DELAWARE-OTSEGO AUDUBON SOC. SPRING 2018 RAPTOR SURVEYS IN THE PROPOSED BLUESTONE WIND PROJECT

SUMMARY

The Delaware-Otsego Audubon Soc. conducted field surveys of raptors in the study area of the proposed Bluestone Wind Project area in Broome Co., NY in March, 2018. Fifteen days were covered at a site near the hamlet of Sanford, Broome Co. The surveys were timed to coincide with the peak of Golden Eagle migration.

101 migrating raptors were recorded during the period, including 42 Bald Eagles and 22 Golden Eagles. In addition, a significant number of non-migratory eagles were sighted. These included 218 Bald Eagles, 20 Golden Eagles, and 2 unidentified eagles.

On October 16, 2017 the Delaware-Otsego Audubon Society (DOAS) was awarded intervenor funding through the NY State Department of Public Service Article 10 review process for the proposed Bluestone Wind Project in Broome Co., NY. Funding was granted for the analysis of GPS tracking data from Golden Eagles, and for on-the-ground surveys of raptors to be conducted during the fall 2017 and spring 2018 peaks of the Golden Eagle migration.

A report on the fall 2017 surveys was submitted to Administrative Law Judge Sean Mullany on January 11, 2018.

This report covers the spring 2018 surveys which were conducted in March.

METHODS

Prior to the intervenor funding hearing on 10/16/2017, DOAS had scouted the project area for sites with an adequate viewshed for surveying migrating raptors, with limited success. Two sites were recommended to DOAS by Jason Ritzert of Bluestone Wind consulting firm WEST for the spring surveys. After scouting those, and other sites, DOAS chose to use one of the recommended sites nearest the hamlet of Sanford. Site coordinates are 42.103105° - 75.479114°, UTM - 18T 460385 E 4661335 N.

Between the approval of the funding request and the start of surveys, DOAS held separate conference calls with the US Fish and Wildlife Service (USFWS) and the NY State Department of Environmental Conservation (NYSDEC) to discuss a draft protocol and determine what additional data those agencies desired in their review of the Bluestone Wind project. USFWS requested that distance and height information of eagles be recorded. Eagles would be recorded as above or below 200 meters "above ground level" (the approximate height of proposed wind turbines), and within or beyond 800 meters from the survey site. As a result of this discussion, the protocol was revised to include these height and distance categories for all species.

NYSDEC requested detailed data – including the mapping of flight paths - for Bald and Golden

Eagles and two additional at risk species, Northern Harrier and Peregrine Falcon. A "Listed Species" form was created using data gathered by Bluestone Wind in their surveys as a model, and also added to the protocol. At the conclusion of the surveys, these data were entered into a spreadsheet for analysis (attached).

Five qualified hawk counters from the Franklin Mountain Hawk Watch were recruited to cover the site. A schedule was created and a final protocol was distributed to the DOAS surveyors. In addition, conversations were held with surveyors to ensure they understood the protocol and the system for recording data.

At the conclusion of the surveys, a quality control check was conducted, referencing the protocol, and comparing data on all daily forms and maps, and the hawkcount.org database, where data was also submitted. Inconsistencies were corrected with assistance from the surveyors.

SITE INFORMATION

Ideally, for surveying migrating eagles, a good view of a distant horizon provides the most information. Large soaring raptors, including Golden Eagles, frequently fly at low altitudes during migration, using lift from winds deflecting off hills and ridges to glide efficiently. An obstructed horizon - even in part - can result in missed birds, or birds that are within view only briefly. Such ideal sites have not been found in the project area.

Advantages of the selected site in Sanford:

- The site has as good or better a view as any other location scouted by DOAS for spring surveys.
- There is a clear view to the south.
- There are clear views of ridges on each side of the narrow valley in a southerly direction – the source of spring migrants.
- The ridge on the east side of the valley parallels the axis of the migration.
- The site is also surveyed by WEST.
- The site is on a public road, simplifying access.

Disadvantages of the selected site in Sanford:

- Since the survey site is at a low elevation, there is no view east or west beyond the near horizons created by the nearby ridges. Thus there is a narrow, limited field of view. In addition, this location on a valley floor is an unlikely site for a wind turbine.
- The surrounding ridges are approximately 200 meters above the site. Assessing risk based on bird elevations at the site will be difficult.
- The 800 meter distance threshold at the site does not reach the ridges. Thus, risk assessment based on distance also becomes difficult.
- There are obstructions limiting the view to the north and northeast. This has little impact on surveying migrants – which move in a linear path - but may restrict the view of non-migrant birds.

WEATHER AND OTHER FACTORS AFFECTING THE SURVEYS

Winter weather persisted through the survey period, with snow completely covering the ground throughout. Temperatures were generally below or around freezing. Three significant snow storms prevented surveys on some days. Persistent, and sometimes "lake-enhanced" snow showers, followed these storms and affected visibility at times. There was a northerly component to winds on 13 of 15 days. Wind direction most days ranged from west to north, with one day having NNE winds. There were southerly winds on 2 days.

With predominately winter weather conditions, most soaring birds appeared to be using orographic lift. No surveyors noted the use of thermals.

On west and northwest winds, migrants would be expected to use lift on the east side of the valley. The ridge there is well oriented to the spring migration. Observers documented many eagles using lift along that ridge. Many migrants followed a direct path along that ridge. Many non-migrant birds also used the ridge for lift.

Non-migrant eagles were frequently observed to the south. This is the only area where birds can be observed at any distance.

Through the period, eagle flights and paths were fairly concentrated in some areas. This would be expected with a limited range of wind conditions.

During 20 of the 105 hours of coverage, a second volunteer observer was present, and contributed to the surveys. With close horizons in every direction, few birds would be missed by a single observer. However, a second observer provided an advantage by being able to track individual eagles for extended periods of time. The primary surveyor cannot follow individuals for long periods without missing other birds.

RESULTS

Surveys were completed on March 22, 2018, one day later than planned. Persistent winter weather, and the three major nor'easter storms during the period contributed to the slightly late finish.

The number of non-migrant eagles of both species was exceptionally high, considerably more than had been anticipated. There were so many Bald Eagles seen on some days, many of them distant in an area where ridges confine a narrow valley, it became impossible to clearly count or identify individuals. After the first day of surveys, USFWS was immediately contacted to discuss how these birds should be documented. After discussion with USFWS, the method of documenting non-migrant Bald Eagles was changed from a count of individual birds to the documentation of "sightings" which would include possible multiple views of a single bird. Surveyors were directed to document every sighting and instructed to record as one sighting

any eagle that leaves their view briefly, then returns, with the surveyor confident it is the same bird.

Even though many non-migrant eagles of both species were distant according to the protocol (beyond 800M), none were so distant that species could not be determined when the eagles were seen well with good optics. The sightings were recorded on the Listed Species Form and the daily field map, and entered into a spreadsheet. These data were sorted by species, distance, height, and the number of birds per hour. Individual eagle sightings were only entered for a single hour, even if birds were visible for multiple hourly periods. The charts and graphs below summarize these sightings.
Note: Before a decision was made—following consultation with USFWS--on how to report these sightings, details were sometimes recorded on the maps only. These sightings were subsequently added to the Listed Species Forms. As a result, the numbering of birds on the maps is not always sequential with the times the birds were seen.

Non-migrant Golden Eagles were more limited in number. While these birds were also recorded as "sightings" a significant effort was made to identify individuals based on plumage differences. This was possible with a number of juvenile birds. Of the 20 sightings of non-migrant Golden Eagles, 5 individual juveniles were identified, with one being seen on 3 occasions. However, some juveniles were not seen well enough for this level of detailed identification. All adults were nondescript. A minimum of 6 different individuals were identified with confidence. Details on individual Golden Eagles can be found in Appendix A and elsewhere.

MIGRATING RAPTORS

101 raptors and Turkey Vultures were judged to be migrants during the 105 hours of surveys. This included 42 Bald Eagles, 22 Golden Eagles, 3 Northern Harriers and 2 Peregrine Falcons. Migrating eagles tended to concentrate on the east ridge. This would be expected with the prevailing wind direction during the period.

DOAS Sanford Spring 2018 migrant raptors daily totals

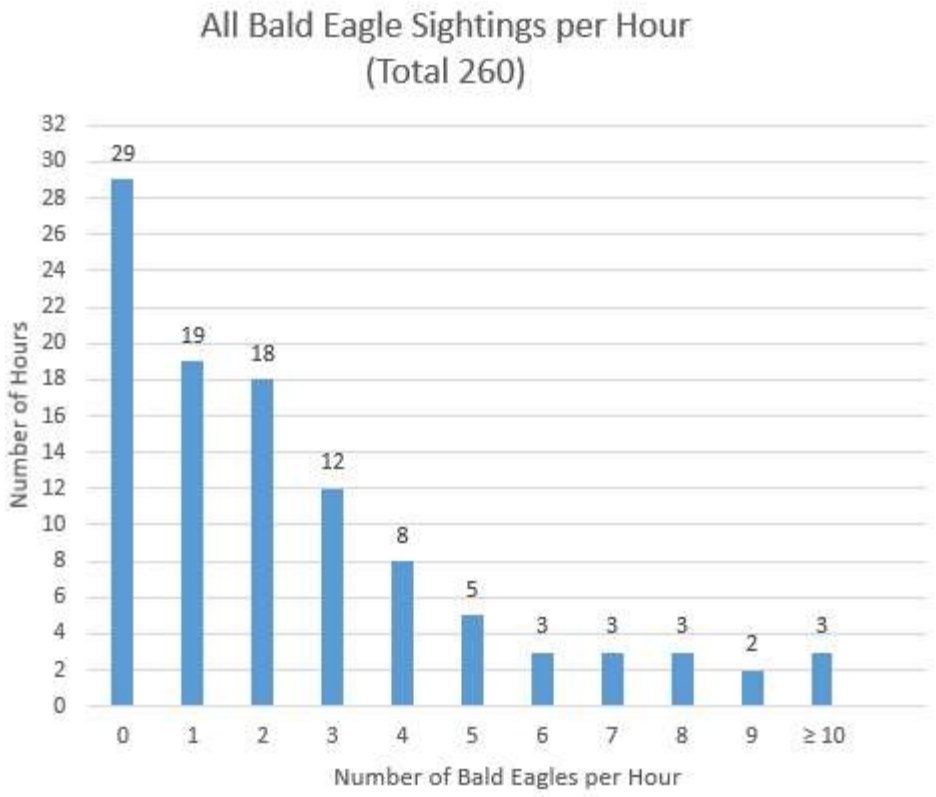
Date	Duration	WIND	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PG	UR	TOTAL
	(hrs.)																			
3/4/18	7.0	NW	0	2	0	16	0	0	0	0	1	0	3	0	4	0	0	0	0	**26**
3/5/18	7.0	NNW	0	0	0	1	1	0	0	0	0	0	2	0	0	0	0	0	0	**4**
3/6/18	7.0	S	0	2	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	**4**
3/8/18	7.0	W/NW	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	**2**
3/10/18	7.0	NW	0	0	0	3	0	0	0	0	0	0	0	0	1	0	0	0	0	**4**
3/11/18	7.0	W/NW	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	**3**
3/12/18	7.0	S	0	0	0	3	0	1	0	0	0	0	1	0	0	0	0	0	0	**5**
3/15/18	7.0	NW	0	0	0	6	0	0	0	0	0	0	0	0	1	0	0	0	0	**7**
3/16/18	7.0	NNW	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**3**
3/17/18	7.0	N	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	**1**
3/18/18	7.0	NW	0	1	0	4	1	0	0	0	0	0	0	0	1	0	0	0	0	**7**
3/19/18	7.0	NW	0	0	0	1	1	0	0	0	0	0	0	0	2	0	0	0	1	**5**
3/20/18	7.0	CALM	0	8	0	1	0	0	0	0	0	0	2	0	6	0	0	2	0	**19**
3/21/18	7.0	NNE	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	**3**
3/22/18	7.0	N	0	0	0	6	0	0	0	0	0	0	1	0	1	0	0	0	0	**8**
TOTAL	**105.0**		**0**	**17**	**0**	**42**	**3**	**1**	**0**	**0**	**2**	**0**	**10**	**0**	**22**	**0**	**0**	**2**	**2**	**101**

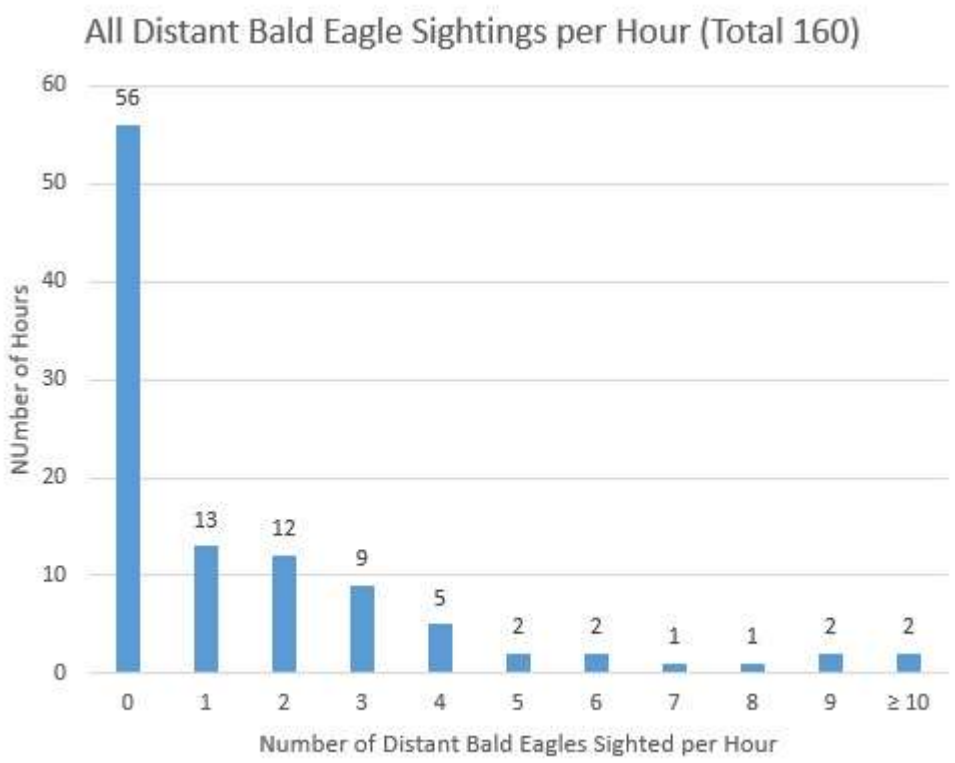
BV=Black Vulture; TV=Turkey Vulture; OS=Osprey; BE=Bald Eagle; NH=Northern Harrier; SS=Sharp-shinned Hawk; CH=Cooper's Hawk; NG=Northern Goshawk; RS=Red-shouldered Hawk; BW=Broad-winged Hawk; RT=Red-tailed Hawk; RL=Rough-legged Hawk; GE=Golden Eagle; AK=American Kestrel; ML=Merlin; PG=Peregrine Falcon; UA= Unidentified Accipiter; UB=Unidentified Buteo; UF= Unidentified Falcon; UE= Unidentified Eagle; UR=Unidentified Raptor

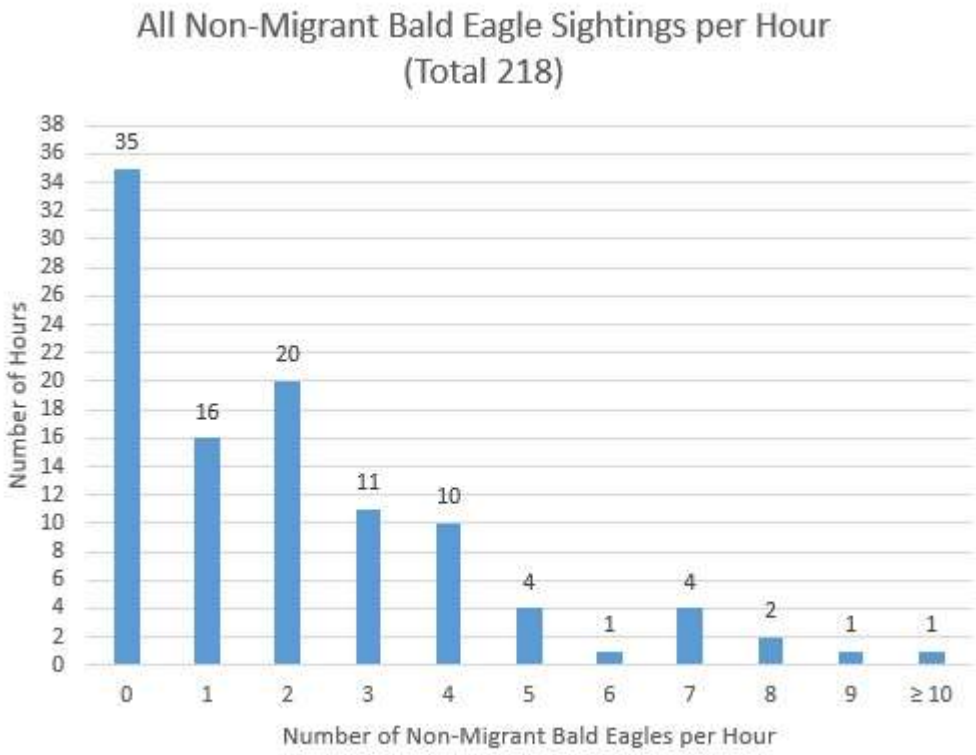
DISCUSSION OF NON-MIGRANT EAGLES

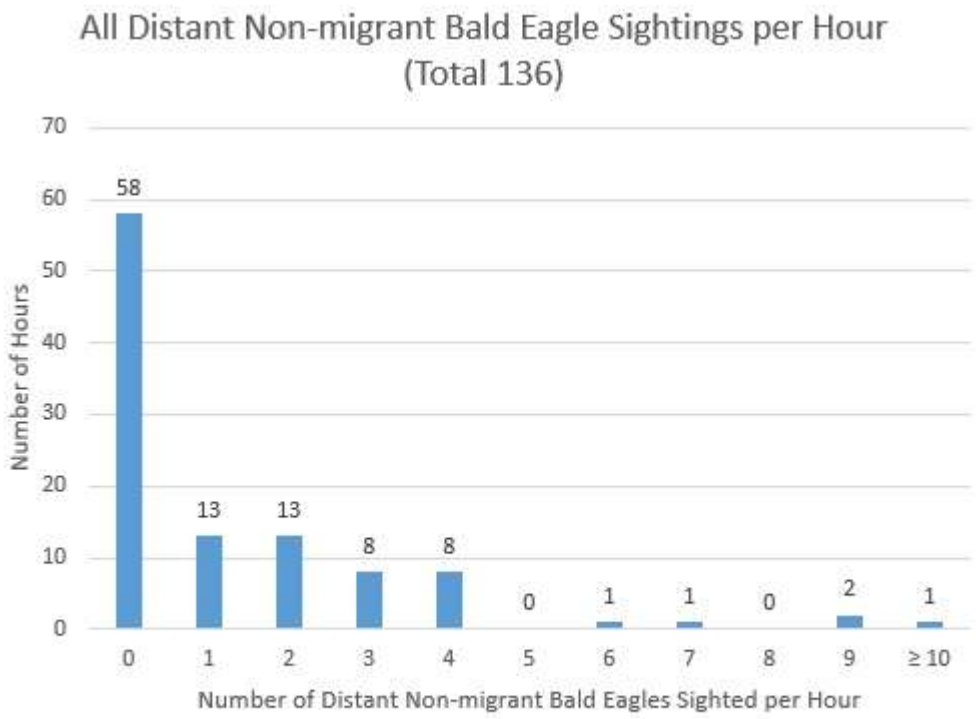
The survey site is near a well-known concentration area for Bald Eagles around and below the Cannonsville Reservoir dam. Bald Eagles are present there year round and in significant numbers from late fall through early spring. The dam is 6 miles from the survey site. Given the persistent winter weather through the period, many of the observed non-migrant eagles are assumed by DOAS to be winter residents. At the suggestion of USFWS, the number of eagles observed during each hour of the surveys was tallied.

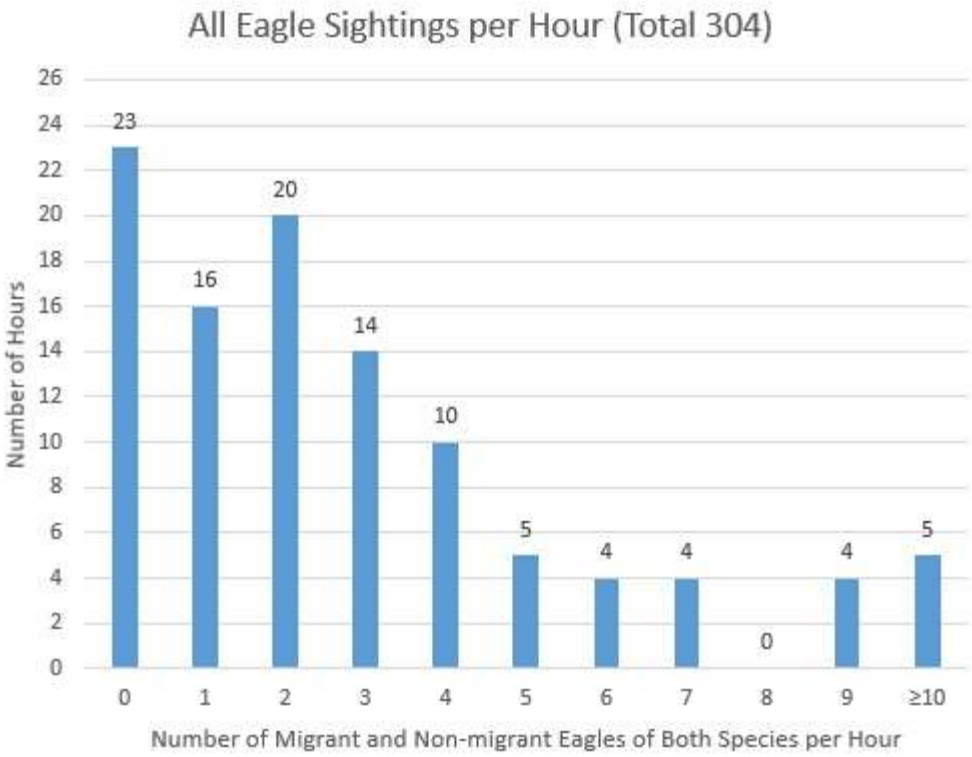
After changing to a count of sightings, DOAS surveyors recorded 218 non-migrant Bald Eagles, 20 non-migrant Golden Eagles and 2 non-migrant eagles that could not be identified by species. The data, in eagle sightings per hour, were examined 3 ways: non-migrant Bald Eagles only; all Bald Eagles - including migrants and non-migrants; and, all observed eagles of both species, migrants and non-migrants. (Graphs below)

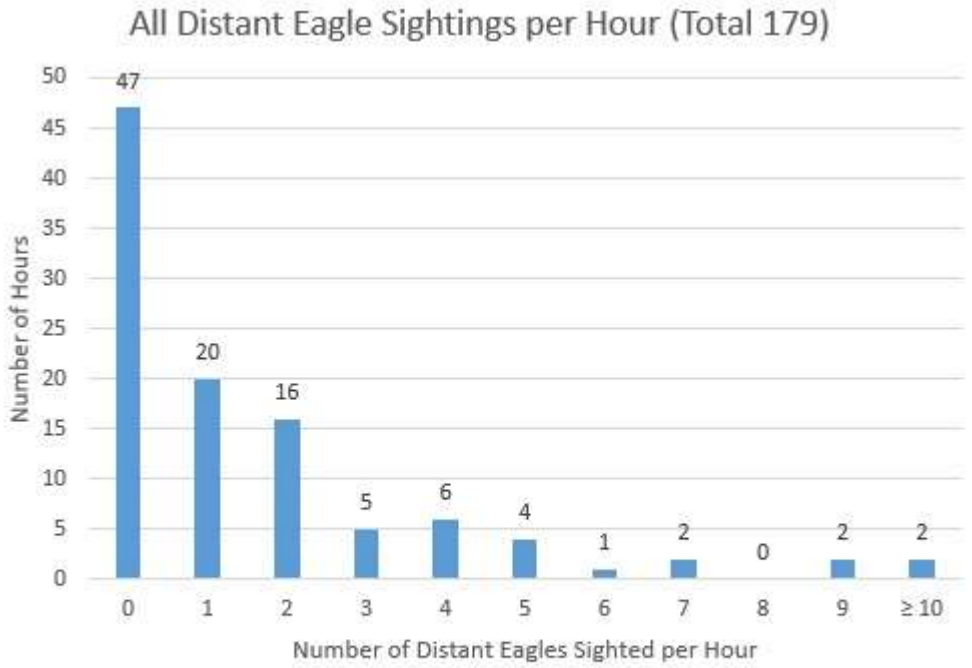

All Bald Eagle Sightings per Hour
(Total 260)
Number of Hours
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
29
19
18
12
8
5
3
3
3
2
3
0
1
2
3
4
5
6
7
8
9
≥ 10
Number of Bald Eagles per Hour


All Distant Bald Eagle Sightings per Hour (Total 160)
NUmber of Hours
60
50
40
30
20
10
0
56
13
12
9
5
2
2
1
1
2
2
0
1
2
3
4
5
6
7
8
9
≥ 10
Number of Distant Bald Eagles Sighted per Hour


All Non-Migrant Bald Eagle Sightings per Hour
(Total 218)
Number of Hours
38
36
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
35
16
20
11
10
4
1
4
2
1
1
0
1
2
3
4
5
6
7
8
9
≥ 10
Number of Non-Migrant Bald Eagles per Hour


All Distant Non-migrant Bald Eagle Sightings per Hour
(Total 136)
Number of Hours
70
60
50
40
30
20
10
0
58
13
13
8
8
0
1
1
0
2
1
0
1
2
3
4
5
6
7
8
9
≥ 10
Number of Distant Non-migrant Bald Eagles Sighted per Hour


All Eagle Sightings per Hour (Total 304)
Number of Hours
26
24
22
20
18
16
14
12
10
8
6
4
2
0
23
16
20
14
10
5
4
4
0
4
5
0
1
2
3
4
5
6
7
8
9
≥10
Number of Migrant and Non-migrant Eagles of Both Species per Hour


All Distant Eagle Sightings per Hour (Total 179)
Number of Hours
50
45
40
35
30
25
20
15
10
5
0
47
20
16
5
6
4
1
2
0
2
2
0
1
2
3
4
5
6
7
8
9
≥ 10
Number of Distant Eagles Sighted per Hour

The regular presence of large numbers of winter resident eagles raises a question about a local food source. We observed no significant food source in the narrow valley. Bald Eagles in view of the site were not focused in a way that suggested a concentrated food source. Corvids were present daily, however, they were not concentrated either.

In a discussion with a local farmer he stated that he observed 11 eagles around a road-killed deer near the survey site during early February. Another local resident told a DOAS surveyor that 3 deer carcasses were on the eastern ridge to the north, away from the road. This resident would not explain the reason the carcasses were present. It is possible they were a coyote hunter's bait pile. While this possible food source was north of the survey site, most observations of non-migrant eagles were south of the site, some quite a distance south.

During 105 hours of surveys, non-migrant Golden Eagles were observed 20 times. These sightings consisted of an unknown number of adults and at least 5 distinct juveniles (Appendix A).

Golden Eagles were observed actively hunting, and in one case successfully acquiring prey. On multiple occasions, Golden Eagles used a hunting technique called "kiting", or remaining stationary in mid-air using wind speed for lift. One spent 14 minutes kiting above the east ridge before continuing out over the valley. Other Golden Eagle hunting strategies included rushing in low at a flock of turkeys, and diving into trees. One eagle both kited and dove into the forest canopy (3/15/18 - #21) in a relatively small area. It was successful in capturing what appeared to be a squirrel. Golden Eagles were also observed perched in the open. This could also be a hunting strategy.

Many of the non-migrant Golden Eagles were in sight of the surveyors for extended periods of time. Of 20 birds documented, 11 spent time perched. Eight of the birds were in sight for >50 minutes, 3 for 2 hours or more.

When inexact times from field notes are rounded down to the nearest hour, e. g. "over 2 hours" was rounded to 2 hours, non-migrant Golden Eagles were present more than 10% of the time surveyors were at the site. *Note: Birds included in this analysis: 0306-3, 0308-3, 0308-18, 0310-23, 0312-7, 0315-8, 0315-21, 0317-13, 0318-17, 0322-1.*

There is little baseline data on Golden Eagle winter residence in New York State, although non-migrant Golden Eagles are considered rare. The highest reported winter densities over the past two decades have been in the Taconic and Catskill Mountains[1]. Camera trap surveys have shown they are regularly present in the southeastern third of the state. To help address a data void, DOAS organized winter raptor counts in Delaware County during the first weekend of February during the winters of 2015 and 2016. The goal was to determine if this would be an effective way to survey Golden Eagles in the Northern Catskill Mountains. A protocol used by traveling teams the Blufflands area of Minnesota was adapted for these surveys.

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1 *The Kingbird*, NYS on-line Birding Lists, 2013-2018 Reports to NYSDEC for License to Collect and Possess 1386

The DOAS winter surveys compiled 57.74 team/hours of data in 2015 and 45.53 team/hours of data during 2016. Each year 3 Golden Eagles were recorded. These birds included 1 each year at a baited site operated by DOAS volunteers. The rate of Golden Eagle sightings was .058/hour, or 1 for every 17.2 team/hours.

Another source of data on Golden Eagles near the project study area is the nine days of surveys DOAS conducted 10.8 miles ESE of this Sanford site in Delaware County from 5 March to 14 March 2009[2]. Because the terrain there limited visibility, a three site transect was created. It had a view perpendicular to the migration approximately three times as wide as at the Sanford survey site.

There was a surveyor present at at least one of the three transect sites during 67.75 hours in 2009. One non-migrant Golden Eagle was documented during that time. At Sanford in March 2018, surveyors recorded one non-migrant Golden Eagle sighting for every 5.25 hours of coverage.

Except for two baited camera trap sites in the Catskill Mountains 40 miles to the east, there are no known areas in New York State where similar densities of Golden Eagle have been found in winter[3]. The camera traps operate for 9 or 10 weeks and are continually monitored by a motion activated camera.

BREAKDOWN OF MIGRANTS AND EAGLES BY DISTANCE AND HEIGHT

ALL MIGRATING RAPTORS AND VULTURES BY DISTANCE AND HEIGHT

Category	Number	Percent
Close/Low	39	38.6
Close/High	17	16.8
Distant/Low	35	34.7
Distant/High	10	9.9
Total	101	

ALL BALD EAGLES BY DISTANCE AND HEIGHT

Category	Count	Percent
Close/Low	82	31.5
Close/High	18	6.9
Distant/Low	109	41.9
Distant/High	51	19.6
Total	260	

ALL EAGLE SIGHTINGS BY DISTANCE AND HEIGHT

Category	Count	Percent
Close/Low	101	33.2
Close/High	24	7.9
Distant/Low	126	41.4
Distant/High	53	17.4
Total	304	

ALL MIGRANT BALD EAGLE SIGHTINGS BY DISTANCE AND HEIGHT

Category	Count	Percent
Close/Low	13	31.0
Close/High	5	11.9
Distant/Low	16	38.1
Distant/High	8	19.0
Total	42	

2 http://doas.us/wp-content/uploads/2013/04/DELA_Eagle_Count_Report_3-09.pdf

3 *The Kingbird*, NYS on-line Birding Lists, 2013-2018 Reports to NYSDEC for License to Collect and Possess 1386

ALL NON-MIGRANT BALD EAGLE SIGHTINGS BY DISTANCE AND HEIGHT

Category	Count	Percent
Close/Low	69	31.7
Close/High	13	6.0
Distant/Low	93	42.7
Distant/High	43	19.7
Total	218	

ALL NON-MIGRANT GOLDEN EAGLE SIGHTINGS BY DISTANCE AND HEIGHT

Category	Count	Percent
Close/Low	11	55.0
Close/High	0	0
Distant/Low	9	45.0
Distant/High	0	0
Total	20	

ALL MIGRANT GOLDEN EAGLE SIGHTINGS BY DISTANCE AND HEIGHT

Category	Count	Percent
Close/Low	8	36.4
Close/High	6	27.3
Distant/Low	6	27.3
Distant/High	2	9.1
Total	22	

ALL PEREGRINE FALCON SIGHTINGS BY DISTANCE AND HEIGHT

Category	Count	Percent
Close/Low	0	0
Close/High	0	0
Distant/Low	2	100.0
Distant/High	0	0
Total	2	

ALL NORTHERN HARRIER SIGHTINGS BY DISTANCE AND HEIGHT

Category	Count	Percent
Close/Low	1	33.0
Close/High	1	33.0
Distant/Low	1	33.0
Distant/High	0	0
Total	3	

RECORDING DATA ON THE DIFFERENCES IN HEIGHT WITHIN AND BEYOND 800M

According to the protocol, surveyors were instructed to record the "height above ground level at the time of closest observation (higher or lower than 200m)". Due to the low elevation of the site, we considered the possibility that birds flying level might change their height above ground level (AGL) while passing from the surrounding ridges to over the valley. These changes could affect risk assessment. Surveyors were asked to record the height of listed species when beyond 800 meters if those heights were different from the values when the birds were closer.

For birds that were at different heights within and beyond 800 meters, those that passed within 200 meters of ground level at any time during their observation were recorded as "low". Those that did not pass within 200 meters of ground level at any time were recorded as "high".

These observations were not taken on all dates; these data are available for 233 of 304 total eagle sightings. Twenty-four eagles changed height categories with the change in the 800 meter distance threshold. Of those, 15 that were high (above 200M) when close, were low when beyond 800 meters. Eleven that were low when close, were high when beyond 800 meters.

INCIDENTAL OBSERVATIONS

DOAS observers were instructed to record observations of birds other than raptors if they were federally listed species or in large flocks (over 50 birds). In addition to these guidelines, observers were encouraged to record any observations they thought were noteworthy. These data have not been entered into a spreadsheet. This summary contains numbers and species only. Details, including the height and distance, can be found on the Incidental Wildlife Forms for each date at the web link below.

- Flock of 70 Icterids, most likely Red-winged Blackbird on 3/4/18.
- 110 American Crow on 3/8/18.
- 700 Canada Goose in 3 flocks on 3/19/18.

COMMENTS

Our request for intervenor funding was intended to provide a more complete understanding of the early spring Golden Eagle migration in the area of the project. Non-migrant eagles were a secondary goal. The documentation of such large numbers of non-migrant eagles of both species in this area during March was unexpected.

The frequency and numbers of non-migrant Golden Eagles observed during 105 hours of surveys in Sanford are unprecedented in New York State. The large numbers of sightings of non-migrant Bald Eagles raises questions about why they were there.

Golden Eagles were observed foraging and preying on wildlife. A local food source for the Bald Eagles is unknown. Carcasses would be a normal winter food source for Bald Eagles. However, there is little livestock in the area. The possibility of coyote hunters' bait exists.

The surveys were scheduled to coincide with the migration of adult Golden Eagles through the area. We anticipated that these would be birds moving through the area from further south. The presence of large numbers of non-migrant eagles suggests that this period in late winter may be a more important period for assessing risk than previously thought. The overlap with coyote hunting season is important to consider. Baiting coyotes, which attracts a variety of scavengers, is common practice. Baiting near a wind project would raise the risk to scavenging birds, and this activity should be addressed by state regulators.

Our experience in Sanford suggests it may be necessary to spend more time and effort surveying the late winter period in March for future wind projects, especially in areas of potential eagle concentration.

All hourly data, including surveyor, weather information, and height and distance information are available at:
https://docs.google.com/spreadsheets/d/1h5mVafhvrWY07QXbjyIVUW97pysCQNhCNwEY9EhDX8g/edit?usp=sharing

Attachment 1

DOAS Spring Raptor Migration Survey protocol for the Bluestone Project Study Area

DOAS Raptor migration surveys will consist of counts of raptors at a fixed-point location in the project study area. Surveys will be conducted on 15 days during the first 3 weeks of March 2018. The second and third weeks of the month will be prioritized as they are typically the peak of the spring adult Golden Eagle migration in the region. We will attempt to survey every day during those weeks except those with strong and persistent rain, or any condition that would significantly limit visibility.

During the first week of March, we will monitor reports from upstream count sites and only survey once birds have started moving, and during ideal weather conditions.

The timing of the surveys targets Golden Eagle but all raptor and vulture species will be recorded. The survey site (42.103105° -75.479114°) was recommended to DOAS by WEST. It is a site they have used. It provides a reasonable - albeit low elevation - view towards the oncoming spring flight. Surveys will cover 7 hours each day, with the option of an additional hour should birds be moving persistently. Surveys will be planned to start at 0900 hours EST. Weather conditions may determine a different start time. Ideally, full coverage will take place between 0900 and 1500 to coincide with historic flight peaks.

All migrating raptors seen during each survey will be recorded and entered into the hawkcount.org database.

Details on every individual of 4 NYS listed species - Bald Eagle, Golden Eagle, Northern Harrier and Peregrine Falcon – will be recorded on a daily data form and a daily map. Each bird's sequential number from the form will be referenced on the map. Data for individual birds will include: 1) species; 2) age; 3) time of nearest passage to observation site (EST); 4) height above ground level at the time of closest observation (higher or lower than 200m); 5) closest distance from observation site (closer or farther than 800m); 6) Because the valley floor survey site is - on average - 200 meters lower than the surrounding hills and ridges, some birds crossing the valley at ridge height or greater are expected to be higher than 200 meters when they pass within 800 meters of the observation site. Since the height over the valley is not valuable in assessing risk, a separate data field will record the height of those birds when outside 800 meters and at ridge height or greater. Those that passed within 200 meters of ground level <u>at any time</u> during their observation will be recorded as "low". Those that do not pass within 200 meters of ground level <u>at any time</u> will be recorded as "high"; 7) migrant vs."local"; and for "local" birds, (8) notes on behavior. For the purpose of this study, "local" will only mean the bird was not migrating. Any comments or unusual observations will be also noted.

The field map will be prepared from a USGS topo map. It will be marked with the survey location and an 800 meter radius circle.

Eagle migration in our region is typically from SW to NE in spring. Weather conditions and terrain will affect the exact direction birds are moving at any time. For this study migratory behavior will be defined as a bird moving persistently or deliberately in a direction ranging from N to E. If a consistent flight is noted slightly outside that directional range, surveyors may use their own judgment to determine if the birds are migrating. Stalling briefly to look for prey will not cause a bird to be excluded from the migratory bird count.

On days with high migratory movement, most birds will be moving in the migratory direction. This minimizes the possibility that birds may be double counted. On days with limited migratory movement, "local" birds may also move in a migratory direction. To prevent double counting, surveyors will note distinguishing characteristics of birds passing the site, i.e. multiple birds together, missing feathers, age, state of molt, etc. Using that information, any birds counted as migrants that are then judged to have returned to the area, will be removed from the migrant count and reassigned the designation of "local" birds.

"Local" birds will be defined as those moving in directions outside the migratory range, those making significant changes of direction, those engaged in extended kiting or hunting behavior, and perched birds. If there is doubt about whether a bird is a migrant or local bird, it will be recorded as a local bird. For local birds that are seen multiple times during a survey day, and recorded with multiple tracks on the map, the original assigned number from the daily sheet will be maintained.

The date, start and end time of the survey, and weather information will be recorded hourly in hawkcount.org data fields. Weather information will include: temperature [°C]; wind speed (Beaufort Scale); wind direction; precipitation; cloud cover (%); and, visibility (km). The timing of any cold or warm fronts passing through, and any low cloud ceiling heights that could impact the survey will be recorded in "weather" notes.

The following data will be recorded hourly for all raptors and vultures exhibiting migratory behavior:

• The number of individuals of each species passing the site;

• Each individual will be placed in a height and distance category: close and low (<800m/<200m); close and high (<800m/>200m); distant and low (>800m/<200m); and, distant and high (>800m/>200m). For birds within 800 meters, height will be recorded while within the 800 meter radius circle. Note: additionally, any Golden Eagle, Bald Eagle, Northern Harrier or Peregrine Falcon that passes within the 800m distance threshold will have its height while beyond 800 meters recorded, if it was observed beyond that distance.

• When species cannot be determined, birds will be recorded as one of the following categories:
    - unknown raptor (UR)
    - unknown accipiter (UA)
    - unknown eagle (UE)
    - unknown falcon (UF)

Hourly data will be entered into a hawkcount.org account at the end of each day, or as soon as possible.

If state or federally listed species, or large flocks (greater than 50 individuals) of other bird types (i.e., waterfowl, shorebirds, corvids, and passerines) are observed during the surveys, they will be recorded on an incidental wildlife observation data sheets. The data recorded are similar to those described above, including observation number, date, time, species, number of individuals, distance and height from observer, sex/age class, habitat, and any noteworthy behavior.

After data entry, all field sheets (map, daily data sheet, tally sheet for migrants, incidental observation sheet) will be stapled together and submitted to Andrew Mason or Thomas Salo. These documents will be scanned and made available to interested parties. Data from these documents will be summarized in a final report of the fall season surveys.

Quality checks:
• After data entry, surveyors will confirm that listed species on the daily data sheet have been entered correctly according to distance and height.
• After submission of the field forms, a qualified individual other than the surveyor will review each day's data for errors.

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Attachment 2

LISTED SPECIES FORM DATA

DATA NOTES AND ABBREVIATIONS:					
BIRD:	Replace numbers 1,2,3,... with date and number; e.g. 1103-4 means 4th bird seen on Nov 3.				
	Numbering note 1: - In some cases, single numbers were assigned to “pairs” of eagles moving together on the same path. In the spreadsheet, these eagles are entered individually as A & B, preceded by their number from the form. Note 2: On some days a surveyor numbered every raptor. Only eagles, Peregrine Falcons and Northern Harriers were entered into the spreadsheet. Note 3: Some birds were recorded on field maps and entered later, resulting in times and numbers being out of sequence.				
SPECIES: GE= Golden Eagle; BE = Bald Eagle; NH = Northern Harrier; PG = Peregrine Falcon					
AGE: Ad = Adult (includes sub-adult); Juv = Juvenile; Unk = Unknown					
TIME: Time in EST of nearest passage to observation site.					
HEIGHT : Note “High” or “Low” for birds above or below the 200m Above Ground Level threshold where the					
	bird is observed. Birds observed in low airspace will be recorded as such, even if it flies higher.				
DISTANCE: Note “Close” for any bird that comes within or 800 meters of survey site. “Far” otherwise.					
HEIGHT BEYOND 800M: Data entered only if different from height within 800 meters.					
MIGRANT: Yes or No. (No = “Local”)					
BEHAVIOR (Primarily for Non-Migrant birds, optional for migrants), use multiples as needed:					
	P = Perched; S = Soaring; Flap = Flapping; For = Foraging; G = Gliding;				
	A = Aggression or Territorial Defense; O = Other to be recorded as field notes.				

BIRD	SPECIES	AGE	TIME	HEIGHT >200M	DISTANCE >800M	HT BEYOND 800M	MIGRANT Y/N	BEHAVIOR	FIELD NOTES					
0304-1	BE	JUV	9:13	L	C		N	S, G						
0304-2	BE	JUV	9:13	L	C		N	S, G						
0304-3	BE	AD	9:13	H	F		N	S	Courtship behavior with 4, talons locked then separated					
0304-4	BE	AD	9:13	H	F		N	S	Courtship behavior with 3, talons locked then separated					
0304-5	BE	AD	9:29	L	C		Y	G, Flap	Chased off course - off the ridge - by #6					
0304-6	BE	AD	9:29	L	C		N	A	Chased #5 off course, then broke off.					
0304-7	BE	JUV	9:33	L	C		N	F						
0304-8	BE	AD	9:37	L	F		Y	G						
0304-9	BE	AD	10:55	L	C		N	F	Sub-adult, transitional plumage					
0304-10	BE	AD	11:29	L	F		N	S, Flap						
0304-11	BE	AD	11:29	L	F		N	A, Flap						
0304-12	BE	JUV	11:48	L	F		Y	G						
0304-13	BE	JUV	11:48	L	F		Y	G						
0304-14	BE	JUV	11:58	L	F		Y	G, A						
0304-15	BE	JUV	11:58	L	F		Y	G						
0304-16	BE	AD	12:13	L	F		Y	G						
0304-17	BE	AD	12:13	L	F		Y	G						
0304-18	GE	AD	12:15	L	F		Y	G, S						
0304-19	BE	AD	12:17	L	F		Y	G						
0304-20	BE	AD	12:17	L	F		Y	G						
0304-21	GE	AD	12:53	L	F		Y	G						
0304-22	BE	AD	13:01	L	F		Y	G						
0304-23	BE	AD	13:08	L	C		N	S	Talon lock and tumble with 24					
0304-24	BE	AD	13:08	L	C		N	S	Talon lock and tumble with 23					
0304-25	BE	AD	13:14	L	F		Y	G						
0304-26	BE	AD	13:15	L	F		Y	G						
0304-27	GE	AD	13:44	L	F		Y	G						
0304-28	BE	JUV	14:19	L	F		Y	G						
0304-29	BE	AD	14:55	H	F		Y	G, S						
0304-30	BE	AD	15:04	L	F		Y	G						

(0304 con't.)

0304-31	GE	AD	15:09	L	F		Y	G						
0304-32	GE	AD	15:44	L	C		N	S						
0304-33	BE	AD	15:44	L	C		N	S						
0304-34	BE	JUV	15:44	L	C		N	S						
0304-35	BE	AD	11:50	L	F		N	S	35-38 soaring together					
0304-36	BE	JUV	11:50	L	F		N	S						
0304-37	BE	UNK	11:50	L	F		N	S						
0304-38	BE	UNK	11:50	L	F		N	S						
0304-39	BE	AD	11:35	L	F		N	S	Sub-adult, #9 was also sub-adult with similar transitional plumage					
0304-40	BE	AD	12:26	L	F		N	G						
0304-41	BE	JUV	12:29	H	F		N	S						
0304-42	BE	JUV	12:29	H	F		N	S						
0304-43	BE	JUV	12:29	H	F		N	S						
0304-44	BE	JUV	13:08	L	C		N	A						
0304-45	BE	AD	14:26	H	F		N	S, G						
0304-46	BE	AD	14:34	L	F		N	G						
0304-47	BE	AD	14:50	L	F		N	S, G						
0304-48	BE	AD	14:50	L	F		N	S, G						
0304-49	BE	AD	15:36	H	F		N	G						
0304-50	BE	AD	15:58	L	F		N	S, G						
0304-51	BE	AD	9:59	L	F		N	S, G	51 and 52 were probably 3 and 4					
0304-52	BE	AD	9:59	L	F		N	S, G	51 and 52 were probably 3 and 4					

(0304 con't.)

0304-47	BE	AD	14:50	L	F		N	S, G						
0304-48	BE	AD	14:50	L	F		N	S, G						
0304-49	BE	AD	15:36	H	F		N	G						
0304-50	BE	AD	15:58	L	F		N	S, G						
0304-51	BE	AD	9:59	L	F		N	S, G	51 and 52 were probably 3 and 4					
0304-52	BE	AD	9:59	L	F		N	S, G	51 and 52 were probably 3 and 4					
0305-1	NH	UNK	9:05	H	C		Y	Flap						
0305-2	BE	AD	9:37	L	C		Y	Flap						
0305-3	BE	JUV	10:47	L	C	H	N	Flap, G						
0305-4	BE	JUV	12:45	L	C		N	F, P						
0305-5	BE	AD	13:00	L	C		N	Flap	Flew south along valley east side.					
0306-3	GE	Ad	10:12	L	F		N	Flap, G,P	Golden Eagle perched in tree on W ridge of appx. 1 hour before moving north.					
0306-6A	BE	Ad	11:39	L	C		N	S, Flap, A						
0306-6B	BE	Ad	11:39	L	C		N	S, Flap, A						

0308-1	BE	JUV	9:20	L	C		N	Flap, P	Flew up middle of valley, perched near houses on Shaver Rd. Mobbed by crows.
0308-2	BE	JUV	9:25	L	C		N	Flap, S	Joined with #1 and flew along ridge and east, circling.
0308-3	GE	AD	9:40	L	C	H	N	Flap, P, S	Flew below west ridge, perched about an hour. Flew across valley, circled up high and went SE down the other side of ridge.
0308-4	BE	AD	11:30	H	F		N	Flap	Circled with #5, wheeling, diving together high off SE ridge.
0308-5	BE	AD	11:30	H	F		N	Flap	Circled with #4, wheeling, diving together high off SE ridge.
0308-6	BE	AD	12:08	L	C		N	P	Perched on tree at top of W ridge. Stayed about 40 minutes. I had that bird and 4 & 5 in sight at the same time.
0308-7	BE	AD	12:30	H	C		N	Flap	7 & 8 probably repeat 4 & 5. Circled together high above Shaver Rd. ridge.
0308-8	BE	AD	12:30	H	C		N	Flap	7 & 8 probably repeat 4 & 5. Circled together high above Shaver Rd. ridge.
0308-9	GE	AD	12:40	H	C		Y	Flap, G	
0308-10	BE	AD	13:20	H	C		N	Flap	Repeat of 4 & 5, and 7 & 8? Circled together over E ridge Shaver Rd. Perched on trees near houses, pine planting.
0308-11	BE	AD	13:20	H	C		N	Flap	Repeat of 4 & 5, and 7 & 8? Circled together over E ridge Shaver Rd. Perched on trees near houses, pine planting.
0308-12	BE	JUV	13:25	L	C		N	Flap, P	12 and 13 interacting with AD bald eagles in trees along Shaver Rd., E ridge. Originally flew across valley low from NW.
0308-13	BE	JUV	13:25	L	C		N	Flap, P	12 and 13 interacting with AD bald eagles in trees along Shaver Rd., E ridge. Originally flew across valley low from NW.
0308-14	BE	AD	14:30	L	C	H	N	Flap	14 & 15 flew from E ridge low across field north over horse farm. Circled W over Loomis Hill.
0308-15	BE	AD	14:30	L	C	H	N	Flap	14 & 15 flew from E ridge low across field north over horse farm. Circled W over Loomis Hill.
0308-16	BE	AD	15:05	L	F		N	P	16 & 17 perched on snag below ridge of far southeastern ridge
0308-17	BE	AD	15:05	L	F		N	P	16 & 17 perched on snag below ridge of far southeastern ridge
0308-18	GE	AD	15:15	L	C		N	P, Flap	Perched in deciduous tree just below ridge on E side of valley, north of where BEs perched on snag. After 5 minutes, from first noticed, flew E over the ridge. Wild turkeys were feeding at the time in cornfield. Large flock of noisy crows nearby. Assumed to be the same bird as #3.

0310-1	BE	AD	9:29	L	F		N	S						
0310-2	BE	AD	9:31	L	F		N	S, G						
0310-3	BE	AD	9:35	L	F		N	Flap, A						
0310-4	BE	JUV	9:35	L	F		N	S						
0310-5	BE	JUV	9:35	L	F		N	S	4 in sight, 2 is certainly a different bird.					
0310-6	BE	UNK	9:35	L	F		N	S						
0310-7	BE	JUV	9:50	L	F		N	S, A	7, 8, 9 together					
0310-8	BE	JUV	9:50	L	F		N	S						
0310-9	BE	AD	9:50	L	F		N	S	Probably #1					
0310-10	BE	AD	10:06	L	F		N	S, Flap						
0310-11	BE	AD	10:10	L	F		N	S						
0310-12	BE	AD	10:51	L	F		N	P	12 & 13 together, perched when snow cleared. Left after ~ 5 minutes. Went behind hill.					
0310-13	BE	AD	10:51	L	F		N	P	12 & 13 together					
0310-14	BE	AD	11:21	L	F		Y	S, G						
0310-15	BE	AD	11:42	L	C		N	G	Possibly 12 & 13 - came from direction they went.					
0310-16	BE	AD	11:42	L	C		N	G	Possibly 12 & 13 - came from direction they went.					
0310-17	BE	AD	12:00	L	F		N	S, G	17 and 18 interacted, went behind ridge. Adult pair appearing at 12:20 is assumed to be the same birds and is not included as separate sightings.					
0310-18	BE	AD	12:01	L	F		N	S	17 and 18 interacted, went behind ridge. Adult pair appearing at 12:20 is assumed to be the same birds and is not included as separate sightings.					
0310-19	BE	JUV	12:20	H	F		Y	G						
0310-20	GE	AD	12:45	L	F		Y	G						
0310-21	BE	UNK	12:47	L	F		N	S, A						
0310-22	BE	JUV	14:21	L	F		Y	G						
0310-23	GE	JUV	14:45	L	C		N	Flap, For, P	Made run at 34 turkeys, perched 3X, kited about 14 minutes low over ridge, then kited further out for an extended time. In sight at least 50 minutes. Went out of sight while scanning. Detailed description on back of HMANA form.					
0310-24	BE	JUV	15:29	L	C		N	G						
0310-25	GE	JUV	15:43	L	C		N	G, P	Detailed description on back of tally sheet.					
0310-26	BE	AD	15:43	L	F		N	A						

0311-1	GE	JUV	9:10	H	C		Y	Flap	Harrassed by redtail. Missing primary in left wing - probably #25 from 3/10/18.
0311-2	BE	AD	10:35	H	F		N	Flap	Circling, diving with each other beyond SE ridge
0311-3	BE	AD	10:35	H	F		N	Flap	Circling, diving with each other beyond SE ridge
0311-4	BE	AD	10:40	H	F		N	Flap, S	
0311-5	BE	AD	12:05	H	F	L	N	S	Group of 6 soaring, circling, whirling over and down the SE ridge. All 6 in one field for ~10 minutes.
0311-6	BE	AD	12:05	H	F	L	N	S	Group of 6 soaring, circling, whirling over and down the SE ridge. All 6 in one field for ~10 minutes.
0311-7	BE	AD	12:05	H	F	L	N	S	Group of 6 soaring, circling, whirling over and down the SE ridge. All 6 in one field for ~10 minutes.
0311-8	BE	JUV	12:05	H	F	L	N	S	Group of 6 soaring, circling, whirling over and down the SE ridge. All 6 in one field for ~10 minutes.
0311-9	BE	JUV	12:05	H	F	L	N	S	Group of 6 soaring, circling, whirling over and down the SE ridge. All 6 in one field for ~10 minutes.
0311-10	BE	JUV	12:05	H	F	L	N	S	Group of 6 soaring, circling, whirling over and down the SE ridge. All 6 in one field for ~10 minutes.
0311-11	BE	AD	12:30	L	C		N	Flap	"Came from north - horse farm, flew low over field and west over ridge."
0311-12	BE	AD	12:30	L	C		N	Flap	"Came from north - horse farm, flew low over field and west over ridge."
0311-13	GE	UNK	12:40	H	F		Y	Flap, S	
0311-14	BE	JUV	13:48	H	F		N	Flap, S	Circled up north of site over fields, moved west.
0311-15	BE	JUV	13:48	H	F		N	Flap, S	Circled up north of site over fields, moved west.
0311-16	BE	AD	14:20	H	C		N	Flap, S	
0311-17	BE	AD	15:20	L	F	H	N	Flap, P	Came from south, flew across valley to west ridge, circled back to perch on snag on SE slope.
0311-18	BE	AD	15:20	L	F	H	N	Flap, P	Came from south, flew across valley to west ridge, circled back to perch on snag on SE slope.
0311-19	BE	JUV	15:35	L	F		N	Flap, P	Circled around 2 AD bald eagles on snag before perching below them and slightly north below ridge.

0312-5	BE	Juv	10:10	L	C		N	Flap						
0312-6	BE	Juv	10:11	L	C		N	Flap						
0312-7	GE	Unk	8:20	L	F		N	P	Perched on ridge. Dropped onto E face of W ridge. Was not seen again. Total time observed over 2 hours.					
0312-8	BE	Ad	10:35	L	C		N	S						
0312-9	BE	Ad	10:45	L	C		N	Flap, S						
0312-10A	BE	Ad	10:45	L	C		N	Flap, S						
0312-10B	BE	Ad	10:45	L	C		N	Flap, S						
0312-12	BE	Ad	11:09	L	F		N	S, G						
0312-13	BE	Ad	11:09	L	F		N	S, G						
0312-14	BE	Juv	11:20	H	C		N	S						
0312-15	BE	Ad	11:30	H	C		N	S						
0312-16	BE	Juv	11:31	L	C		N	S						
0312-17	BE	Juv	12:10	H	F		N	S	Not mapped					
0312-18	BE	Juv	12:12	L	C		Y	Flap, S						
0312-19	BE	Juv	12:19	L	C		Y	S						
0312-21	BE	Juv	13:38	L	F		N	Flap, S						
0312-22	UE	Unk	13:50	L	F		N	Flap	Unknown eagle sighted off shoulder of E ridge. Quickly flew E over ridge.					
0312-23	BE	Juv	14:57	L	C		Y	Flap, G						

0315-1	BE	Juv	9:29	H	C		Y	G						
0315-2	GE	Juv	9:29	L	F		N	S, G	Distant bird, continued south					
0315-3	BE	Ad	9:29	L	F		N	S, G						
0315-4	BE	Ad	9:29	L	F		N	S, G						
0315-5	BE	Juv	9:29	H	C	L	Y	G						
0315-6	BE	Juv	9:29	H	C	L	N	G						
0315-7	GE	Ad	9:41	H	C	L	Y	G						
0315-8	GE	Juv	9:48	L	C		N	For, S, G	Actively hunting. In sight 5 minutes, returned hour late for 10 minutes. 2-3rd year, juvie, white in wings/tail - not pure white in tail "dirty".					
0315-9	BE	Juv	9:50	L	C		N	G						
0315-10	BE	Juv	9:52	L	F		N	S						
0315-11	BE	Ad	10:27	L	C		N	S, G						
0315-12	GE	Ad	10:35	L	F		N	S	Lost behind ridge to S.					
0315-13	BE	Ad	11:06	H	F		N	G						
0315-14	BE	Ad	11:11	H	F		N	G						
0315-15	BE	Ad	12:40	H	C		N	S, G	15 & 16 interacting					
0315-16	BE	Ad	12:40	H	C		N	S, G	15 & 16 interacting					
0315-17	BE	Ad	13:00	H	C		Y	S, G						
0315-18	BE	Ad	14:06	H	C		Y	G						
0315-19	BE	Ad	14:08	H	C		N	S, G						
0315-20	BE	Ad	14:08	H	C		N	S, G						

0316-1	BE	Ad	9:30	L	C		N	G						
0316-2	BE	Ad	9:30	L	C		N	G						
0316-3	BE	Juv	9:35	H	F		N	S						
0316-4	BE	Ad	10:01	L	C		N	Flap						
0316-5	BE	Ad	10:20	L	C		N	G, Flap						
0316-6	BE	Ad	10:20	L	C		N	G, Flap						
0316-7	GE	Juv	12:20	L	C		N	For, G, Flap	"Sooty" tailed.					
0316-8	BE	Juv	12:25	L	F		N	G						
0316-9	BE	Unk	14:59	L	F		N		9 & 10 interacting. "Tumbling" from hawkcount.org comments.					
0316-10	BE	Unk	14:59	L	F		N		9 & 10 interacting. "Tumbling" from hawkcount.org comments.					
0316-11	BE	Ad	15:15	L	C		N	G, Flap						

0317-2	BE	Juv	9:05	L	F		N	G	Landed S of site.					
0317-4	GE	Juv	9:35	L	C		Y	S, G						
0317-7A	BE	Juv	10:10	L	F		N	Flap, A						
0317-7B	BE	Juv	10:10	L	F		N	Flap, A						
0317-8	BE	Ad	10:11	L	F		N	S, G						
0317-10	BE	Ad	10:45	L	F		N	Flap, A						
0317-11	BE	Ad	11:33	L	C		N	S						
0317-12	BE	Ad	11:48	L	F		N		Flew in low and landed on top of snag. Flew off after 5 minutes. Climbed, headed S.					
0317-13	GE	Unk	12:03	L	F		N	P	Perched on ridge. Appeared to be eating. left 2:10. Present more than 2 hours.					
0317-14	BE	Ad	12:10	L	F		N		Landed next to perched Golden Eagle #13.					
0317-15	BE	Ad	12:10	L	F		N		Landed next to #14. Left perch to interact with #16A and 16B. 13, 14 & 15 close together at one point.					
0317-16A	BE	Juv	12:27	L	F		N							
0317-16B	BE	Juv	12:27	L	F		N							
0317-18A	BE	Juv	13:02	L	F		N	Flap, A						
0317-18B	BE	Juv	13:02	L	F		N	Flap, A						
0317-20A	BE	Ad	14:24	H	F		N		Repeat?					
0317-20B	BE	Ad	14:24	H	F		N		Repeat?					
0317-21A	BE	Ad	14:46	H	F		N		21A & 21B flew E and W. Landed on W ridge.					
0317-21B	BE	Ad	14:46	H	F		N		21A & 21B flew E and W. Landed on W ridge.					
0317-22	BE	Ad	13:10	L	F		N	S	1:10 PM - 7 Bald Eagles interacting. "I believe these are repeat birds." Added as sightings from notes on original map.					
0317-23	BE	Ad	13:10	L	F		N	S	1:10 PM - 7 Bald Eagles interacting. "I believe these are repeat birds." Added as sightings from notes on original map.					
0317-24	BE	Ad	13:10	L	F		N	S	1:10 PM - 7 Bald Eagles interacting. "I believe these are repeat birds." Added as sightings from notes on original map.					
0317-25	BE	Ad	13:10	L	F		N	S	1:10 PM - 7 Bald Eagles interacting. "I believe these are repeat birds." Added as sightings from notes on original map.					
0317-26	BE	Juv	13:10	L	F		N	S	1:10 PM - 7 Bald Eagles interacting. "I believe these are repeat birds." Added as sightings from notes on original map.					

(0317 con't.)

0317-27	BE	Juv	13:10	L	F		N	S	1:10 PM - 7 Bald Eagles interacting. "I believe these are repeat birds." Added as sightings from notes on original map.					
0317-28	BE	Juv	13:10	L	F		N	S	1:10 PM - 7 Bald Eagles interacting. "I believe these are repeat birds." Added as sightings from notes on original map.					
0318-1	GE	Juv	9:20	L	F		N	S, G	No urgency.					
0318-2	GE	Ad	9:50	H	C		Y	S, G	In sight 15 minutes.					
0318-3	BE	Ad	10:10	H	F	L	N	S						
0318-4	BE	Ad	10:15	H	F		Y	S, G						
0318-5	BE	Ad	10:15	H	F		Y	S, G						
0318-6	BE	Ad	10:15	H	F		Y	S, G						
0318-7	BE	Ad	10:15	H	F		Y	S, G						
0318-8	BE	Ad	10:51	L	F		N	P, G, S						
0318-9	BE	Ad	10:51	L	F		N	P, G, S						
0318-10	BE	Juv	11:00	L	F		N	S						
0318-11	BE	Ad	11:00	L	F		N	S						
0318-12	BE	Ad	11:00	L	F		N	S						
0318-13	BE	Ad	11:20	H	F	L	N	S	13 & 14 interacting.					
0318-14	BE	Ad	11:20	H	F	L	N	S	13 & 14 interacting.					
0318-15	BE	Juv	11:21	H	F	L	N	Flap, G	Flap, hard					
0318-16	GE	Juv	11:30	L	F		N	P, S	Dusky tailed bird. Interacting with 17. Perched with 17 in dead snag for over an hour. - Note in part from hawkcount.org					
0318-17	GE	Juv	11:30	L	F		N	P, S	with 16 in dead snag for over an hour. - Notes from hawkcount.org and 3/18 phone conversation with KD - TES					
0318-18	BE	Juv	11:38	H	F		N	S, G						
0318-19	BE	Ad	11:38	H	F		N	S, G						
0318-20	BE	Ad	11:38	H	F		N	S, G						
0318-21	BE	Juv	11:38	H	F		N	S, G						
0318-22	BE	Ad	12:30	L	C		N	G						
0318-23	BE	Ad	12:53	L	F		N	S						
0318-24	BE	Ad	12:53	L	F		N	S						

(0318 con't.)

0318-25	BE	Ad	13:25	L	C		N	G						
0318-26	BE	Ad	13:25	L	C		N	G						
0318-27	BE	Juv	13:45	L	C		N	G						
0318-28	BE	Ad	13:59	L	F		N	S, P						
0318-29	BE	Ad	13:59	L	F		N	S						
0318-30	BE	Juv	14:00	L	F		N	S						
0318-31	BE	Juv	15:08	H	F	L	N	S						
0318-32	NH	Unk	15:34	L	F		Y	Flap, G						

0319-1	BE	Ad	9:00	H	F		N	Flap, S						
0319-2	BE	Ad	9:50	L	F		N	Flap, P	Perched on snag on SE slope. Flew in from south.					
0319-3	BE	Ad	9:50	L	F		N	Flap, P	Perched on snag on SE slope. Flew in from south.					
0319-4	BE	Ad	9:52	L	C	H	N	Flap, S	Flew along E ridge, came out overhead - lost sight of it - went W?					
0319-5	BE	Ad	10:00	L	F		N	Flap, P, O	Perched with 6 on snag on below W ridge on far slope. Flew off, diving and whirling. Perched again. Still there at 10:30 (30 minutes).					
0319-6	BE	Ad	10:00	L	F		N	Flap, P, O	Perched with 5 on snag on below W ridge on far slope. Flew off, diving and whirling. Perched again. Still there at 10:30 (30 minutes).					
0319-7	BE	Ad	10:10	L	F		N	Flap, G	With 8, flying and diving down near where 5 & 6 were perched.					
0319-8	BE	Juv	10:10	L	F		N	Flap, G	With 7, flying and diving down near where 5 & 6 were perched.					
0319-9	BE	Ad	10:15	H	C		N	Flap	Circling over Loomis Hill area.					
0319-10	GE	Unk	10:28	H	C		Y	Flap	Powered steadily along E ridge. Could see some white at base of tail, but not clearly juvenile.					
0319-11	BE	Ad	10:39	H	F		Y	Flap, S						
0319-12	BE	Ad	10:58	L	C		N	Flap, O, P	12 & 13 - Possibly the pair that had been perched earlier (5 & 6), diving and flying inside the ridge at edge of field. One bird went down into the snow, then went up to snag on SE slope.					
0319-13	BE	Ad	10:58	L	C		N	Flap, O, P	12 & 13 - Possibly the pair that had been perched earlier (5 & 6), diving and flying inside the ridge at edge of field. One bird went down into the snow, then went up to snag on SE slope.					
0319-14	BE	Ad	13:05	L	C		N	Flap, P	Same behavior and vicinity as 12 & 13.					
0319-15	BE	Ad	13:05	L	C		N	Flap, P	Same behavior and vicinity as 12 & 13.					
0319-16	GE	Ad	14:01	H	C		Y	Flap, S						

(0319 con't.)

0319-17	BE	Ad	14:20	L	F		N	O, P	17, 18 & 19 - 3 Ad BE circling, diving far end of W ridge. Perched in 2 separate trees on slope.					
0319-18	BE	Ad	14:20	L	F		N	O, P	17, 18 & 19 - 3 Ad BE circling, diving far end of W ridge. Perched in 2 separate trees on slope.					
0319-19	BE	Ad	14:20	L	F		N	O, P	17, 18 & 19 - 3 Ad BE circling, diving far end of W ridge. Perched in 2 separate trees on slope.					
0319-20	NH	Unk	15:12	L	C		Y	Flap, S						
0320-1	BE	Ad	9:55	L	F		N	P						
0320-2	BE	Ad	9:55	L	F		N	P						
0320-3	BE	Unk	10:00	H	F		N	S						
0320-4	BE	Juv	10:40	L	C		Y	G						
0320-5	GE	Juv	10:55	L	C		Y	G, Flap						
0320-6	GE	Ad	11:05	L	C		Y	G, Flap						
0320-7	GE	Ad	11:05	L	C		Y	G, Flap						
0320-8	BE	Ad	11:07	L	F		N	Flap						
0320-9	GE	Ad	11:35	L	C		Y	G, Flap						
0320-10	GE	Ad	11:35	L	C		Y	G, Flap						
0320-11	BE	Ad	11:50	L	C		N	G						
0320-12	PE	Unk	12:07	L	F		Y	Flap						
0320-13	GE	Ad	12:20	L	F		N	G, Flap						
0320-14	PE	Unk	13:45	L	F		Y	Flap						
0320-15	GE	Juv	13:55	L	C		Y	G, Flap						

0321-1	BE	Ad	10:05	L	F		N	Flap, S, P	1 & 2 - First BE came up over far SE slope, circling, soaring, then 2nd BE came over and both perched on snag on slope. Stayed 45 minutes. Saw them there again at 11:05 until 1 PM. (TES note - in sight 2 hours 40 minutes)					
0321-2	BE	Ad	10:07	L	F		N	Flap, S, P	1 & 2 - First BE came up over far SE slope, circling, soaring, then 2nd BE came over and both perched on snag on slope. Stayed 45 minutes. Saw them there again at 11:05 until 1 PM. (TES note - in sight 2 hours 40 minutes)					
0321-3	GE	Ad	11:09	H	F		Y	Flap, S	High above W ridge then cut across to NE past horse farm.					
0321-4	BE	Ad	11:54	H	F		Y	Flap, S	Moved along E side over Loomis Hill going N. Crows went after it.					
0321-5	BE	Juv	13:00	H	F		N	Flap, O	5 & 6 - Circling, diving high NW of site.					
0321-6	BE	Juv	13:00	H	F		N	Flap, O	5 & 6 - Circling, diving high NW of site.					
0321-7	GE	Juv	13:59	L	C		Y	Flap, G	Hugged the W ridge as it powered through. Local red-tailed hawk dove on it.					
0321-8	BE	Juv	15:15	H	F		N	Flap	Was in the same area as 5 & 6.					
0322-1	GE	Juv	9:00	L	C		N	P, Flap, G	Flew along W ridge, landed in trees. Red-tailed Hawk pursued it. Unseen where it landed at 9:00 AM. Reacquired bird perched in tree on same ridge - redtail perched in tree on top of ridge above GE. At 10:05, GE dropped into valley, headed E. Climbed up E ridge. Flew N along E ridge. Perched for over 1 hour.					
0322-5	BE	Ad	9:36	H	F		N	S						
0322-9	BE	Ad	10:14	L	C		N	S	Came up eastern side of E ridge as GE #1 headed N, then dropped back down.					
0322-11	BE	Juv	10:42	L	C		Y	Flap, S						
0322-13	BE	Ad	10:51	L	C		Y	S, G						
0322-14	UE	Unk	10:52	L	F		Unk		Not mapped.					

(0322 con't.)

0322-20	BE	Ad	12:05	L	C		N		20, 21 & 22 came up over W ridge. 2 aggressive, one soaring. All 3 went back over W ridge.					
0322-21	BE	Ad	12:05	L	C		N		20, 21 & 22 came up over W ridge. 2 aggressive, one soaring. All 3 went back over W ridge.					
0322-22	BE	Ad	12:05	L	C		N		20, 21 & 22 came up over W ridge. 2 aggressive, one soaring. All 3 went back over W ridge.					
0322-23	BE	Ad	12:14	L	C		N	G						
0322-24	BE	Ad	12:14	L	C		N	G	Not mapped.					
0322-28	BE	Ad	13:33	L	C		Y	G, S						
0322-29	GE	Ad	13:37	L	C		N	S, G						
0322-30	BE	Ad	14:01	L	C		Y	G						
0322-31	BE	Ad	14:08	L	C		N	G						
0322-32	BE	Ad	14:26	L	C		N	G						
0322-33	GE	Juv	14:49	L	C		N	Flap, G	Good look at markings on this bird. Wing patches, white in tail clearly visible when it landed on face of E ridge at 2:26. At 3:24, bird left perch, climbed ridge, then interacted with adult Bald Eagle. Bald flew N and golden followed.					
0322-34	GE	Ad	15:00	L	F		Y	G						
0322-35	BE	Ad	15:05	L	C		Y	G						
0322-36	BE	Ad	15:24	L	C		Y	G						

Appendix A: Details on non-migrant Golden Eagles.

Surveyors were asked to share details on individual, non-migrant Golden Eagles in an attempt to identify birds that appeared on more than one survey day. Field notes on bird ages are transcribed as written on the field forms. However, identification of individuals was not done using surveyor judgments of year-class with the exception of a single first winter bird. These are distinctly different from older juveniles and only one was seen. Adult Golden Eagles are uniformly dark and identifying individual birds is very difficult unless some unusual feature such as a missing feather is noted. Juveniles vary widely in plumage, and these differences provide a method for identifying individuals. Typically, the tails of juveniles are pure white to the terminal band. A bird was reported on 3 days with a tail that was not pure white.

- 7 sightings of nondescript adult birds occurred on multiple days, including 2 sightings on 8 March.
- A late day juvenile on 3/10 with a distinctive missing primary (25) was recorded as an early day migrant on 3/11 (1). It was not seen again.
- A well-described juvenile from 3/10 with small wing patches (23) was not identified again.
- A sooty-tailed juvenile was seen on 3/15 (8), 3/16 (7) and 3/18 (16) and is assumed to be a single individual.
- A first winter bird on 3/15 (21) had not been identified previously. This age class is distinctive. It was the only bird of this age class noted.
- An older juvenile on 3/18 (17) with almost no wing patches, and little white in tail had not been identified previously.

DELAWARE-OTSEGO AUDUBON SOC. FALL 2017 RAPTOR SURVEYS IN THE PROPOSED BLUESTONE WIND PROJECT

The Delaware-Otsego Audubon Society (DOAS) was awarded intervenor funding on October 16, 2017 through the NY State Department of Public Service Article 10 review process for the proposed Bluestone Wind project in the Towns of Sanford and Windsor in Broome Co., NY. Funding was granted for the analysis of GPS tracking data from Golden Eagles, and for on-the-ground surveys of raptors to be conducted during the fall and spring peaks of the Golden Eagle migration. Fall surveys were completed on November 27, 2017. This report covers the fall period. Spring surveys will be conducted in March 2018.

Prior to the intervenor funding hearing on 10/16, DOAS had scouted the project area for sites with an adequate viewshed for surveying migrating raptors, with limited success.

Within several days of the funding approval, DOAS received a draft fall migration map of Golden Eagle GPS tracks through the project area from Dr. Trish Miller. A final map was received following suggestions from DOAS (map attached). This map showed a cluster of tracks near Cliff Road in the Town of Sanford.

The site was investigated and found to have a limited view and to be on a public road. Despite the somewhat restricted view, it is as good quality as any other site found in the study area. It also appeared on a map produced by Bluestone Wind contractor Western Ecosystems Technology (WEST) that indicated a nearby location was used for their earlier surveys.

No site with an adequate view could be found near a smaller cluster of Golden Eagle tracks in the western part of the project area.

The Cliff Rd. site is on the edge of the project area. During consultation with the NY State Department of Environmental Conservation (NYSDEC), it was agreed that a site near the periphery with better visibility was preferable to a more central site with a poor view. In light of these considerations, this site was chosen by DOAS as its fall survey location.

Site coordinates are 18T 0454822 4651829 or 42° 1'1.89"N – 75°32'44.37"W

Between the approval of the funding request and the start of surveys, DOAS held separate conference calls with the US Fish and Wildlife Service (USFWS) and NYSDEC to discuss a draft protocol and determine what additional data those agencies desired in their review of the Bluestone Wind project. USFWS requested that distance and height information of eagles be recorded. Eagles would be recorded as above or below 200 meters (the approximate height if proposed wind turbines), and within or beyond 800 meters from the survey site. Using these categories USFWS can sort data and directly compare DOAS survey results to those results from surveys carried out by Bluestone Wind. As a result of this

discussion, data fields were added to the protocol for these height and distance categories for all species.

NYSDEC requested detailed data recording – including the mapping of flight paths - for the two eagle species and two additional at risk species - northern harrier and peregrine falcon. A "Listed Species" form was created using data gathered by Bluestone Wind in their surveys as a model, and also added to the protocol. At the conclusion of the surveys, these data were entered into a spreadsheet for analysis (attached).

Five qualified hawk counters from the Franklin Mountain Hawk Watch were recruited to cover the Cliff Rd. site. A schedule was created and a final protocol was distributed to the DOAS surveyors. In addition, conversations were held with surveyors to ensure they understood the protocol and the system for recording data.

SITE INFORMATION

A view of the horizon is important for surveying migrating eagles. Large soaring raptors, including Golden Eagles, frequently fly at low altitudes during migration, using lift from winds deflecting off hills and ridges to glide efficiently. An unobstructed view of the horizon is essential for thorough surveys. An obstructed horizon - even in part - can result in missed birds, or birds that are within view only briefly.

Advantages of the site:

- The site has as good or better a view as any other location scouted by DOAS. There is an approximate 75° unobstructed view of the distant horizon (beyond 800 meters) in a southeasterly direction. This view is of a ridge that is well oriented to the migration.
- The site is believed to be near the site of the fall 2017 surveys by WEST.
- 4 GPS tracked Golden Eagles had passed near the site during fall migrations.
- The site is on a public road, simplifying access.

Disadvantages of the site:

- About 210° of the distant horizon is seen through trees.
- Because of a hill, there is no view of the far horizon to the north. The view to the northeast is limited by trees and the slope of the same hill. Since most migrants would approach the site from the northeast during fall migration, the view of birds coming from that direction could be restricted.
- The hill to the north blocks the distant horizon over about 75° of the field of view. Observers can only see distant birds in that direction if they are more than 4° above the horizon. The top of the hill is about 530 meters distant and 37 meters above the site (includes the height of the mature trees). 800 meters from the site in that direction the elevation is approximately the same as the survey site. Thus the entire 1600 meter diameter X 200 meter high cylinder could not be completely surveyed. Low birds north

of the adjacent hill would likely not be seen.

- After surveys started, three neighboring landowners expressed concerns about the safety of our surveyors on opening weekend of the deer rifle season. These landowners are quite familiar with the numbers and behavior of the hunters using the land surrounding the site. Having taken these concerns seriously, we chose to not survey on 18 and 19 November even though weather conditions were acceptable on the 19th.
- The highest point on the dead end road is also the only place available to turn a vehicle around. To avoid possible conflicts with neighbors, we chose to use a site slightly lower than that high point. During our surveys we observed Bluestone Wind surveyors using the highest point on the road.

WEATHER AND TIMING OF THE 2017 FALL MIGRATION

Weather factors delayed completion of the surveys until 11/27, two days beyond the planned survey period. Several survey days were cut short due to weather that was worse than forecast.

RESULTS

An effort was made to cover the Cliff Road site on 23 days. Weather interfered with full coverage on 3 days. 148 hours of coverage were completed. All raptors and turkey vultures determined to be migrants were recorded and entered into the hawkcount.org database. 246 total migrants were recorded. Of the 4 species for which detailed height and distance information was recorded, no Peregrine Falcons were observed. 35 Golden Eagles, 10 Northern Harriers and 12 Bald Eagles were determined to be migrating. In addition, 22 individual Bald Eagles were recorded as "local" or non-migrants[1].

Following the count, a quality control check of all field forms was carried out. This check found clarification needed for the flight paths of two birds. These were made as hand written notes on the maps for 10/26/17 and 10/27/17.

The charts below show the numbers and percentages of these species by height and distance categories. Close is within 800 meters. Low is below 200 meters.

1 Bald Eagle 10/25-7 and 10/25-3 were treated as if they were a single bird for this analysis.

TOTAL MIGRANTS BY DISTANCE AND HEIGHT

Category	Number	Percent
Close/Low	85	34.6
Close/High	30	12.2
Distant/Low	67	27.2
Distant/High	64	26
Total	246	

MIGRANTS BY DISTANCE AND HEIGHT EXCLUDING TURKEY VULTURES

Category	Number	Percent
Close/Low	75	37.5
Close/High	26	13
Distant/Low	54	27
Distant/High	45	22.5
Total	200	

GOLDEN EAGLES BY DISTANCE AND HEIGHT

Category		Percent
Close/Low	19	54.3
Close/High	3	8.6
Distant/Low	6	17.1
Distant/High	7	20
Total	35	

BALD EAGLE MIGRANTS BY DISTANCE AND HEIGHT

Category		Percent
Close/Low	5	33.3
Close/High	1	6.7
Distant/Low	7	46.7
Distant/High	2	13.3
Total	15	

BALD EAGLE NON-MIGRANTS BY DISTANCE AND HEIGHT

Category		Percent
Close/Low	9	40.9
Close/High	2	9.1
Distant/Low	10	46.7
Distant/High	1	4.5
Total	22	

NORTHERN HARRIERS BY DISTANCE AND HEIGHT

Category		Percent
Close/Low	8	80
Close/High	1	10
Distant/Low	0	0
Distant/High	1	10
Total	10	

COMPARISON OF CLIFF ROAD FLIGHT WITH THE FLIGHT AT FRANKLIN MOUNTAIN

The Franklin Mountain Hawk Watch is a well-known concentration point for migrating raptors in the Upper Susquehanna Watershed. Data has been collected at the site since 1989. On days with good migratory potential, multiple observers are typically present, contributing to the count. The Cliff Road site was always surveyed by a single observer.

Of the 23 days with some effort at Cliff Road, there was coverage at the Franklin Mountain Hawk Watch on all but one day. This analysis is limited to only days that were surveyed at Cliff Road. Total hours of coverage were similar at the two sites – 148 at Cliff Road, 144 at Franklin Mountain. Franklin Mountain totaled 871 migrants. Cliff Road had 246 migrants (28% of the Franklin Mountain total). Golden Eagle totals were 136 and 35 (26%) respectively. Migrating Bald Eagles totals were 62 and 12 (19%) respectively. Northern Harriers totaled 5 at Franklin Mountain. Cliff Road recorded 10 (200%). Data on non-migrant Bald Eagles is only recorded as casual field notes at Franklin Mountain limiting its value for this analysis.

Noteworthy days at Franklin Mountain during the survey period included 5 days with 10 or more Golden Eagles. On each of those days fewer Golden Eagles were observed at Cliff Road. On the 2 days with the highest counts – 11/10 and 11/27 – no Golden Eagles were counted at Cliff Road. This suggests that on days with weather conditions that are ideal for concentrating Golden Eagles at Franklin Mountain, they move in their SW migratory direction somewhere out of sight of the Cliff Road site.

There were 3 days when Golden Eagle numbers at Cliff Road exceeded those at Franklin Mountain – 10/26, 11/11 and 11/24. The highest count at Cliff Road was on 11/11. This was the day after 21 Golden Eagles were recorded at Franklin Mountain. This is an interesting phenomenon that might indicate broad front movements of Golden Eagles through the surrounding area following very concentrated movements at Franklin Mountain.

Since the limited DOAS Cliff Road data set does not have any similar sequence, this possibility of broad front movements following big Franklin Mountain days should be further investigated. A similar pattern occurred on 11/27 and 11/28. Unfortunately, DOAS could not get an observer to Cliff Road on the 28th. If Bluestone Wind data are available for 11/28, it should examined in this context.

Migrating Bald Eagle numbers were modest at Cliff Road during the period. Non-migrating Bald Eagles numbers were considerably higher than those of migrants. On the 3 highest Bald Eagle days at Franklin Mountain, none were counted as migrants at Cliff Road.

The Northern Harrier count at Cliff Road was double that at Franklin Mountain Hawk Watch.

SPECIES COMPARISON FOR DAYS WHEN SURVEYS WERE CONDUCTED AT CLIFF ROAD

	GOLDEN EAGLE		BALD EAGLE		NORTHERN HARRIER		GROSS MIGRANTS		HOURS	
DATE	CLIFF RD	FMHW	CLIFF RD	FMHW	CLIFF RD	FMHW	CLIFF RD	FMHW	CLIFF RD	FMHW
10/25/17	0	1	1	4	1	1	20	64	7	7.75
10/26/17	6	0	4	5	2	1	31	142	7	7
10/27/17	1	1	2	1	0	0	11	17	7	6
10/31/17	1	2	2	1	0	1	14	30	7	7
11/01/17	0	NA	0	NA	0	NA	0	NA	3	NA
11/03/17	0	0	0	0	0	0	4	12	4	3.5
11/04/17	0	0	2	3	5	1	85	181	7	6.5
11/06/17	0	0	0	0	0	0	0	0	0.5	3.75
11/07/17	1	8	0	2	0	0	14	67	7	6
11/08/17	0	3	0	5	0	0	7	36	7	8
11/09/17	1	5	0	0	0	0	3	7	7	6
11/10/17	0	21	0	10	1	0	3	77	7	7.5
11/11/17	9	4	1	3	1	0	23	47	7	7.5
11/12/17	1	1	0	1	0	0	3	9	7	6.5
11/13/17	0	0	0	0	0	0	0	0	7	6
11/14/17	0	1	0	1	0	0	0	9	7	6.5
11/17/17	3	18	0	14	0	0	6	53	7	7.75
11/20/17	2	10	0	3	0	0	4	26	7	6
11/22/17	1	14	0	0	0	0	5	15	7	8
11/24/17	2	1	0	1	0	0	3	8	7	7
11/25/17	0	0	0	0	0	0	0	1	7	5
11/26/17	7	15	0	0	0	0	10	25	7.5	7
11/27/17	0	31	0	8	0	1	0	45	7	7.5
TOTALS	**35**	**136**	**12**	**62**	**10**	**5**	**246**	**871**	**148**	**143.75**

Complete Franklin Mountain Hawk Watch data can be viewed at hawkcount.org. Requests for those data in spreadsheet format should be sent to andymason@earthling.net.

INCIDENTAL OBSERVATIONS

DOAS observers were instructed to record observations of birds other than raptors if they were federally listed species or in large flocks (over 50 birds). In addition to these guidelines, observers were encouraged to record any observations they thought were noteworthy. These data have not been entered into a spreadsheet. This summary contains numbers and species only. Details, including the height and distance, can be found on the Incidental Wildlife Forms for each date at the web link below.

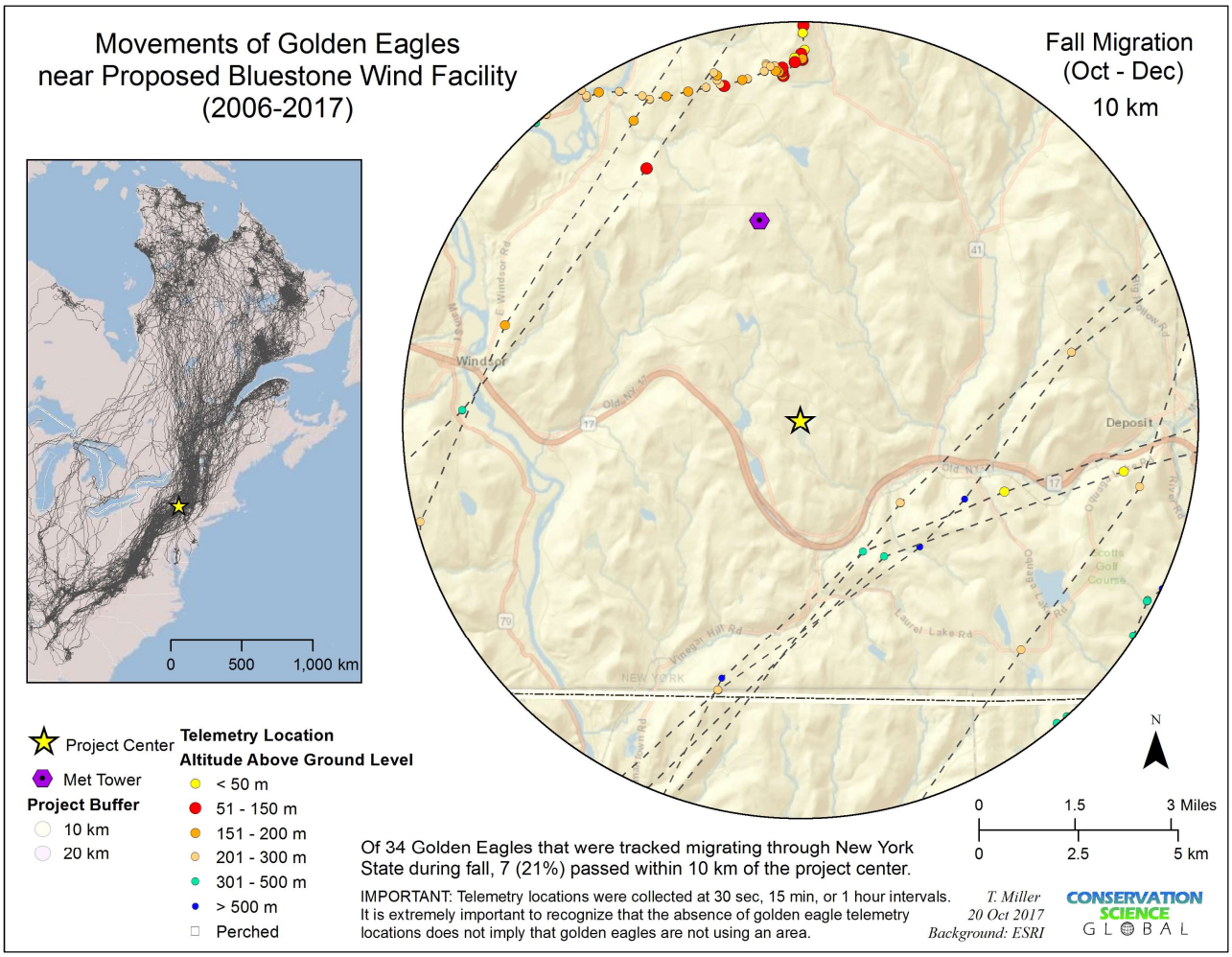
- Flock of 50 Red-winged Blackbird on 10/26/17.
- ~1000 passerines, mostly Icterids in 6 flocks on 11/4/17. The majority of these birds were likely Red-winged Blackbirds.
- 85 American Crow on 11/4/17.
- 462 Canada Goose in 2 flocks on 11/7/17. 1300 in several flocks on 11/27/17.
- Flock of 120 gulls (species?) on 11/20/17.
- Common Loon was reported on numerous occasions in field notes on HMANA forms, and occasionally on the Listed Species Form. Common Loon is a NYS Species of Special Concern. Maximum was 11 on 11/10/17.
- Common Raven were recorded on the Incidental form twice. These were groups that were noteworthy because they were large numbers for the species: 30 on 10/25/17; 20 on 10/26/17.

(Scanned copies of all field data forms can be found at: https://drive.google.com/drive/folders/1MuMa5KabJJHlbLTPCz-q06ZKfxMjnAg8?usp=sharing)

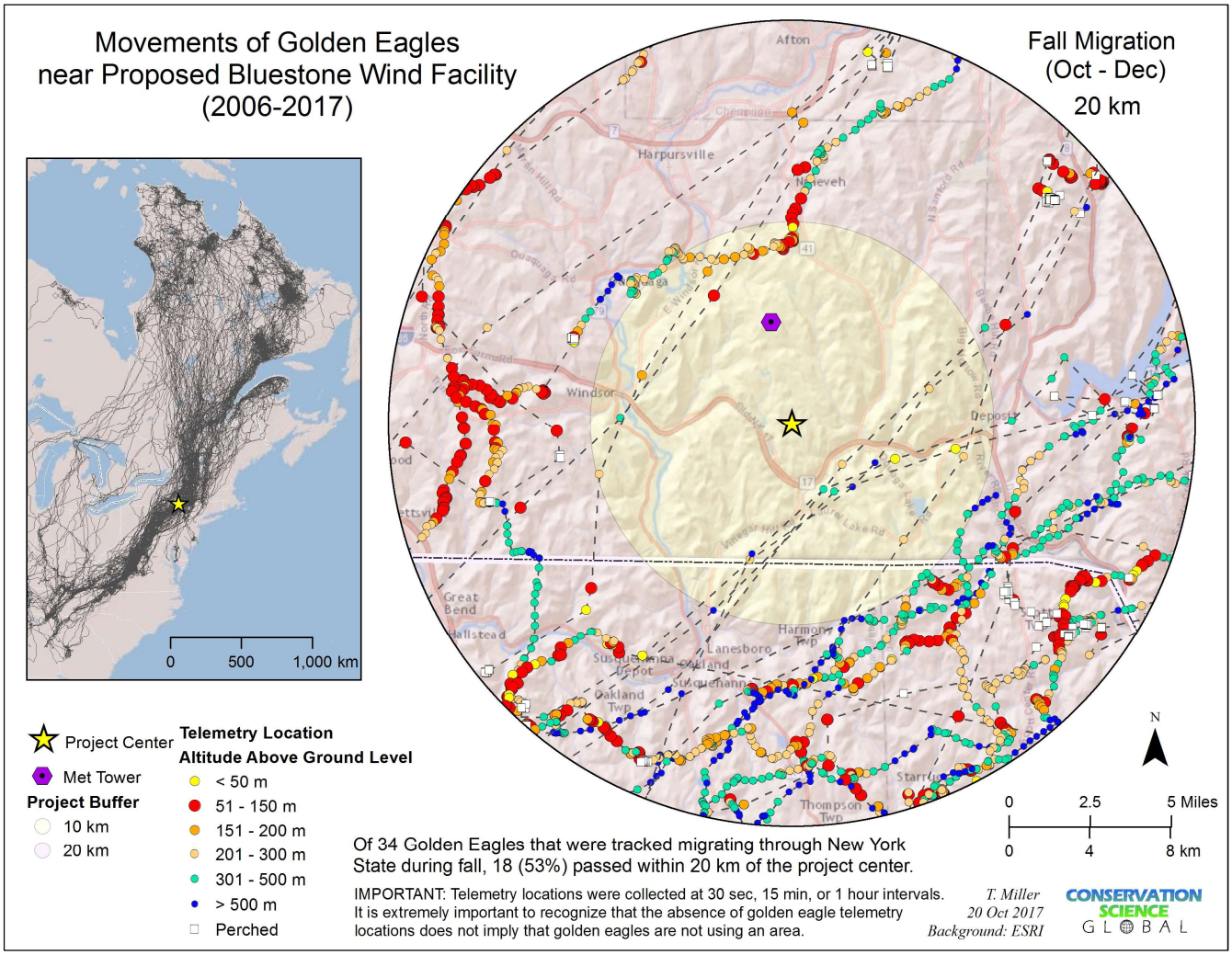
Attachments:

1. Conservation Science Global maps
2. DOAS Fall raptor migration survey protocol
3. DOAS Cliff Road daily totals
4. Listed Species data

Attachment 1.



Attachment 1. (con't.)



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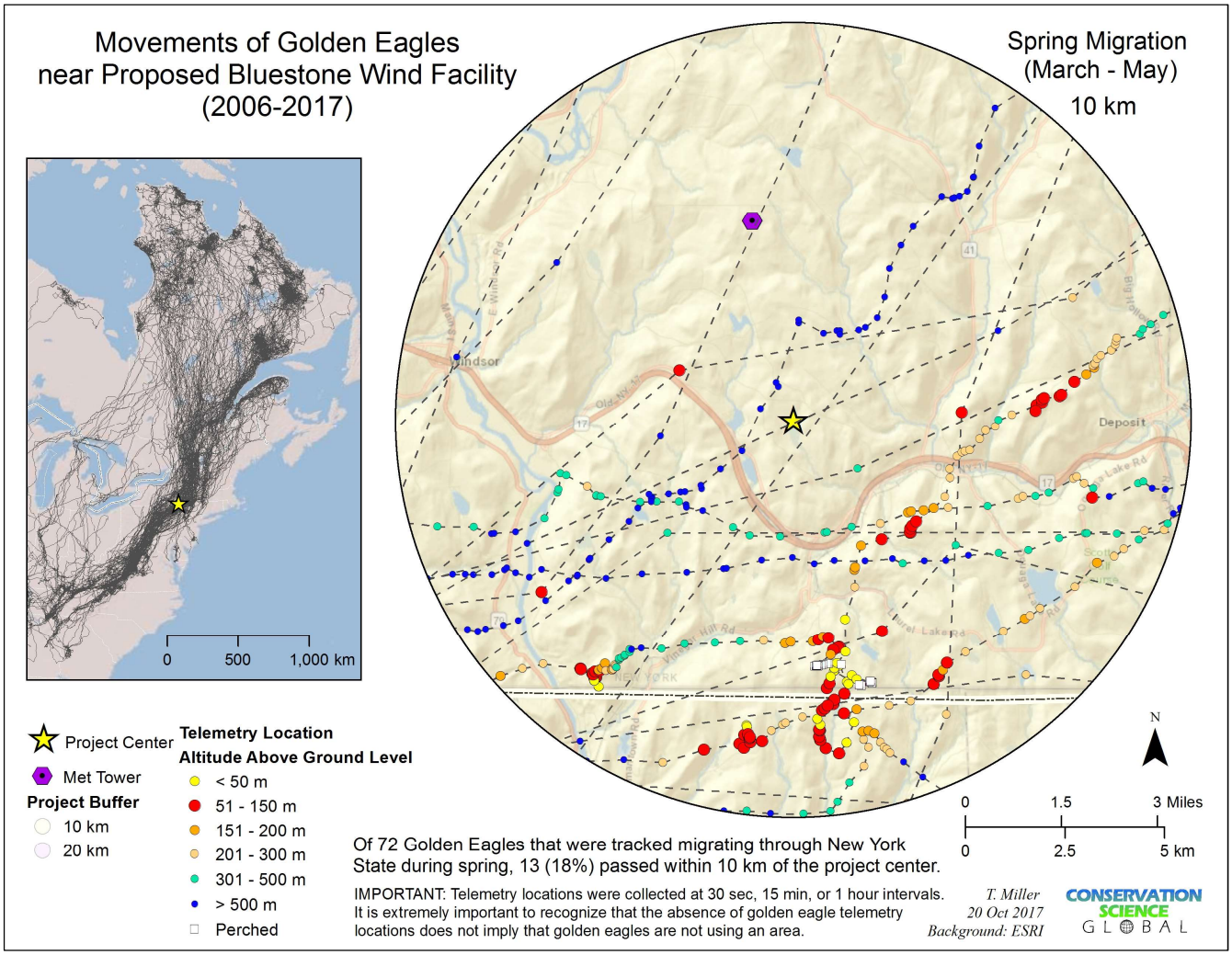

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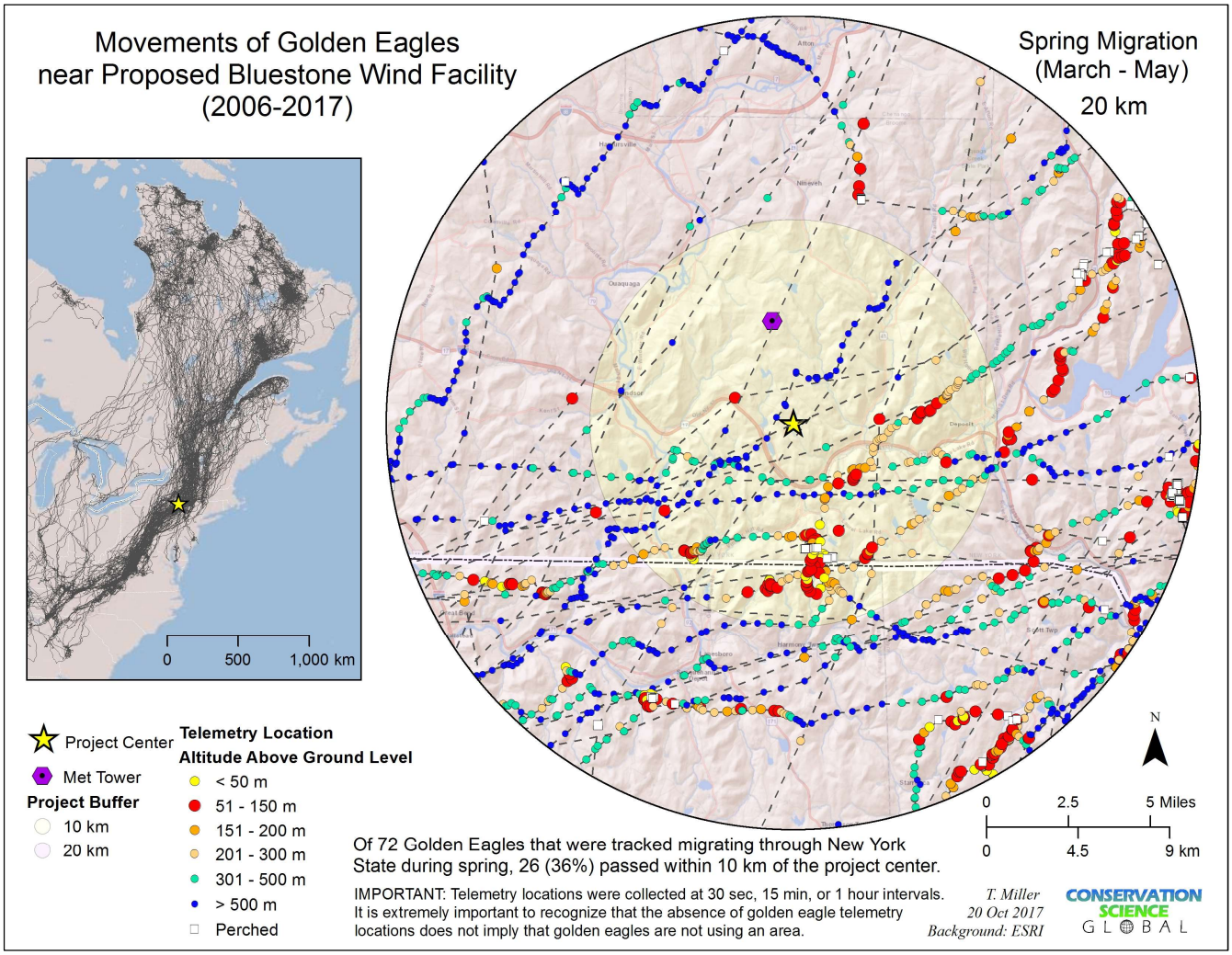


Attachment 2.

DOAS Fall Raptor Migration Survey protocol for the Bluestone Project Area

DOAS Raptor migration surveys will consist of counts of raptors at a fixed-point location in the project area. Surveys will be conducted on 20 days judged to be either acceptable, or good migrating weather from October 25 to November 25, 2017. The timing of the surveys targets Golden Eagle but all raptor and vulture species will be recorded. A single site was chosen based upon a combination of viewshed and the known use of the area by GPS tracked Golden Eagles (42.017184° -75.545329°). Surveys will cover 7 hours each day, with the option of an additional hour should birds be moving persistently. Surveys will be planned to start at 0800 hours EST. Weather conditions may determine an earlier or later start time. Surveys will not be conducted on days forecast to have strong and persistent S or SW winds, heavy rain, heavy snow, dense fog or extremely low cloud ceiling conditions that would limit visibility.

All migrating raptors seen during each survey will be recorded and entered into the hawkcount.org database.

Details on every individual of 4 NYS listed species - Bald Eagle, Golden Eagle, Northern Harrier and Peregrine Falcon – will be recorded on a daily data sheet and a daily map. Each bird's sequential number will be referenced on the map. Data for individual birds will include: species; age; time of nearest passage to observation site (EST); height above ground level at the time of observation (greater or less than 200m); distance from observation site (greater or less than 800m); migrant vs."local"; and for "local" birds notes on behavior. For the purpose of this study, "local" will only mean the bird was not migrating. Any comments or unusual observations will be also noted.

The field map will be prepared from the 2016 USGS topo map. It will be marked with the survey location and an 800 meter radius circle.

Eagle migration in our region is typically from NE to SW in fall. Weather conditions and terrain will affect the exact direction birds are moving at any time. For this study migratory behavior will be defined as a bird moving persistently or deliberately in a direction ranging from SSE to W. Stalling briefly to look for prey will not cause a bird to be excluded from the migratory bird count.

On days with high migratory movement, most birds will be moving in the migratory direction. This minimizes the possibility that birds may be double counted. On days with limited migratory movement, "local" birds may also move in a migratory direction. To prevent double counting, surveyors will note distinguishing characteristics of birds passing the site, i.e. multiple birds together, missing feathers, age, state of molt, etc. Using that information, any birds counted as migrants that are then judged to have returned to the area, will be removed from the migrant count and reassigned the designation of "local" birds.

"Local" birds will be defined as those moving in directions outside the migratory range, those making significant changes of direction, those engaged in extended kiting or hunting behavior, and perched birds. If there is doubt about whether a bird is a migrant or local bird, it will be recorded as a local bird. For local birds that are seen multiple times during a survey day, and recorded with multiple tracks on the map, the original assigned number from the daily sheet will be maintained.

The date, start and end time of the survey, and weather information will be recorded hourly in hawkcount.org data fields. Weather information will include: temperature [°C]; wind speed (Beaufort Scale); wind direction; precipitation; cloud cover (%); and, visibility (km). The timing of any cold or warm fronts passing through, and any low cloud ceiling heights that could impact the survey will be recorded in "weather" notes.

The following data will be recorded hourly for all raptors and vultures exhibiting migratory behavior:

• The number of individuals of each species passing the site;

• Each individual will be placed in a height and distance category in relation to the survey site: close and low (<800m/<200m); close and high (<800m/>200m); distant and low (>800m/<200m); and, distant and high (>800m/>200m). Note: If a GE, BE, NH or PG is low outside the 800m threshold but high within it, that must be noted in the field notes.

• When species cannot be determined, birds will be recorded as one of the following categories:
- unknown raptor (UR)
- unknown accipiter (UA)
- unknown eagle (UE)
- unknown falcon (UF)

Hourly data will be entered into a hawkcount.org account at the end of each day, or as soon as possible.

If state or federally listed species are observed or large flocks (greater than 50 individuals) of other bird types (i.e., waterfowl, shorebirds, corvids, and passerines) are observed during the surveys, they will be recorded on an incidental wildlife observation data sheets. The data recorded are similar to those described above, including observation number, date, time, species, number of individuals, distance and height from observer, sex/age class, habitat, and any noteworthy behavior.

After data entry, all field sheets (map, daily data sheet, tally sheet for migrants, incidental observation sheet) will be stapled together and submitted to Andrew Mason or Thomas Salo. These documents will be scanned and made available to interested parties. Data from these documents will be summarized in a final report of the fall season surveys.

Quality checks:
• After data entry, surveyors will confirm that listed species on the daily data sheet have been entered correctly according to distance and height.
• After submission of the field forms, a qualified individual other than the surveyor will review each day's data for errors.

***

Attachment 3.

DOAS Cliff Rd. Fall 2017 daily totals

Date	Duration	BV	TV	OS	BE	NH	SS	CH	NG	RS	BW	RT	RL	GE	AK	ML	PG	UA	UB	UF	UE	UR	TOT
	(min)																						
10/25/17	420	0	7	0	1	1	5	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	**20**
10/26/17	420	0	8	0	4	2	6	0	1	0	0	4	0	6	0	0	0	0	0	0	0	0	**31**
10/27/17	420	0	4	0	2	0	2	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	**11**
10/31/17	420	0	0	0	2	0	1	0	0	0	0	10	0	1	0	0	0	0	0	0	0	0	**14**
11/1/17	180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
11/3/17	240	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	**4**
11/4/17	420	0	23	0	2	5	7	6	0	4	0	35	0	0	1	2	0	0	0	0	0	0	**85**
11/6/17	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
11/7/17	420	0	2	0	0	0	1	1	0	0	0	9	0	1	0	0	0	0	0	0	0	0	**14**
11/8/17	420	0	1	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	**7**
11/9/17	420	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	**3**
11/10/17	420	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	**3**
11/11/17	420	0	0	0	1	1	0	0	0	3	0	9	0	9	0	0	0	0	0	0	0	0	**23**
11/12/17	420	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	**3**
11/13/17	420	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
11/14/17	420	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
11/17/17	420	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0	0	0	0	0	0	2	**6**
11/20/17	420	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	1	**4**
11/22/17	420	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	0	0	0	0	1	**5**
11/24/17	420	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	**3**
11/25/17	420	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
11/26/17	450	0	0	0	2	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	1	0	**10**
11/27/17	420	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
TOTAL	**8880**	**0**	**46**	**0**	**15**	**10**	**23**	**7**	**1**	**7**	**0**	**94**	**0**	**35**	**1**	**2**	**0**	**0**	**0**	**0**	**1**	**4**	**246**

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; UA= Unidentified Accipiter; UB=Unidentified Buteo; UF= Unidentified Falcon; UE= Unidentified Eagle; UR=Unidentified Raptor

(All hourly data, including surveyor, weather information, and height and distance information is available at: https://drive.google.com/drive/folders/1MuMa5KabJJHlbLTPCz-q06ZKfxMjnAg8?usp=sharing)

Attachment 4.

DOAS Cliff Rd. Fall 2017 Listed Species Data

BIRD	SPECIES	AGE	TIME	HEIGHT> 200M	DISTANCE> 800M	MIGRANT Y/N	BEHAVIOR	FIELD NOTES
10/25-1	BE	Juv.	10:30	Low	Far	N	S-A-Flap	10/25-1&2 are likely same unnumbered birds shown on the map at 11:30. At 11:30 - low - far - exhibited aggression
10/25-2	BE	Juv.	10:30	Low	Far	N	S-A-Flap	
10/25-3	BE	Juv.	10:58	Low	Close	N	S-G	
10/25-6	BE	Ad.	12:15	Low	Far	N	S-G	
10/25-7	BE	Juv.	12:35	Low	Close	N	S-G	Could be same bird as 3 - started low - soared high (treated as the same bird in the DOAS report)
10/25-8	BE	Ad.	14:12	Low	Close	N	F-S-G	Bird dropped below line of sight, later re-emerged soaring
10/26-6	BE	Ad.	8:56	Low	Close	N	S	
10/26-12	BE	Juv.	10:42	High	Far	N	S	
10/26-13	BE	Ad.	11:58	Low	Far	N	S	
10/31-1	BE	Juv.	9:00	Low	Far	N	G	Dropped
10/31-5	BE	Ad.	12:12	Low	Far	N	S-G	
11/04-8	BE	Juv.	11:01	Low	Close	N		
11/04-9	BE	Ad.	11:55	High	Close	N		
11/04-10	BE	Juv.	14:16	Low	Far	N		
11/04-11	BE	Ad.	14:43	High	Close	N		
11/09-1	BE	Juv.	10:22	Low	Close	N	S	
11/09-2	BE	Juv.	10:26	Low	Close	N	Flap	
11/10-2	BE	Ad.	14:10	Low	Close	N	Flap-For-Glide	
11/11-6	BE	Ad.	11:18	Low	Far	N		
11/11-13	BE	Juv.	14:48	Low	Far	N		Photographed multiple individuals*
11/20-2	BE	Juv.	11:05	Low	Close	N	G	
11/26-1	BE	Juv.	10:00	L	Far	N	S-G	
11/27-1	BE	Juv.	12:05	Low	Close	N	For-Gliding	
10/25-5	BE	Ad.	11:22	Low	Far	Y	S-G	Started low (<100m), soared above 200m, went into glide
10/26-8	BE	Juv.	9:20	High	Close	Y	S	
10/26-9	BE	Ad.	9:50	Low	Far	Y	S	
10/26-14	BE	Juv.	12:19	Low	Far	Y	S	
10/26-15	BE	Juv.	12:58	Low	Close	Y	S	
10/27-1	BE	Juv.	9:35	Low	Close	Y	F-S	
10/27-2	BE	Juv.	9:55	Low	Close	Y	F-S	

Attachment 4. (con't.)

10/31-3	BE	Juv.	12:04	Low	Far	Y	G	
10/31-4	BE	Juv.	12:09	High	Far	Y	G	
11/04-3	BE	Juv.	9:52	High	Far	Y		
11/04-6	BE	Juv.	10:10	Low	Far	Y		
11/11-5	BE	Ad.	11:15	Low	Far	Y		
11/24-1	BE	Juv.	10:45	Low	Close	Y	Flap-G	
11/26-9	BE	Ad.	14:34	L	Close	Y	F-G	Came up from below horizon
11/26-10	BE	Juv.	14:40	L	Close	Y	F-G	
10/26-1	GE	Juv.	8:05	Low	Close	Y	S	
10/26-2	GE	Juv.	8:05	Low	Close	Y	S	
10/26-4	GE	Ad.	8:40	Low	Close	Y	S	
10/26-5	GE	Juv.	8:56	Low	Close	Y	S	
10/26-10	GE	Ad.	9:55	High	Far	Y	S	
10/26-11	GE	Ad.	9:56	High	Far	Y	S	
10/27-3	GE	Juv.	10:00	Low	Far	Y	S	
10/31-2	GE	Juv.	9:54	Low	Far	Y	Flap-G	Kept pushing along ridge
11/09-3	GE	Ad.	12:21	Low	Close	Y		Photographed*
11/11-1	GE	Ad.	9:19	High	Far	Y		
11/11-2	GE	Ad.	9:58	High	Far	Y		
11/11-3	GE	Ad.	10:14	Low	Far	Y		
11/11-4	GE	Juv.	11:14	Low	Far	Y		
11/11-7	GE	Ad.	11:23	High	Far	Y		
11/11-8	GE	Juv.	11:38	High	Far	Y		
11/11-9	GE	Juv.	12:21	High	Far	Y		
11/11-11	GE	Juv.	14:34	High	Close	Y		
11/11-12	GE	Juv.	14:40	Low	Close	Y		
11/17-1	GE	Unk	9:30	Low	Close	Y	Flap-G	
11/17-2	GE	Ad.	9:55	Low	Close	Y	S-G	
11/17-3	GE	Ad.	12:40	Low	Close	Y	Flap-G-S	Disappeared below horizon
11/20-1	GE	Unk	10:43	Low	Close	Y	Flap-G	
11/20-3	GE	Unk	11:30	Low	Close	Y	Flap-G	

Attachment 4. (con't.)

11/22-1	GE	Ad.	13:45	Low	Close	Y	S-Gliding	
11/24-2	GE	Ad.	11:32	Low	Close	Y	G	
11/24-3	GE	Juv.	11:37	Low	Close	Y	Flap-G	
11/26-2	GE	Ad.	12:26	L	Close	Y	S-G	
11/26-3	GE	Ad.	12:36	L	Close	Y	S-G	
11/26-4	GE	Ad.	12:58	L	Close	Y	G-Flap	
11/26-5	GE	Ad.	13:20	H	Close	Y	S-G	Harassed by raven
11/26-7	GE	Ad.	14:10	H	Close	Y	S-G-Flap	
11/26-8	GE	Juv.	14:17	L	Close	Y	S-G	
11/26-11	GE	Ad.	14:55	H	Far	Y	S	
11/07-1	GE	Ad.	13:45	Low	Close	Y	Gliding	
10/25-4	NH	Ad.	11:12	Low	Close	Y	G	
10/26-3	NH	Ad.	8:27	Low	Close	Y	Flap	
10/26-7	NH	Ad.	8:57	Low	Close	Y	Flap	
11/04-1	NH	Ad.	8:55	Low	Close	Y		Adult male
11/04-2	NH	UNK	9:25	High	Far	Y		
11/04-4	NH	Ad.	10:01	Low	Close	Y		Adult female
11/04-5	NH	Juv.	10:01	Low	Close	Y		Bird 4 & 5 flying together
11/04-7	NH	Juv.	10:40	Low	Close	Y		
11/10-1	NH	Unk	13:30	Low	Close	Y	Flap	
11/11-10	NH	Ad.	12:51	High	Close	Y		
11/26-6	UE		13:46	L	Far	N	G	

Behavior Codes: P = Perched; S= Soaring; Flap = Flapping; For = Foraging; g = Gliding; A = Aggression or Territorial Defense; and, O= Other

(Complete daily listed species forms are available at: https://drive.google.com/drive/folders/1MuMa5KabJJHlbLTPCz-q06ZKfxMjnAg8?usp=sharing)

DELAWARE-OTSEGO AUDUBON SOCIETY, INC.
P.O. BOX 544, ONEONTA, NY 13820

Kathleen H. Burgess
Secretary to the Commission
NY State Public Service Commission
Albany, NY

Oct. 30, 2017

Ms. Burgess:

Please find attached maps of GPS tracks from telemetered Golden Eagles passing through the Bluestone Wind Project area. Expenses for these maps were included in our organization's request for intervenor funding for this project, and approved at the intervenor funding conference held on Oct. 16, 2017.

These maps have also been submitted to Administrative Law Judge Sean Mullany, to the NY State Department of Environmental Conservation, to the US Fish and Wildlife Service, as well as all persons identified on the party list for this proceeding.

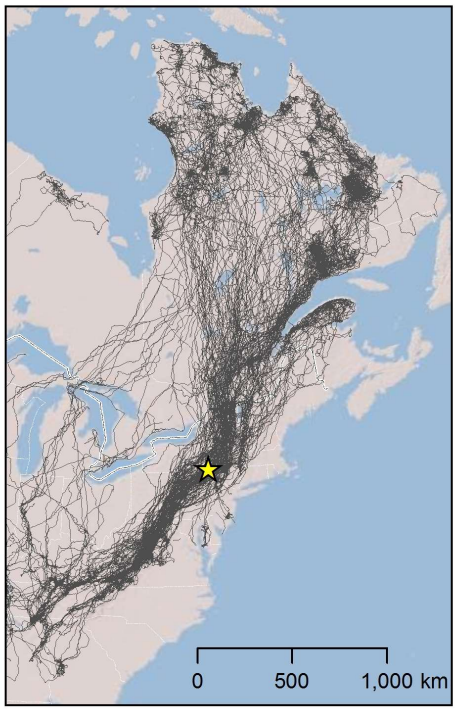
Sincerely,

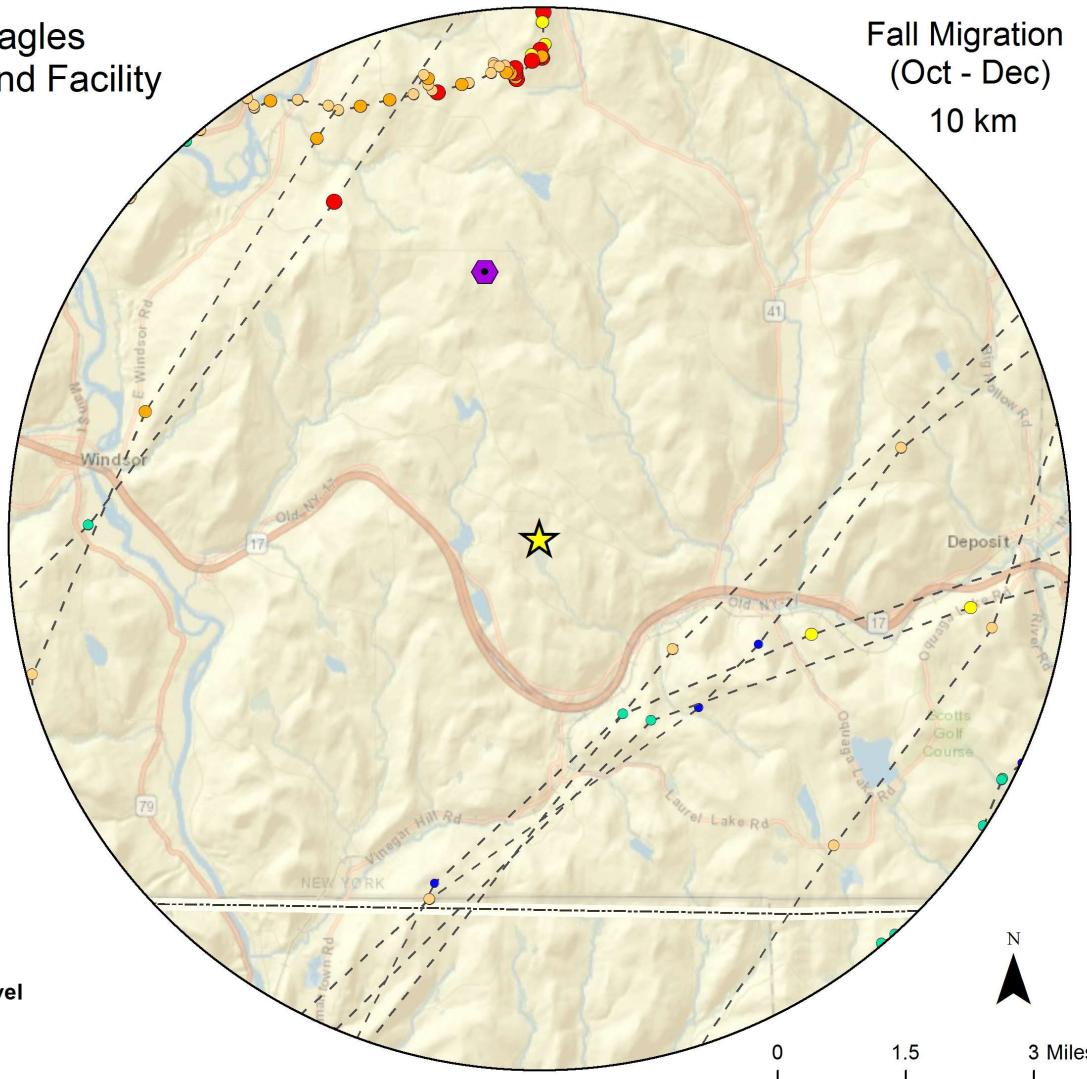
Andrew Mason, Co-President
Delaware-Otsego Audubon Soc.

Andrew Mason
1039 Peck St.
Jefferson, NY 12093
(607) 652-2162
AndyMason@earthling.net

Movements of Golden Eagles near Proposed Bluestone Wind Facility (2006-2017)

Fall Migration
(Oct - Dec)
10 km





Project Center

Met Tower

Project Buffer

10 km

20 km

Telemetry Location

Altitude Above Ground Level

< 50 m

51 - 150 m

151 - 200 m

201 - 300 m

301 - 500 m

> 500 m

Perched

N

0 1.5 3 Miles

0 2.5 5 km

Of 34 Golden Eagles that were tracked migrating through New York State during fall, 7 (21%) passed within 10 km of the project center.

IMPORTANT: Telemetry locations were collected at 30 sec, 15 min, or 1 hour intervals. It is extremely important to recognize that the absence of golden eagle telemetry locations does not imply that golden eagles are not using an area.

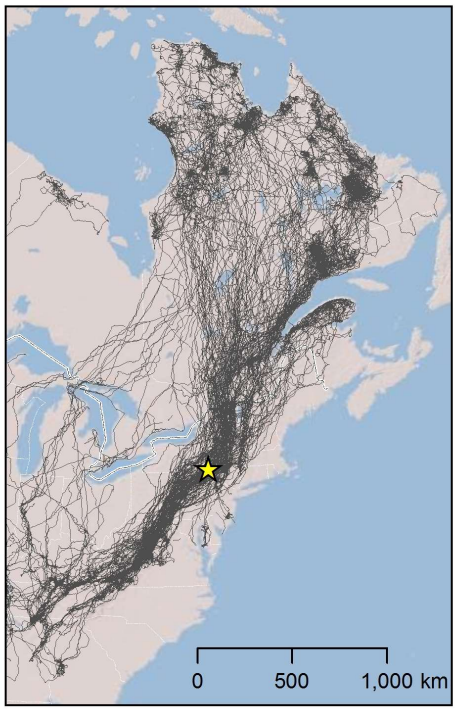
T. Miller
20 Oct 2017
Background: ESRI

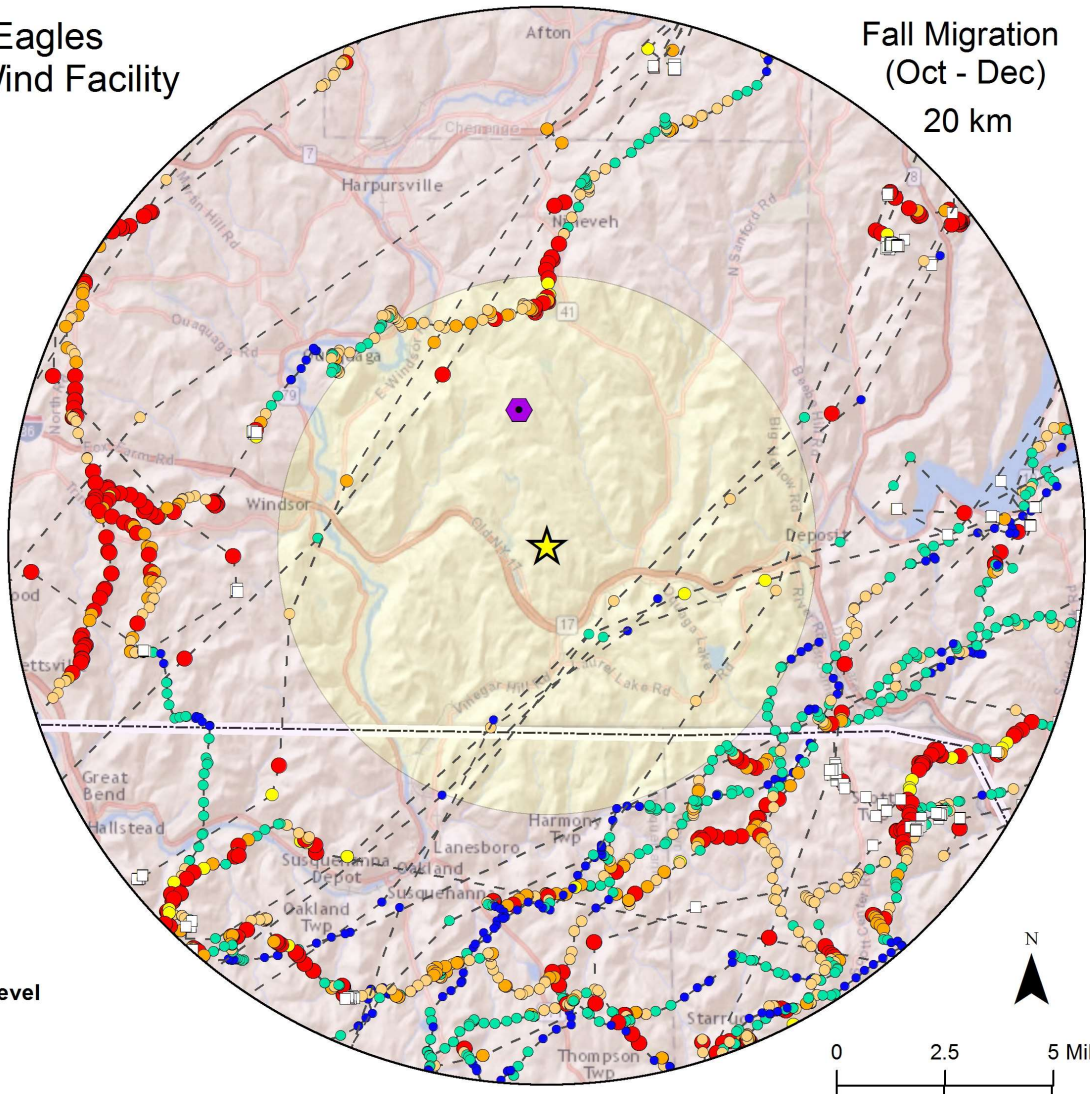
CONSERVATION SCIENCE GLOBAL

Movements of Golden Eagles near Proposed Bluestone Wind Facility (2006-2017)

Fall Migration (Oct - Dec)

20 km





Project Center

Met Tower

Project Buffer

10 km

20 km

Telemetry Location

Altitude Above Ground Level

< 50 m

51 - 150 m

151 - 200 m

201 - 300 m

301 - 500 m

> 500 m

Perched

Of 34 Golden Eagles that were tracked migrating through New York State during fall, 18 (53%) passed within 20 km of the project center.

IMPORTANT: Telemetry locations were collected at 30 sec, 15 min, or 1 hour intervals. It is extremely important to recognize that the absence of golden eagle telemetry locations does not imply that golden eagles are not using an area.

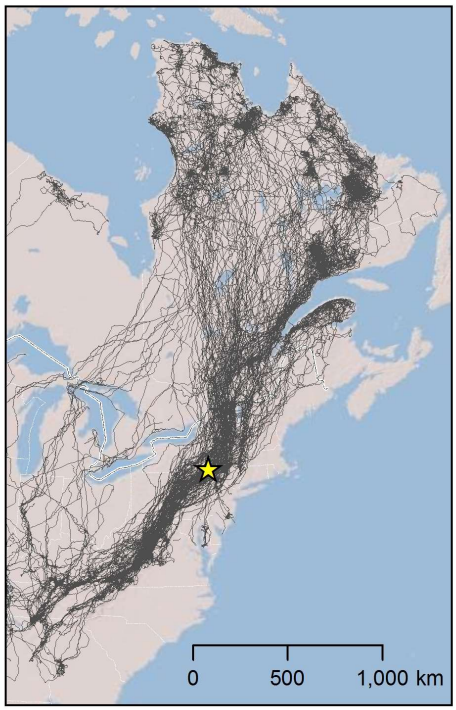
T. Miller
20 Oct 2017
Background: ESRI

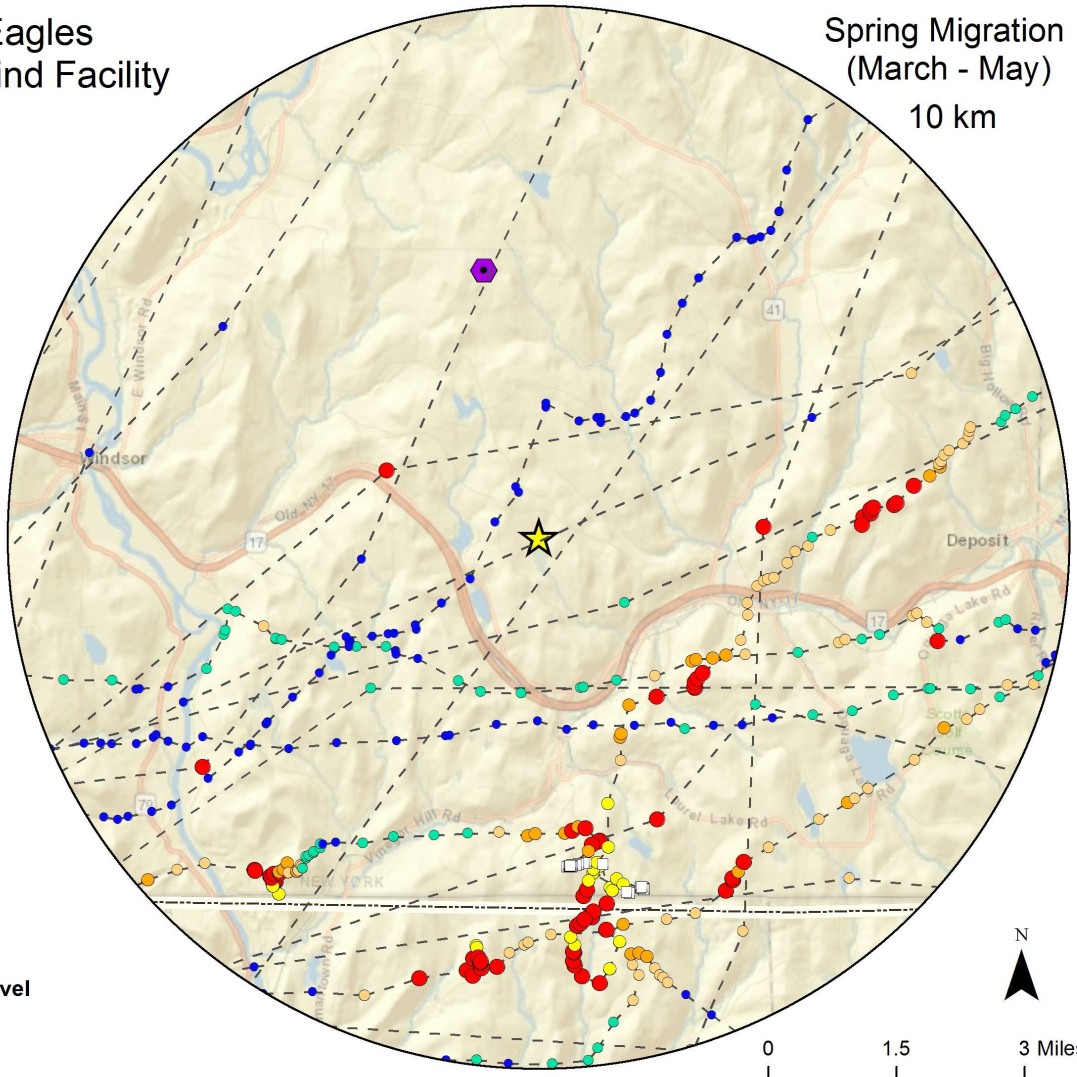
CONSERVATION SCIENCE GLOBAL

Movements of Golden Eagles near Proposed Bluestone Wind Facility (2006-2017)

Spring Migration
(March - May)

10 km





Project Center

Met Tower

Project Buffer

10 km

20 km

Telemetry Location

Altitude Above Ground Level

< 50 m

51 - 150 m

151 - 200 m

201 - 300 m

301 - 500 m

> 500 m

Perched

N

0 1.5 3 Miles

0 2.5 5 km

Of 72 Golden Eagles that were tracked migrating through New York State during spring, 13 (18%) passed within 10 km of the project center.

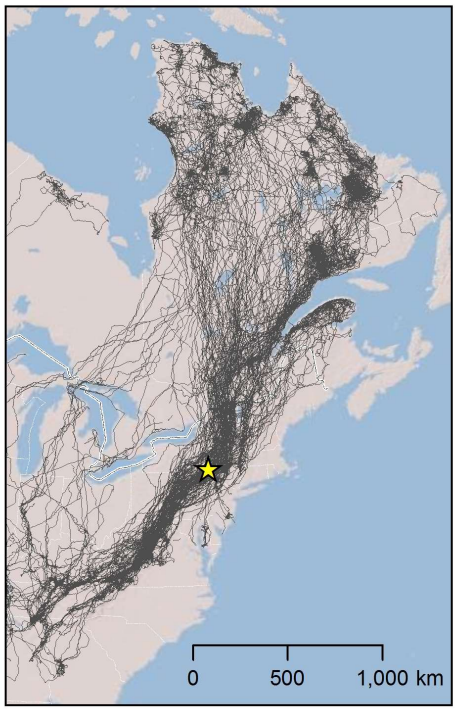
IMPORTANT: Telemetry locations were collected at 30 sec, 15 min, or 1 hour intervals. It is extremely important to recognize that the absence of golden eagle telemetry locations does not imply that golden eagles are not using an area.

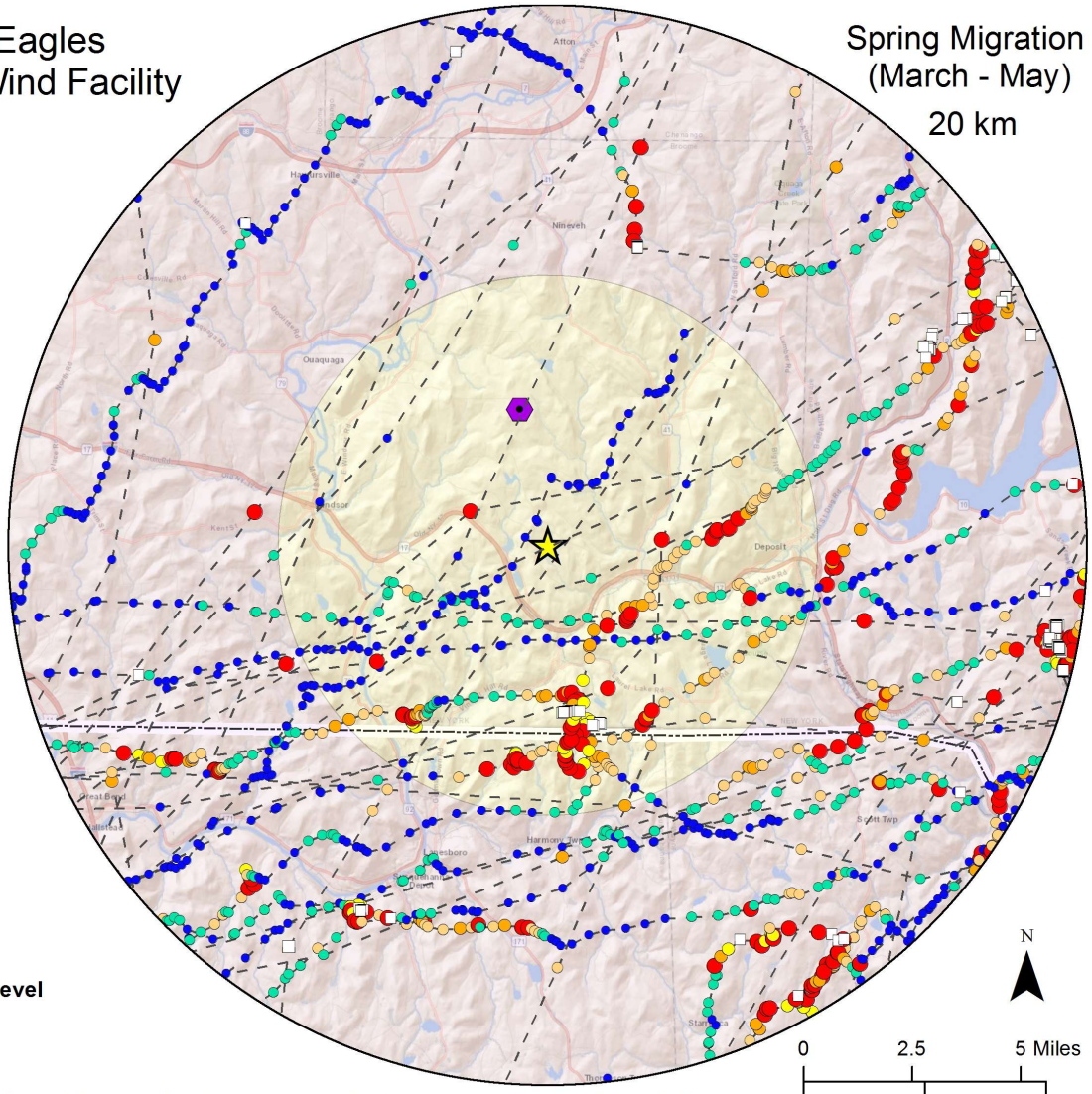
T. Miller
20 Oct 2017
Background: ESRI

CONSERVATION SCIENCE GLOBAL

Movements of Golden Eagles near Proposed Bluestone Wind Facility (2006-2017)

Spring Migration
(March - May)
20 km





Project Center

Met Tower

Project Buffer

10 km

20 km

Telemetry Location

Altitude Above Ground Level

< 50 m

51 - 150 m

151 - 200 m

201 - 300 m

301 - 500 m

> 500 m

Perched

Of 72 Golden Eagles that were tracked migrating through New York State during spring, 26 (36%) passed within 10 km of the project center.

IMPORTANT: Telemetry locations were collected at 30 sec, 15 min, or 1 hour intervals. It is extremely important to recognize that the absence of golden eagle telemetry locations does not imply that golden eagles are not using an area.

T. Miller
20 Oct 2017
Background: ESRI

CONSERVATION SCIENCE GLOBAL