveyed. I also tallied all of the Osprey seen and heard during BBS surveys in the northeast.





I consider this a strong confirmation of Bierregaard's thesis that the number of breeding Osprey in the northeast are increasing. These data include all of the northeast and NJ, and all the provinces of eastern Canada from Quebec to Newfoundland. Thus we are left with the paradoxical conundrum that although the number of OS breeding successfully in the northeast is increasing, the number counted in migration has been decreasing for the last 30 years or so. I consider this very important because it brings into question whether hawk watch counts do actually monitor raptor populations.

Now Osprey migration is quite different from most other hawks. The females leave early, often as early as mid-August. They and the juveniles tend to wander around considerably before initiating migration, so that their migration starting point may be hundreds of miles from their breeding site. They fly long distances over water and sometimes at night. They are long distance migrants and normally winter in South America. But none of these factors help explain our conundrum because the birds have been behaving this way for lots longer than the 100 years we have been studying them.

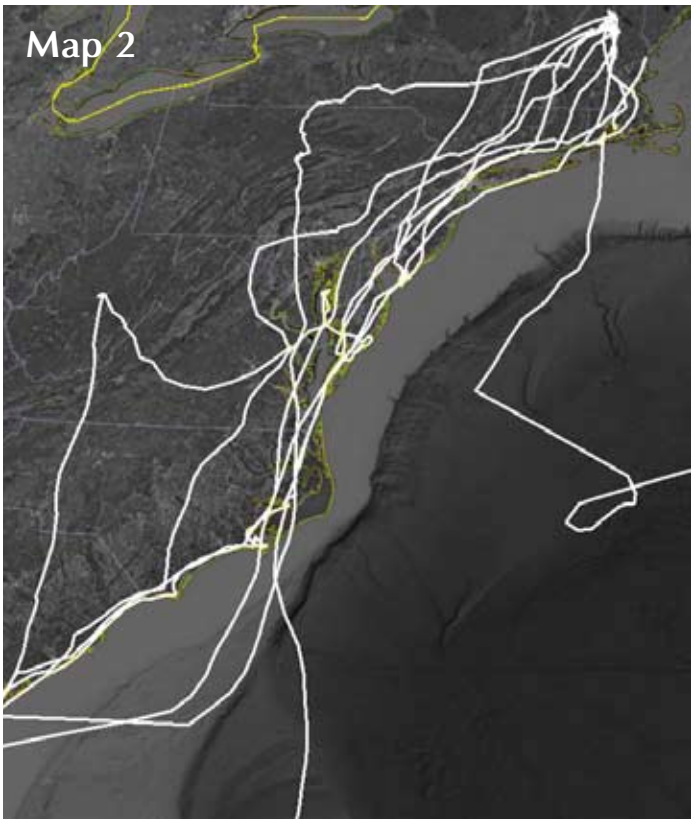
In the past 30 years there has been a change in where OS breed in the northeast. In the 1940's they were mostly limited to a few large colonies and now, for the most part, the large colonies have decreased (Bierregaard, 2014b), but Osprey have spread all along the coast as well as inland. They also used to nest in trees but now almost all nests are on human structures, such as telephone poles, nest platforms erected specifically for them, cell towers, buoys and channel markers, etc.

The biological characteristics of their habitat have changed as well. Predators and prey have changed in numbers and distribution. Raccoons are increasing near human habitations, and Bald Eagles have been increasing away from human habitations. Great Horned Owls are a problem everywhere there are woods. They are a threat to nestlings, juveniles, and adults! But it is unlikely that these factors could affect the numbers counted at hawk watches enough to cause the decrease we see in migration counts.

Hypothesis:

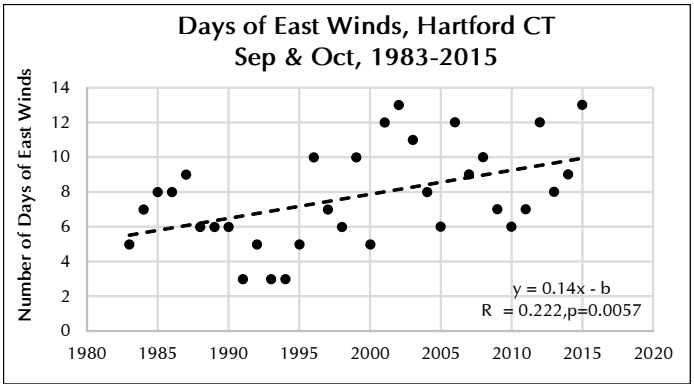
We have some hints as to what is happening from the hawk migration data itself. First, there doesn't seem to be a common trend shared by all of the sites over the years. This would be explained if the migration path that the Osprey follow changes from year to year and/or we are not counting the same, or even a substantial proportion of, the migrating population. A second hint comes from the tracking maps from Bierregaard's satellite tagged Ospreys. (http://www.ospreytrax.com/Osprey_Migration/maps%202010/Belle-2010.htm#18_Oct_2010)

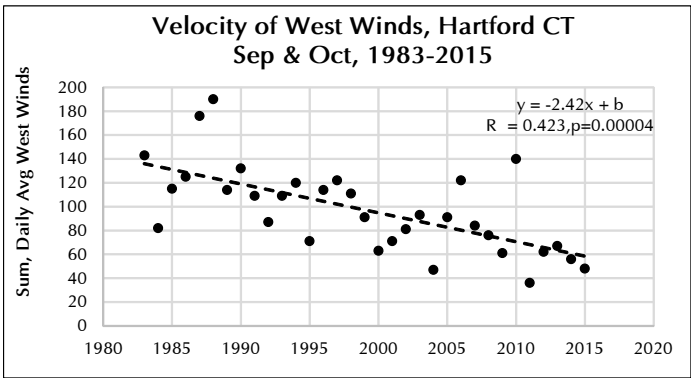
Map 1 shows the fall migration routes of 18 juvenile Ospreys tagged on Martha's Vineyard and Newfoundland. I count 13 birds doing an overwater flight directly to the Caribbean, Only 2 or 3 make the journey to Florida entirely over land and mostly along the coast. These juveniles have an inate sense to fly south which, from Martha's Vineyard and many NE coastal sites, leads them out over the ocean. When they return as adults they follow an overland route which they then use on their subsequent southbound journeys indicating that they learn a safer over-land migration route.



Map 2 shows the fall migration routes of ten juvenile Ospreys tagged in New Hampshire by Bierregaard and Iain MacLeod. Unlike the Vineyard birds, these Ospreys from inland sites, follow a more overland route south for the first time. The one exception was a youngster named Chip who left NH and staged for five weeks in coastal Rhode Island before starting his migration due south. He was blown out to sea in a storm and then hitched rides on east-bound freighters. After a week at sea he died near the Azores. Several NH birds have headed out over open ocean over the Georgia Bite, but all have "corrected" and found the Georgia and/or Florida coasts or the Bahamas.

But the conclusion is clear, recently-fledged Osprey juveniles can and do fly out of our region, overwater and missing a large majority of our hawk watches. Given that the densest Osprey breeding populations are in coastal areas of New England and up into the Canadian Maritimes, it is reasonable to assume that many juvenile Ospreys miss many New England and mid-Atlantic hawkwatch sites perhaps after





hitting Cape Cod. This alone does not account for a decreasing count of Osprey unless an increasing proportion are taking this route in recent years.

What could cause an increasing proportion of Osprey to take off on an open ocean migration track? My best guess is what Trudy documented at last year's Raptor Research Conference—a decrease in the velocity of west wind days, and an increase in the number of days of east winds during the migration period. (See graphs) Before taking a perilous 2-3 day overwater journey it is unlikely that they would do this in unfavorable winds. So we would not expect to see them taking off while facing opposing south winds. North winds would aid them in such a journey and east winds would tend to carry them safely back to the coast. And we have been seeing that increase in east and northeast winds. What effect would west winds have? Consider Belle's course (the heavily dotted path in Map 1). It is likely that she encountered the westerlies common at this latitude and was drifted to the east….a very dangerous proposition because Osprey cannot land on water and rest—their plumage is not water proof like the ducks. And, although they could catch food, I've never seen or heard of one eating on the wing as the falcons do. So being carried too far east by westerly winds is tantamount to a death sentence. So, I'm proposing that the breeding evidence is correct…Ospreys breeding in the northeast are increasing from Newfoundland to Quebec and south. The migration counts are decreasing because more Osprey are encountering good winds when they are on the coast because climate change is producing a change in prevailing winds. We have seen decreasing west winds and increasing east winds so a far greater proportion of Ospreys are taking out over water and avoiding our land

based hawk watches. The observed increase in Osprey counts at Fire Island and Cape May are due to "short hoppers", which are Osprey that start out over water on favorable winds but then either reconsider their choice or, on encountering, strong east winds, wind up heading back to the coast. That is my hypothesis, unless I hear serious criticisms from readers of this Report….and if you have a good argument against this theory by all means let me know at dpanko@pipeline.com.

I am not completely comfortable with this hypothesis as it is based mostly on the over water tendencies for Osprey starting out at Martha's Vinyard only. Future or unpublished banding or tracking data may reveal other routes for Osprey. But it seems reasonable to expect that any Osprey that encounters the coast while migrating south in favorable weather will have the same tendency to jump off over the ocean as the birds from Martha's Vineyard. Birds taking a more westerly route (West of Lake Erie) will continue to take a more inland route to Florida before jumping off for an over ocean leg of their migration.

Acknowledgements:

Many thanks to Rob Bierregaard for his many contributions to our evolving understanding of Osprey breeding and migration and his generous permission to use his data. Iain MacLeod offered some interpretation of these data and created the maps of his and Bierregaard's research. Also this article would not have been possible without hawkcount.org, which is a project of the Hawk Migration Association of North America. Many additional thanks to the many compilers and data entry folks from each watch site, including, but not limited to Judith Cinquina (Mount Peter), Steve Mayo (Lighthouse Point), Wayne and Else Greenstone (Montclair), Trudy Battaly (Hook Mountain.), Joe Zeranski and the Greenwhich Audubon Center (Quaker Ridge), Hawk Mountain Sanctuary and Laurie Goodrich (Hawk Mountain), Dave Mizrahi and the Cape May Bird observatory (Cape May), and all the great watchers and good friends at the Fire Island Hawkwatch. For a list of references, see http://www.battaly.com/nehw/2015/panko/. It must be stressed however that it is only Drew Panko that is responsible for any errors, mistakes or misinterpretations in this article.

Osprey. Photo by Iain MacLeod

. . . From the President, continued from page 1

The Raptor Population Index (RPI) Project, a combined effort of the Hawk Migration Association of North America (HMANA), Hawk Watch International, Hawk Mountain Sanctuary, and Bird Studies Canada, will be publishing a biennial update on trends in raptor populations this year (rpi-project.org). Then we shall see if the trends noted in this report are reflected across the continent. We'll also have a broader view of what Trudy has documented in the northeast: that counts for several species are declining more at counts at the southern sites rather than at higher latitudes. RPI researchers have recently published a paper (Condor, 2017) showing that Red-tailed Hawk migration and wintering counts are declining in southern regions while winter counts are increasing in northern latitudes, indicating a change in migration strategy. Increasing numbers of Red-tailed Hawks apparently do not migrate or migrate shorter distances than they have in the past, likely in response to climate change. The RPI research also indicates, however, the possibility of breeding population declines in the central and eastern Canadian provinces.

We'd also like to welcome two new directors to NEHW this year: Ted Mara, site coordinator at Plum Island in eastern Massachusetts and the recently elected President of the Eastern Massachusetts Hawk Watch, and Brian Rusnica, one of the site coordinators at Mt. Watatic in Massachusetts. We are always looking for people who might want to join the NEHW board or help us in one of many ways, including organizing our quadrennial conferences. It's a great ways to learn more about raptors in the northeast, meet many people who know a lot about raptors, and to make new friends. The board meets once each year, usually in early March, in the Connecticut Valley in Mass. or Conn. If you would like to learn more about what you might do in NEHW, contact any of the regional coordinators or directors on the masthead listed on page 1. It is a lot of fun, and you meet some really great, knowledgeable people!

The NorthEast Hawk Watch (NEHW)—and the raptors we all love—need your continued involvement and support. Renew your membership in NEHW, give inexpensive gift memberships to friends, buy a license plate holder so people can see that you are a hawk watcher, and invite friends to go hawk watching with you. Encourage young people to get out and look up during migration season! In a significant step that will appeal to the digital generation, HMANA has worked with a company called Dunkadoo to make it easy for anyone to enter all their hawk watch data electronically real-time via wifi on a tablet, but only if you want to. We need to do all that we can to help ensure that this important citizen science research in which we are all engaged continues, for the benefit of the hawks we love.

Paul M. Roberts
NEHW President

You Can Help NEHW

We suggest that you consider giving a NEHW membership to hawk watching or birding friends. It is only $10 for a 36-pp annual report that provides data and analysis on over four decades of hawk watching in the northeast. Nobody in North America provides a more comprehensive report on each year's migration by site, by species, and by day for any region.

NEHW has developed a new membership brochure that you can download from our web site at www.battaly.com/nehw. We want to recruit more people, including young adults and kids, to hawk watching. They are, in fact, the future of hawk watching and raptor conservation. Consider giving a brochure to friends or members of your local bird or nature club.

Visit the NEHW web site at www.battaly.com/nehw to check out the snappy NEHW license plate holders, available for only $5 each plus postage and handling. You can also buy them directly from a NEHW director near you. The license plate holders announce to everyone who sees your car that you are a hawk watcher, and that you "COUNT", and they help others interested in hawks learn about NEHW!

Thank YOU For Your Gifts !

In 2015-2016, 63 people, more than half our membership, made financial gifts to NEHW in addition to their membership dues. Your gifts are vitally important to our efforts and we thank you: Harvey Allen, Martha Allen, Alan Alterman, Anonymous, Ajit Antony, George Appell, Renee Baade, David Babington, Daniel Barvir, Myra Boenke, John Boral, Julie Brown, Gail Cameron, Dana Campbell, Daniel Capuano, Bill Conger, Myles Conway, John Gluth, Barbara Goodchild, Gary Goodness, Laurie Goodrich, Arthur Green, Bill Haller, Bill Hanley, Alan Hinde, Craig Jackson, Russell Johnson, Seth Kellogg, Thomas Killip, Lloyd Klinger, Nigel Kraus, Susan Llorca, William & Marianne Loomis, Jane Low, Lisa Lozer, Terry Macaskill, Iain MacLeod, David Matsushita, Thomas McCullough III, John Merrill, Doris Metraux, Judith Moore, Donald Morgan, Matthew Nash, Alan Nordell, Deborah Oeky, Steve & Kathy Olson, John & Linda Parker, Linda Peskac, Marcus Rhodes, Philip Ribolow, Brian Rusnica, Joseph Scordato, Peter Severud, Thomas Snelham, Francisco Staffanell, Maryellen & Bob Stone, Thomas Swochak, Fred Vanderburgh, Steve Walter, Todd Watts, Joseph Wojtanowski, Mariko Yamasaki.

Merlin. Photo by Vic Berardi

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Mississippi Kite. Photo by Vic Berardi