



# Assessment of Seasonal Status of Golden Eagles Observed in the Bluestone Wind Project Area

Task 1

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## Summary

Bald and Golden Eagles are federally protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. Because of this, the U.S. Fish and Wildlife Service recommends that wind energy projects conduct surveys for eagles as part of a risk assessment to determine if eagles are likely to be incidentally taken at a wind facility. The Northern Allegheny Plateau, where the Bluestone Wind Project (BWP) is located, may be an important wintering and migratory area for Golden Eagles. The region has topography and forest cover that are typical of both wintering and migratory habitat for Golden Eagles in the eastern USA. Delaware-Otsego Audubon Society (DOAS) conducted surveys for Golden Eagles from a single location in spring 2018 and 2019. WEST, Inc. conducted similar surveys in fall 2017 and spring 2018. Data recorded by DOAS provided detailed information about eagle movements and behavior such that it was possible to classify seasonal status of Golden Eagles using the area. In all, 25 (36%) observations were classified as being of migratory individuals, 19 (27%) of wintering individuals, 17 (24%) of non-migratory individuals (wintering or stopover), and 9 (13%) of individuals with unknown status. Telemetry data from birds captured south of New York State illustrate that the area has been used for spring and fall migration as well as stopover during fall migration. Data collected by DOAS, suggest that the area of BWP is used by Golden Eagles for wintering.

## Introduction

The Bluestone Wind Project (BWP) has been proposed for construction in Broome County, New York. Because both Bald and Golden Eagles are known to be killed by wind turbines and are federally protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act (Pagel et al. 2013), the U.S. Fish and Wildlife Service recommends that wind energy projects conduct surveys for eagles as part of a risk assessment to determine if eagles are likely to be incidentally taken at a facility during normal operating of that facility (USFWS 2013). WEST, Inc. (hereafter, WEST) was contracted to conduct eagle use surveys for BWP.

Delaware-Otsego Audubon Society (DOAS) requested New York State Article 10 Siting Process Intervenor Funding in October 2017 to garner funds to assess telemetry data (Fig. 1) and conduct independent surveys of the project area. DOAS requested intervenor funds a second time, in January 2019, so that, among other things, materials collected during surveys by BWP and DOAS could be reviewed by an outside scientist and eagle expert.

General knowledge about Golden Eagle behavior is essential for assessing potential risk of collision with turbines. Importantly, seasonal movements and habitat of Golden Eagles in eastern North America are not well understood. In discussions of these behaviors, I use the term “seasonal status” to describe the specific time periods during the eagles’ annual cycle. The seasonal status of a Golden Eagle in eastern North America may be described as “in migration”, “in stopover” during migration, “wintering”, “summering”, or “breeding”.

The seasonal status of an eagle influences the time it may spend in an area. For example, birds that are migrating tend to use an area for a relatively short period of time, usually anywhere from several minutes to a couple of days. In contrast, a bird in stopover (the time between migratory flights during which individuals rest and feed) may use an area temporarily for 5 or more days (Alerstam and Lindström 1990). Finally, birds not engaged in migration may be wintering,

breeding, or summering and may thus spend weeks or months in one area. Clearly then, accurately assessing the seasonal status of an individual eagle can be informative about the potential risk such a bird may face from a threat in any one area.

The purpose of this report is to assess the seasonal status of Golden Eagles detected at the Bluestone Wind Project area by Delaware-Otsego Audubon Society (DOAS) and WEST, Inc. observers. First, I provide an overview of Golden Eagle ecology and migration phenology. This is relevant because of the important differences between eastern and western Golden Eagle populations and because this phenological information is the basis for assessing seasonal status of birds recorded by the two observing teams.

### *Overview of Golden Eagle Ecology in Eastern North America*

Golden Eagles in eastern North America are migratory, spending the summer in eastern Canada and, in fall migrating to the eastern USA, where they spend the winter. Golden Eagles previously bred in New York State, New Hampshire, and Maine (Katzner et al. 2012b, Morneau et al. 2012, 2015), but breeding is now restricted to Canada north of  $\sim 47^{\circ}\text{N}$ . The majority of Golden Eagles that spend the summer in eastern Canada migrate through New York State twice each year, generally during the periods of Oct – Dec and late Feb – mid-May (Katzner et al. 2012b, Miller et al. 2016). Golden Eagle migration is concentrated in areas with relatively high topographic relief; these areas tend to be forested hills and ridges that support updrafts that eagles use to subsidize their flight (Duerr et al. 2012, Katzner et al. 2012a, Lanzone et al. 2012, Miller et al. 2016). During migration, Golden Eagles regularly make stopovers *en route* before continuing on to their final summer or winter destination (Miller et al. 2016).

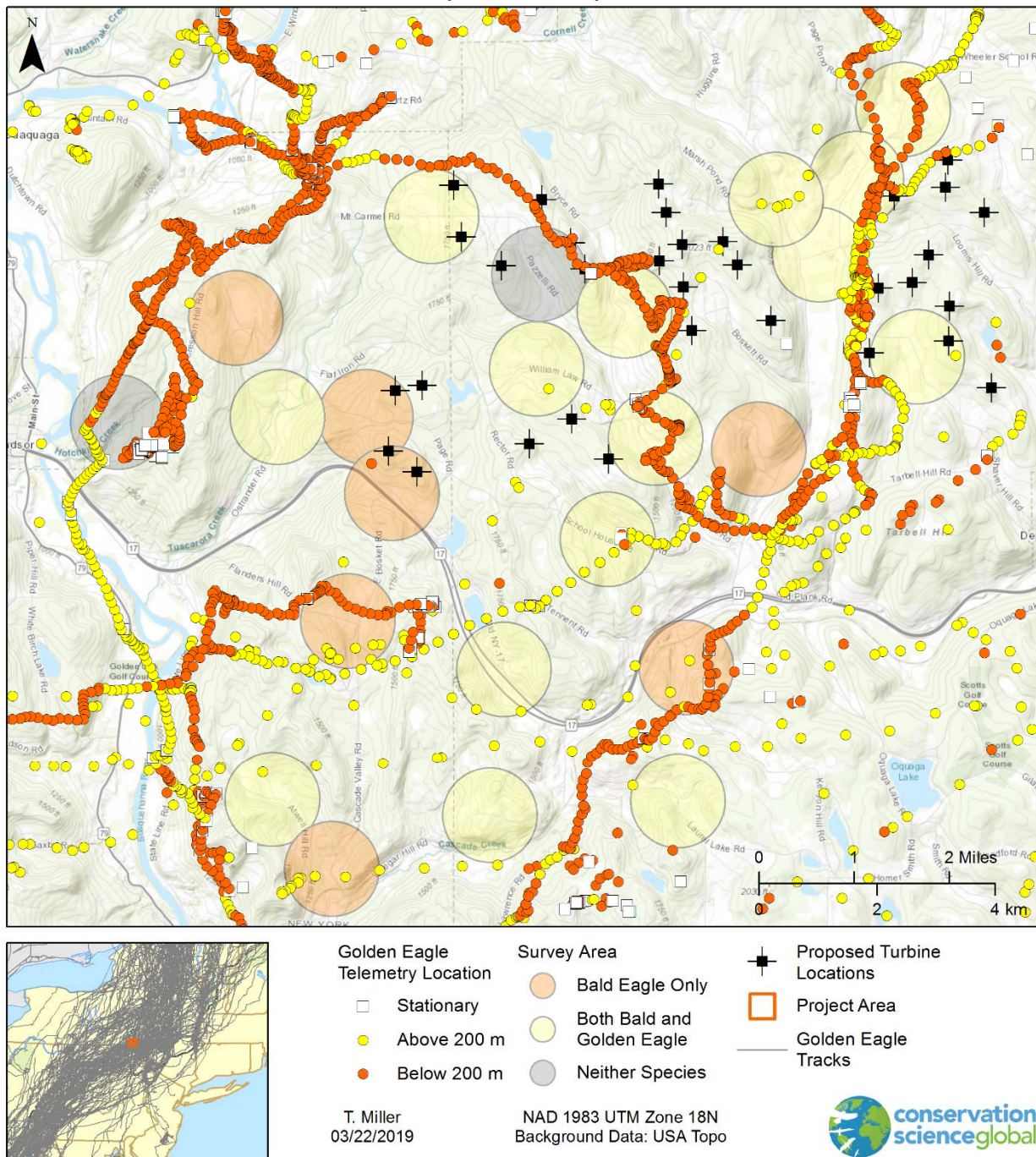
Golden Eagles from the western USA are found in open areas. In contrast, Golden Eagles in the eastern USA are found in the highest densities in heavily forested areas with relatively high topographic relief (Duerr et al. *in press*, Miller et al. 2017, author's unpublished data). Telemetry data show that typical winter habitat within a Golden Eagle home range is composed of  $79.6 \pm 14\%$  forest and  $15.6 \pm 8\%$  open areas with rough terrain (Miller et al. 2017). This composition is generally consistent across latitudes, although areas eagles use in the southeastern USA tend to have less forest cover. Golden Eagles can range over very broad areas during winter. In one study, home range size was from 44 to 27,970  $\text{km}^2$ , with adults occupying the smallest ranges and juveniles the largest (Miller et al. 2017).

Camera trapping data from over 200 sites in eastern North America provides evidence of Golden Eagles wintering in nearly every state east of the Mississippi. There are many camera sites in New York and nearly all of them have recorded wintering and migrating golden eagles (Jachowski et al. 2015, T. Katzner, USGS, pers. comm.). Consistent with the telemetry data, these camera traps are most often in or near forested sites.

### *Phenology of Seasonal Movements of Golden Eagles*

The Eastern Golden Eagle Working Group and my research group has been tracking Golden Eagles in the eastern USA since 2006 (see inset in Fig. 1). The dataset is built from tracks of 108 individuals and it contains 3.7 million GPS locations. Eagles in this dataset winter from New York and Vermont south to Alabama and Georgia. Birds tracked were juveniles (hatch-year in

### Golden Eagle Use of the Bluestone Wind Project Area (2007 - 2018)



**Figure 1.** Golden Eagle use of the Bluestone Wind Project area by Golden Eagles telemetry data collected from 2007 – 2018. Telemetry data illustrate that Golden Eagles have used the area for perching, roosting, and flight both above and below 200 m during spring and fall migration and fall stopover.

fall/2<sup>nd</sup> year in spring), young sub-adults (2<sup>nd</sup> year/3<sup>rd</sup> year), and older sub-adults (3<sup>rd</sup> year/4<sup>th</sup> year and 4<sup>th</sup> year/5<sup>th</sup> year) and adults (after 5<sup>th</sup> year).

Juveniles and young sub-adults have similar plumages such that most observers are likely to classify both as juvenile (Liguori 2004, J. Liguori pers.comm.). Similarly, older sub-adults and adults appear more similar when in flight and most observers can only sometimes easily distinguish between the two. Thus, unless birds are in hand, age estimates need to be interpreted with caution.

The telemetry dataset was used to assess timing of migration of Golden Eagles in eastern North America. These data suggest that in autumn, departure by Golden Eagles from summering grounds begins as early as mid-August but can occur as late mid-November (Table 1). Fall migration is spread across several months, and timing of migration is similar among all age groups. Adults depart in a narrow window of time, but juveniles and young subadults show higher variability in departure times than adults.

Spring migration phenology of Golden Eagles is highly age-structure, with a bi-modal distribution in which there is a peak for adults and a peak for younger birds (Miller 2012, Miller et al. 2016). Adults and sub-adults depart the wintering grounds earliest within a narrow window of time. The mean date on which adults departed from wintering grounds was 17 March (n = 93; 95% confidence interval (CI: 13 – 20 March) (Table 1). Juvenile eagles departed much later, with on 21 April (n = 18, 95% CI: 16 – 26 April). Young sub-adult eagles were similar to juveniles departing on 11 April (n=24, 95% CI: 5 – 17 April). Eagles migrate faster in spring than in fall (Miller et al. 2016, Rus et al. 2017).

**Table 1.** *Beginning dates for spring and fall migration for Golden Eagles tracked in the eastern USA from 2006 – 2019. Many eagles were tracked for multiple years and are represented more than once. Grand means were used for all calculations where applicable. EGEWG unpublished data.*

Season	Age	n	Median	Mean	95% Confidence Interval		Min	Max
Fall	Juvenile	2	12-Oct	12-Oct	21-Sep	2-Nov	2-Oct	23-Oct
	Young sub-adult	8	23-Sep	21-Sep	5-Sep	7-Oct	10-Aug	24-Oct
	Older sub-adult/Adult	43	11-Oct	9-Oct	4-Oct	15-Oct	13-Aug	20-Nov
Spring	Juvenile	18	21-Apr	21-Apr	16-Apr	26-Apr	7-Apr	11-May
	Young sub-adult	24	13-Apr	11-Apr	5-Apr	17-Apr	14-Mar	12-May
	Older sub-adult/Adult	93	15-Mar	17-Mar	13-Mar	20-Mar	15-Feb	16-May

#### *Phenology of migration at Bluestone Wind Project*

BWP is located at ~42.1°N latitude. I evaluated when migrating Golden Eagles reach within 0.5° of that latitude (41.6° – 42.6°N). In fall, southbound migrating eagles are in this latitudinal range during the period from mid-September - mid-January (Table 2). Passage of the majority of young sub-adults occurs between 14 Oct – 28 Nov, whereas passage of older sub-adults and adults is generally between 12 – 26 November.

Autumn migrant Golden Eagles regularly stopover at this latitude. Twelve (37.5%) adult Golden Eagles have engaged in fall stopover for >4 days at the same latitude as BWP. Stopover ranged from 5 – 20 days (mean: 7.6 days; 95% CI: 5.5-9.7 days). Four birds stopped over at this latitude in more than one year. Importantly, one adult Golden Eagle spent 11 days in December 2017 in stopover **in and around the project area** (Fig. 2). This eagle spent 10 days in stopover in 2018 ~ 7 km east of the project area. Four (22%) older sub-adults spent have 5 or 6 days in stopover at the BWP latitude. Stopover (>4 days long) at the latitude of BWP also occurred during spring migration, with 10 (22%) adult eagles spending between 5 – 11 days (mean: 6.1 days; 95% CI: 4.8 – 7.4 days). Five young sub-adult eagles spent from 5 – 12 days (mean: 9.0 days; 95% CI: 8.9 – 9.1 days). Four older sub-adults (11%) spent 5 – 10 days (mean: 7.0 days; 95% CI 3.6 – 10.4 days) in stopover at this latitude.

**Table 2.** *Phenology of migration between 41.6° – 42.6°N. The Bluestone Wind Project is located halfway between these at ~42.1°N. Many eagles were tracked for multiple years and are represented more than once. Grand means were used for all calculations where applicable. EGEWG unpublished data.*

Season	Banding Age	n	Median	Mean	95 % Confidence Interval		Stopover		Migration	
							Min	Max	Min	Max
Fall	Juvenile									
	Young sub-adult	6	11-Nov	6-Nov	14-Oct	28-Nov	NA	NA	15-Sep	2-Dec
	Older sub-adult/Adult	50	16-Nov	19-Nov	12-Nov	26-Nov	19-Oct	21-Jan	19-Oct	22-Jan
Spring	Juvenile	16	26-Apr	26-Apr	21-Apr	1-May	NA	NA	12-Apr	19-May
	Young sub-adult	23	19-Apr	18-Apr	13-Apr	23-Apr	20-Mar	4-May	27-Mar	13-May
	Older sub-adult/Adult	79	21-Mar	24-Mar	21-Mar	27-Mar	24-Feb	28-Apr	25-Feb	26-Apr

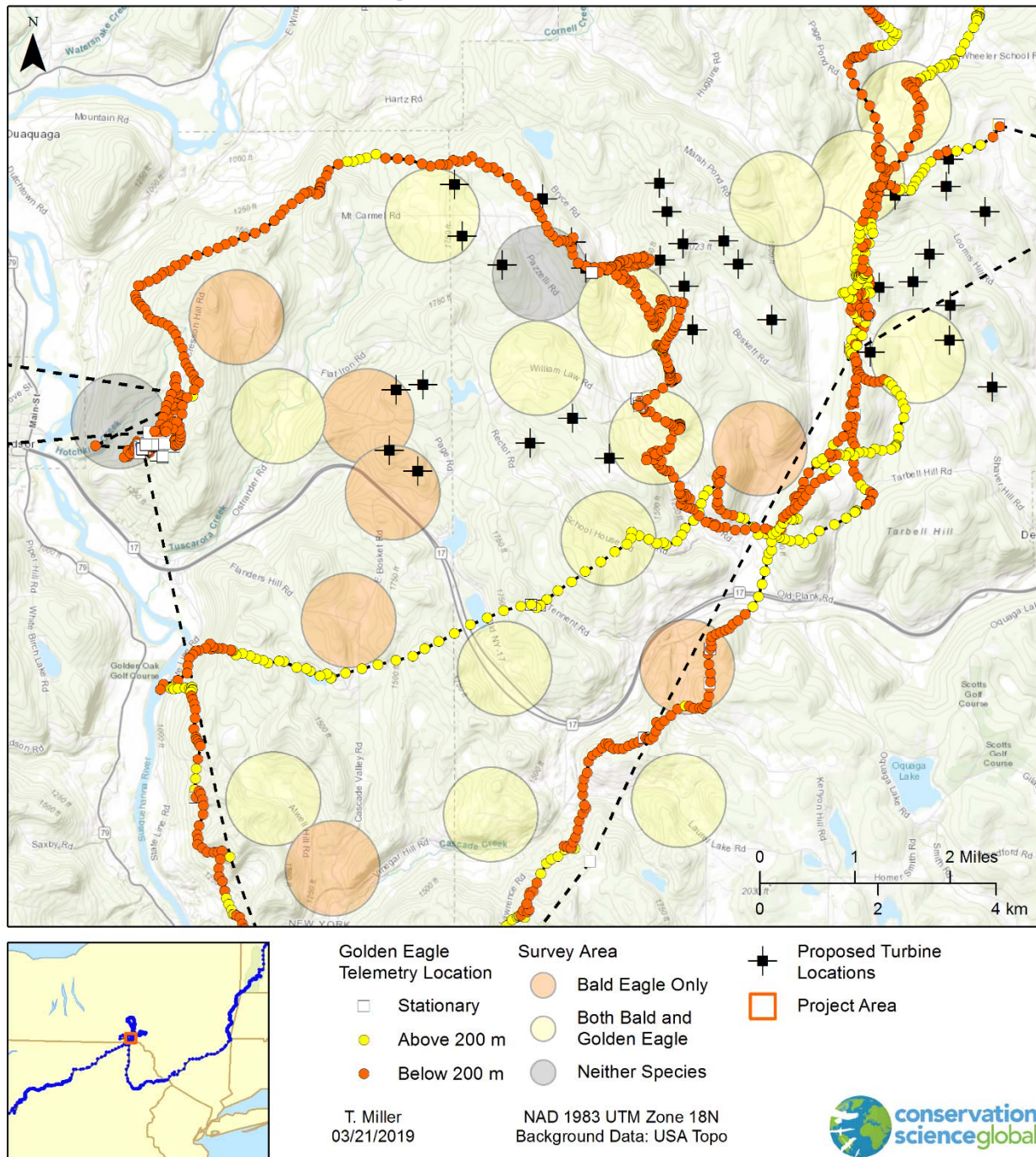
## Determining Seasonality of Golden Eagles Observed at BWT

These data illustrate that the area in and around the Bluestone Wind Project is good habitat for fall and spring migration as well as for stopover and wintering. Thus, the observational data collected by DOAS and WEST may provide insight into the seasonal status of the birds whose presence they recorded.

To determine the seasonal status of an eagle, I examined all information from surveys that were provided to me by DOAS and WEST. The DOAS data included age class, proximity to the observer (above or below 200 m, < or >800 m), date and time of observation, length of observation (2019 only), activity (behavior for DOAS data, i.e., foraging, flapping, gliding, soaring, perching), and detailed notes about specific behaviors that were observed. WEST data included all the above except detailed notes. Additionally, I was provided with a map from both DOAS and WEST showing the flight paths of all Golden Eagles and Bald Eagles. None of the tabular data provided by either WEST or DOAS included a field for direction of flight; however, this information was often included in the notes by DOAS and direction was indicated on the map from DOAS.



## Golden Eagle Use of the Bluestone Wind Project Area During Fall Stopover (Dec 2017)

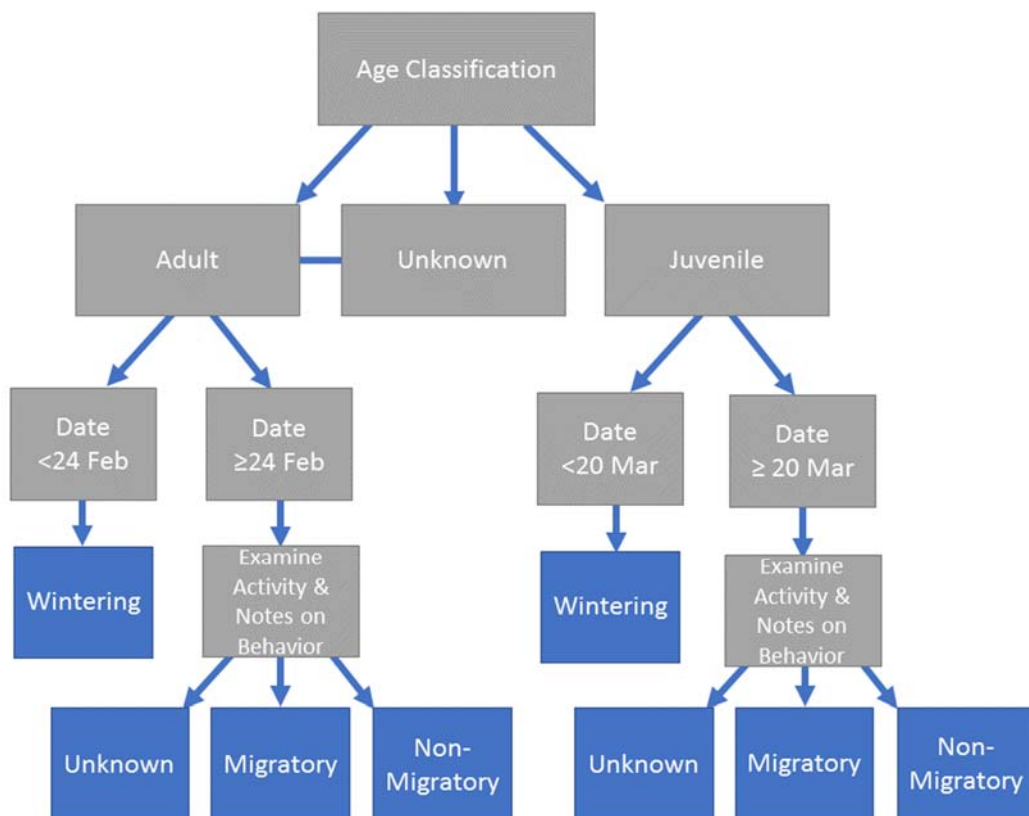


**Figure 2.** Fall stopover use of the Bluestone Wind Project area by an adult Golden Eagle in December 2017. The eagle spent 11 days in and around the project area in 2017. The following year it spent 10 days stopover ~7 km (4.4 miles) to the east of the project area in 2018. Data were recorded on Mondays, Wednesdays, and Saturdays every 4-6 s while the eagle was in flight. On all other days and when eagles were stationary, data were recorded every 15 min. GPS points are connected by dashed lines.

For the purpose of this analysis, I assumed that any birds that observers classified as juveniles, were either juveniles or young sub-adults. This is reasonable given the similarities in plumage as noted above. Likewise, I assumed that any eagle classified by observers as adult were either older sub-adults or adults. Eagles classified as unknown age were assumed to be adults.

I classified seasonal status as wintering, migratory, non-migratory, or unknown (by definition, the other two seasonal statuses, breeding and summering, were not reasonable classes for these birds). The non-migratory class included birds for whom it was impossible to tell if they were wintering or engaged in stopover. To classify the status of birds, I compared the date of observation to age- and season-specific passage dates through the latitudinal band in which BWP is located. I supplemented the date information with the notes on activity and behavior provided by the observers (Fig. 3).

The maximum fall and minimum spring passage date for each age class through the latitudinal band in which BWP is located were the cut-offs for wintering (see above, also Table 2). Beyond and inclusive of that date, eagles could be classified as unknown, migratory or non-migratory based on information on activity and notes on behavior.



**Figure 3.** Process used to classify Golden Eagle seasonal status of Golden Eagles observed from Feb – Mar. Unknown age Golden Eagles were treated conservatively as adults. Dates are based on minimum dates for migration for adults and stopover for juveniles (Table 2). This process takes into account that juvenile and young sub-adults are likely to be identified as juveniles by observers and adults and older sub-adults as adults (Liguori 2004, J. Liguori, pers. comm.).



## Results

Preliminary inspection of fall data showed that all observations of Golden Eagles (35 from DOAS, 12 from WEST) occurred between the minimum and maximum passage dates of telemetered eagles (Table 2). This suggests that these birds were all migrants. Further examination of notes and activity recorded by DOAS supported classification of fall observations as migrants. As such, the discussion of seasonal status is focused exclusively on springtime data.

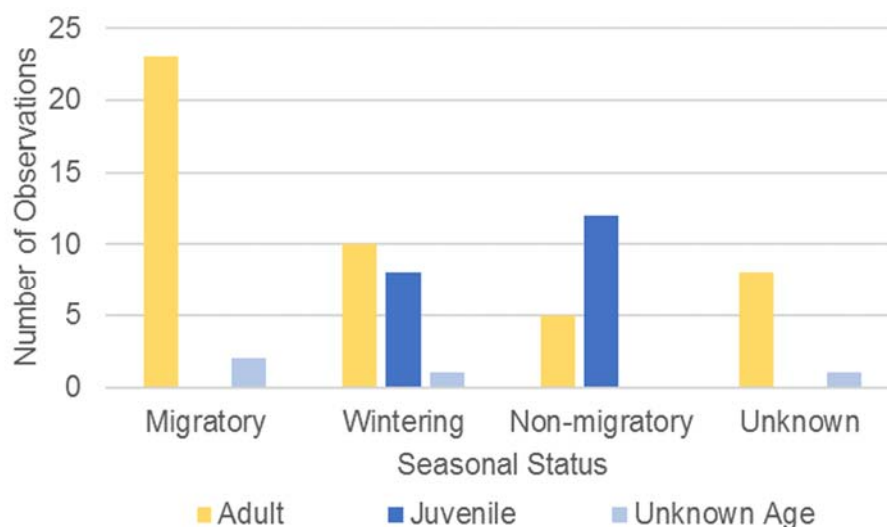
### *WEST Data – Spring*

WEST provided data for observations that included 56-1 min. records for Golden Eagles. One juvenile eagle was classified as wintering. There was not enough additional information provided by WEST to classify seasonal status of any of the other eagles observed by them.

### *DOAS Data - Spring*

There were 70 observations of Golden Eagles in spring, 42 in Year 1 and 28 in Year 2. Year 1 data were collected between 4 – 22 Mar 2018, and Year 2 data from between 9 Feb – 20 Mar 2019 (Appendix A). DOAS observers reported seeing a variety of behaviors, including Golden Eagles interacting with one another, foraging, feeding, and perching for extended periods of time. Movement with and against the primary axis of spring migration were also reported.

Over the two-year period, there were 25 (36%) observations that I classified as migratory, 19 (27%) classified as wintering, 17 (24%) as non-migratory, and 9 (13%) as of unknown migratory status (Figure 2). No adults were classified as wintering in Year 1, but 5 were classified as wintering in Year 2 (Appendix A). This is because classification of a bird as wintering requires it be before a certain date and the surveys started much later in year 1 than in year 2. No juveniles were classified as migratory.



**Figure 2.** Seasonal status of Golden Eagles observed by Delaware-Otsego Audubon Society observers from 4 – 22 Mar 2018 and 9 Feb – 20 Mar 2019 by age class.

### *Notable entries in the field notes*

DOAS observers included several interesting comments that indicate that Golden Eagles used the project area for perching, independent foraging and cooperative hunting.

“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...” *10 Mar 2018*

“Perched in valley. 1st winter bird observed actively hunting/kiting around treetops for over 2 hours. Included a successful hunt/drop/catch of what seemed to be squirrel prey....” *15 Mar 2018*

“Perched with 16 [another Golden Eagle] in dead snag for over an hour.” *18 Mar 2018*

“Hunting cooperatively with GE #2, low over fields to N, then over barn, actively foraging until catching lift off E ridge and dispersing E. Same scope field as GE #2 for majority of time seen. Potential pair?” *9 Feb 2019*

“First identified when the bird dove straight out of the sky onto turkeys - missed the last turkey by only a foot or two as they ran into cover. GE caught lift once again and headed south.” *17 Mar 2019*

### **Conclusions**

Delaware-Otsego Audubon Society surveys provided detailed information about Golden Eagle use of BWP. Notably, the information they provided suggests that over half of their observations were of wintering or non-migratory Golden Eagles and about a third were of migratory birds. As such, I conclude that Golden Eagles currently use the area of the wind project for (a) migration; (b) wintering; and (c) stopover. The evidence for this is:

1. Telemetry data show that eagles migrate through the area and use the area for stopover.
2. Observational data show eagles use the area regularly.
3. Interpretation of the observational data suggests that eagles use it for wintering, stopover and migration.

The BWP lies on the Northern Allegheny Plateau, which has topography and forested areas that are characteristic of Golden Eagle wintering and migratory habitats (Duerr et al. *in press*, Katzner et al. 2012a, b, Miller et al. 2017). Golden Eagles have been captured regularly at camera traps throughout the winter in this region (T. Katzner, USGS, pers. comm.). Moreover, the project area lies along the migration corridor making it a likely place to see migrants during both spring and fall. Finally, telemetry data show that at least one Golden Eagle has used the area for stopover and DOAS data suggest more eagles likely used the area for stopover as well.

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Appendix A. Classification of Seasonal Status of Golden Eagles observed by Delaware Otsego-Audubon Society in the Bluestone Wind Project Area (Mar 2018 and Feb-Mar 2019).

Year	Date	Bird ID	Species	Age (A, J, U)	Time 1st observed	Ht +/- 200m (high/low)	Dist +/- 800m (far, close)	Migrant Y/N	Behaviors	Field Notes	TAM Seasonal Status	TAM Notes
1	3/4/2018	0304-18	GE	A	12:15	L	F	Y	G, S		Migratory	Based on Observer's classification as migrant
1	3/4/2018	0304-21	GE	A	12:53	L	F	Y	G		Migratory	Based on Observer's classification as migrant
1	3/4/2018	0304-27	GE	A	13:44	L	F	Y	G		Migratory	Based on Observer's classification as migrant
1	3/4/2018	0304-31	GE	A	15:09	L	F	Y	G		Migratory	Based on Observer's classification as migrant
1	3/4/2018	0304-32	GE	A	15:44	L	C	N	S		Unknown	
1	3/6/2018	0306-3	GE	A	10:12	L	F	N	Flap, G, P	Golden Eagle perched in tree on W ridge of appx. 1 hour before moving north.	Unknown	It is difficult to classify this bird. Although it perched in view, it flew to the north. It may be a migrant that was resting before heading off north or it could be wintering or in stopover.
1	3/8/2018	0308-3	GE	A	09:40	L	C	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.	Non-migratory	
1	3/8/2018	0308-9	GE	A	12:40	H	C	Y	Flap, G		Unknown	
1	3/8/2018	0308-18	GE	A	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.	Non-migratory	
1	3/10/2018	0310-20	GE	A	12:45	L	F	Y	G		Migratory	
1	3/10/2018	0310-23	GE	J	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.	Wintering	
1	3/10/2018	0310-25	GE	J	15:43	L	C	N	G, P	Detailed description on back of tally sheet.	Wintering	
1	3/11/2018	0311-1	GE	J	09:10	H	C	Y	Flap	Harrassed by redtail. Missing primary in left wing - probably #25 from 3/10/18.	Wintering	
1	3/11/2018	0311-13	GE	U	12:40	H	F	Y	Flap, S		Migratory	
1	3/12/2018	0312-7	GE	U	08:20	L	F	N	P	Perched on ridge. Dropped onto E face of W ridge. Was not seen again. Total time observed over 2 hours.	Non-migratory	
1	3/15/2018	0315-2	GE	J	09:29	L	F	N	S, G	Distant bird, continued south	Wintering	
1	3/15/2018	0315-7	GE	A	09:41	H	C	Y	G		Migratory	
1	3/15/2018	0315-8	GE	J	09:48	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".	Wintering	
1	3/15/2018	0315-12	GE	A	10:35	L	F	N	S	Lost behind ridge to S.	Non-migratory	
1	3/15/2018	0315-21	GE	J	14:40	L	C	N	P, Flap, S, G	Perched in valley. 1st winter bird observed actively hunting/kiting around treetops for over 2 hours. Included a successful hunt/drop/catch of what seemed to be squirrel prey. (This note, in part, copied from Hawkcount.org report).	Wintering	
1	3/16/2018	0316-7	GE	J	12:20	L	C	N	For, G, Flap	"Sooty" tailed.	Non-migratory	Age Suspect; Non-migratory based on activity, time of day, foraging
1	3/17/2018	0317-4	GE	J	09:35	L	C	Y	S, G		Wintering	
1	3/17/2018	0317-13	GE	U	12:03	L	F	N	P	Perched on ridge. Appeared to be eating. left 2:10. Present more than 2 hours.	Unknown	Likely non-migratory base on weather conditions. Most birds would be migrating given the wind and lack of precip.
1	3/18/2018	0318-1	GE	J	09:20	L	F	N	S, G	No urgency.	Wintering	
1	3/18/2018	0318-2	GE	A	09:50	H	C	Y	S, G	In sight 15 minutes.	Migratory	
1	3/18/2018	0318-16	GE	J	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	Non-migratory	Age Suspect; Non-migratory based on behavior
1	3/18/2018	0318-17	GE	J	11:30	L	F	N	P, S	Older juvenile with "almost no white in wing patches. Little white in tail." Perched with 16 in dead snag for over an hour. - Notes from hawkcount.org and 3/18 phone conversation with KD - TES	Non-migratory	Age Suspect; Non-migratory based on behavior;
1	3/19/2018	0319-10	GE	U	10:28	H	C	Y	Flap	Powered steadily along E ridge. Could see some white at base of tail, but not clearly juvenile.	Migratory	
1	3/19/2018	0319-16	GE	A	14:01	H	C	Y	Flap, S		Migratory	

Appendix A. Classification of Seasonal Status of Golden Eagles observed by Delaware Otsego-Audubon Society in the Bluestone Wind Project Area (Mar 2018 and Feb-Mar 2019).

Year	Date	Bird ID	Species	Age (A, J, U)	Time 1st observed	Ht +/- 200m (high/low)	Dist +/- 800m (far, close)	Migrant Y/N	Behaviors	Field Notes	TAM Seasonal Status	TAM Notes
1	3/20/2018	0320-5	GE	J	10:55	L	C	Y	G, Flap		Non-migratory	
1	3/20/2018	0320-6	GE	A	11:05	L	C	Y	G, Flap		Migratory	
1	3/20/2018	0320-7	GE	A	11:05	L	C	Y	G, Flap		Migratory	
1	3/20/2018	0320-9	GE	A	11:35	L	C	Y	G, Flap		Migratory	
1	3/20/2018	0320-10	GE	A	11:35	L	C	Y	G, Flap		Migratory	
1	3/20/2018	0320-13	GE	A	12:20	L	F	N	G, Flap		Unknown	
1	3/20/2018	0320-15	GE	J	13:55	L	C	Y	G, Flap		Non-migratory	
1	3/21/2018	0321-3	GE	A	11:09	H	F	Y	Flap, S	High above W ridge then cut across to NE past horse farm.	Migratory	
1	3/21/2018	0321-7	GE	J	13:59	L	C	Y	Flap, G	Hugged the W ridge as it powered through. Local red-tailed hawk dove on it.	Non-migratory	
										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.	Non-migratory	
1	3/22/2018	0322-1	GE	J	09:00	L	C	N	P, Flap, G		Non-migratory	
1	3/22/2018	0322-29	GE	A	13:37	L	C	N	S, G		Migratory	
										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.	Non-migratory	
1	3/22/2018	0322-33	GE	J	14:49	L	C	N	Flap, G		Non-migratory	
1	3/22/2018	0322-34	GE	A	15:00	L	F	Y	G		Migratory	
										Adult bird, bleached upper wing coverts, extremely light/golden head. Hunting cooperatively with GE #2, low over fields to N, then over barn, actively foraging until catching lift off E ridge and dispersing E. Same scope field as GE #2 for majority of time seen. Potential pair?	Wintering	Behavior suggests wintering pair or winter territoriality. Similar behavior has been observed elsewhere in the east during winter (author's unpublished data, M. Lanzone, Cellular Tracking Technologies, pers. comm.; A. Berry, Bernheim Forest and Research Station, pers. comm.)
2	2/9/2019	0209-1	GE	A	9:56	Low	Close	N	For, flap, G, S		Wintering	
2	2/9/2019	0209-2	GE	A	9:57	Low	Close	N	For, flap, G, S	Adult bird, noticeably darker than GE #1, easily distinguishable from one another. Much darker in the head. Potential pair?	Wintering	
										Ad GE, extremely bright gold head, possible same bird from 2/9. Kiting initially on flight N from valley, in sight for 10 min. Came back into view from N over barn, perched along W ridge. Later buzzed by Ad BE, switching to dead snag along E ridge. Took off at 11:25, kiting across E to W until going out of sight over W ridge (in view 15 min). Returned at 12:12 from S, glided back to W ridge from valley, perched in evergreen. Visible clearly in tree for 54 min. Left S along ridge and would not return. In sight for 10 min before disappearing for good. Total amount in view: 1hr 29min. (Took digiscope photo for documentary purposes)	Wintering	
2	2/16/2019	0216-5	GE	A	10:16	H	C	N	For, S, G, Flap		Wintering	
2	2/22/2019	0222-12	GE	A	12:50	Low	Close	y	G, Flap	Glided along east ridge, circled once over Loomis/Shaver Rd, kept going north. Very dark, good view of tawny shoulders.	Wintering	
2	2/23/2019	0223-10	GE	A	14:44	L	F	N	G, S	Picked up in knotch, scope views revealed adult GE, by patterns on tops of wings, gold head, long tail. Out of view behind ridge as quickly as it came into view.	Wintering	
										Observer believes this to be the same recurring adult GE from 2/9, 2/16 and 2/23, based on distinct plumage and noticeably bright golden head. In sight for 7 minutes.	Wintering	
2	3/1/2019	0301-5	GE	A	11:18	H	F	N	G, S		Wintering	
2	3/1/2019	0301-11	GE	J	11:38	L	F	N	G, S	Observer picked this bird up briefly, would later confirm with photos on Page Pond Road.	Wintering	

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Year	Date	Bird ID	Species	Age (A, J, U)	Time 1st observed	Ht +/- 200m (high/low)	Dist +/- 800m (far, close)	Migrant Y/N	Behaviors	Field Notes	TAM Seasonal Status	TAM Notes
2	3/1/2019	0301-5	GE	A	12:15	L	C	N	G, S	Bird returned, achieving lift in the risk area before heading off to the NE once again. In sight for 6 minutes.	Wintering	
2	3/1/2019	0301-5	GE	A	15:14	L	C	N	G, P	Returned from closest N ridge, perched in the top of a hemlock. Took flight after 20 min	Wintering	
2	3/1/2019	0301-5	GE	A	15:35	L	C	N	Flap, For, G	Took flight and began to get lift of same ridge. Could actively see the bird turning its head in flight, as it foraged. Remained in sight for 15 minutes, before getting well above the ridge and heading off to the N.	Wintering	
2	3/4/2019	0304-3	GE	A	13:25	L	F	N	S, G, For	Extremely light head. So light under cloudy conditions, at first look head-on appeared to be adult BE. Kited 3 times on east ridge: 3 minutes, ~30 seconds, and short instance.	Non-migratory	
2	3/11/2019	0311-13	GE	A	15:04	L	F	Y	G, S		Unknown	
2	3/11/2019	0311-14	GE	A	15:44	L	F	Y	G, S		Unknown	
2	3/12/2019	0312-01	GE	A	10:36	H	C	Y	F, G	came out of the clouds directly overhead, circled up higher, headed north and disappeared into snow squalls	Migratory	
2	3/12/2019	0312-7	GE	A	3:30	L	F	y	F, G	came across gap, up along east ridge moving steadily NE	Migratory	
2	3/12/2019	0312-8	GE	A	3:32	L	F	y	F, G	came along east ridge heading NE	Migratory	
2	3/17/2019	0317-11	GE	A	11:41	H	F	N	Flap, G	Actively moving S along ridge, went into dive until out of sight behind E ridge. Very dark bird, appeared to be hunting. In sight 4 min	Non-migratory	
2	3/17/2019	0317-15	GE	J	15:14	L	C	N	Flap, For	First identified when the bird dove straight out of the sky onto turkeys - missed the last turkey by only a foot or two as they ran into cover. GE caught lift once again and headed south. Heavily marked, substantial white under wings and in tail. Bleached upper wings	Wintering	Likely 3rd Year
2	3/17/2019	0317-15	GE	J	15:40	H	F	N	For	Relocated at 15:40, kiting along the E ridge. Continued to kite along ridge in multiple locations (on map) Took a run at a different prey source NE of the silo. Missed, was harassed by 3 RT before returning to valley. Remained in sight until getting enough lift to continue over E ridge. In sight 30 minutes	Wintering	
2	3/18/2019	0318-2	GE	A	9:42	H	F	Y	G, S	All dark, high stream off to N	Migratory	
2	3/18/2019	0318-20	GE	A	11:52	H	F	Y	G, S	Ad. bird. Caught lift on E ridge, streamed off N	Migratory	
2	3/18/2019	0318-22	GE	J	12:11	H	F	N	G, S	Juv. bird. White in undersides of wings, caught lift beyond E ridge, until too high to see. First picked up in E	Wintering	
2	3/18/2019	0318-25	GE	A	13:16	H	F	Y	G, S	Adult bird, seen well. Picked up high, streamed off N	Migratory	
2	3/18/2019	0318-26	GE	A	13:18	H	C	Y	G, S	Adult bird, seen shortly after GE #25. Behaved similarly, streamed off N	Migratory	
2	3/19/2019	0319-1	GE	A	9:27	L	C	N	F, G	Flew northwest over site and past west ridge.	Unknown	
2	3/19/2019	0319-5	GE	A	12:01	H	C	Y	G	along east ridge	Migratory	
2	3/20/2019	0320-4	GE	A	13:25	L	F	N	G, S, For	Kited in 3 places, max for ~1 minutes. In sight 5 minutes. Flew due S into a steady S wind. Dark head for golden.	Non-migratory	
2	3/20/2019	0320-9	GE	A	15:14	L	C	Y	F, G	Powered flight in part. Flapping and gliding about 2/3 the way up the ridge.	Unknown	