PPL GENERATION, LLC

HOLTWOOD REDEVELOPMENT PROJECT

BALD EAGLE MANAGEMENT AND MONITORING ANNUAL REPORT

PREPARED BY:

Kleinschmidt

STRASBURG, PENNSYLVANIA

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TABLE OF CONTENTS

1.0 INTRODUCTION 1
2.0 METHODS 5
  2.1 MONITORING FOR DISTURBANCE 6
  2.2 ASSESSING THE MAGNITUDE OF DISTURBANCE 7
3.0 RESULTS 8
  3.1 NESTING ACTIVITY 10
  3.2 ACOUSTIC DISTURBANCE MONITORING 11
  3.3 SEISMIC DISTURBANCE MONITORING 13
  3.4 VISUAL DISTURBANCE MONITORING 13
4.0 DISCUSSION 15
5.0 CONCLUSIONS 23
6.0 LITERATURE CITED 24
APPENDIX A: BLAST DATA

LIST OF TABLES

TABLE 3-1. ACOUSTIC READINGS, 2012 -2013 11
TABLE 3-3. CONSTRUCTION ACTIVITY AT THE YORK COUNTY EAGLE NEST DURING THE 2012-2013 NESTING SEASON 14
TABLE 4-1. BLAST MATTING DETAILS 2010-2013 17
TABLE 4-2. SEISMIC READINGS, 2010 THROUGH 2013 22

LIST OF PHOTOS

PHOTO 2-1. CAMERAS AND SOUND METER MOUNTED ON TOWER AT APPROXIMATELY 70 FEET 5
PHOTO 2-2. COMPLETED MONITORING TOWER, STORAGE SHED AND APPURTENANT EQUIPMENT 6

LIST OF FIGURES

FIGURE 1-1. EAGLE NEST LOCATIONS....4
FIGURE 2-1. EAGLE NESTING BUFFERS, 2012-2013 NESTING SEASON....9
FIGURE 3-1. EAGLE ACTIVITY DURING BLASTING EVENTS, 2012-2013....10
FIGURE 3-2. TIME OF BLASTING EVENTS, 2012-2013....11
FIGURE 3-3. PEAK DECIBEL LEVELS, 2012-2013....12
FIGURE 3-4. DECIBEL LEVELS, 2012-2013....12
FIGURE 3-5. SEISMIC READINGS, 2012-2013....13
FIGURE 3-6. DISTANCE BETWEEN BLAST AND PINEY ISLAND NEST, 2012-2013....14
FIGURE 4-1. LINEAR REGRESSION ANALYSIS OF THE EFFECT OF BLAST DISTANCE ON ACOUSTIC LEVELS AT THE EAGLE NEST....16
FIGURE 4-2. LINEAR REGRESSION ANALYSIS OF THE EFFECT OF OVERBURDEN ON ACOUSTIC LEVELS AT THE EAGLE NEST....18
FIGURE 4-3. LINEAR REGRESSION ANALYSIS OF THE EFFECT OF BURDEN ON ACOUSTIC LEVELS AT THE EAGLE NEST....19
FIGURE 4-4. LINEAR REGRESSION ANALYSIS OF THE EFFECT OF AVERAGE WATER DEPTH ON ACOUSTIC LEVELS AT THE EAGLE NEST....20
FIGURE 4-5. LINEAR REGRESSION ANALYSIS OF THE EFFECT OF BLAST MAGNITUDE ON ACOUSTIC LEVELS AT THE EAGLE NEST....21
FIGURE 4-6. LINEAR REGRESSION ANALYSIS OF SEISMIC READINGS 2010-2013....22

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1.0 INTRODUCTION

PPL Holtwood, LLC (PPL) owns and operates the Holtwood Hydroelectric Project on the Susquehanna River in Lancaster and York counties, Pennsylvania. PPL has been constructing an additional powerhouse and performing related work at Holtwood since 2009. This construction activity included blasting, excavation, and other activities that create loud noises, ground vibrations, and are often visible from nearby eagle nesting activity. Previous researchers have found that bald eagles (*Haliaeetus leucocephalus*) are sensitive to construction activities and sudden noises such as blasting and may be disturbed by these construction activities at Holtwood (USFWS 2007; Watson and Rodick 2001).

Two nesting pairs of bald eagles occupy the Holtwood Redevelopment Project. One pair occupies a nest approximately one-half mile (2640 ft) from the Holtwood powerhouse, on Piney Island (Figure 1-1). The Piney Island nest is located along the tailrace on the southeastern side of the island. A deciduous forest protects three sides of the nest from visual disturbances; the fourth side of the nest faces the Holtwood tailrace. The ridges and bluffs of the Susquehanna River valley provide additional visual obstruction between the eagle nest and the main construction site. The second nesting pair of bald eagles occupies a nest located in York County near the Holtwood dam. This nest is located on the wooded hillside adjacent to the white-water feature construction area, more than 2640 feet from the main construction site (Figure 1-1).

The United States Fish and Wildlife Service (USFWS) and the Pennsylvania Game Commission (PGC) required PPL to develop the Holtwood Redevelopment Bald Eagle Monitoring and Management Plan to protect and monitor eagles during construction. The Federal Energy

Regulatory Commission (FERC) approved the plan on November 20, 2009; amendments were filed on June 2, 2010, and March 7, 2011. PPL used the plan to manage construction and monitor eagle activity during the nesting season (December 1 – mid July) from 2009 through 2013.

The bald eagle is no longer a threatened species protected by the Endangered Species Act, but the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act still provide federal protection. The USFWS wrote the National Bald Eagle Management Guidelines to provide management recommendations to landowners about how to avoid disturbing bald eagles and prevent violation of federal regulations (USFWS, 2007). The guidelines specify minimum distances that construction activities and blasting activities should be from bald eagle nesting activity. In particular, the guidelines recommend that all blasting occur greater than 0.5 miles from bald eagle nesting activity. This recommendation did not account for potential blasting methods that may reduce the noise, vibration, and visual stimuli that cause bald eagle disturbances. PPL developed a site specific adaptive management plan that monitors the bald eagle activity and measures the stimuli such as noise, vibration, and visual disturbances to determine if construction activities and specifically blasting causes a disturbance at distances less than recommended by the plan. The USFWS and PGC approved the plan because it minimized the potential effects of construction activities and blasting and would provide monitoring research that would detect activities that cause eagle disturbance and inform future construction activities near nesting eagles.

In the fall of 2011, heavy rains from Hurricane Irene, Tropical Storm Lee, and other storms caused a 20-week delay of any work on the Holtwood Redevelopment that required access to the Susquehanna River. Consequently, tailrace excavation was behind schedule, and much of the work planned for the late summer and fall could not be completed near the Piney Island eagle nest as originally planned to minimize the potential to disturb the nesting eagle. To make up time in the construction schedule, PPL requested to adapt the plan and allow excavation and blasting closer to the Piney Island nest during the nesting season. The USFWS and PGC approved this change in the plan because the construction activities had been ongoing within 2640 feet of the Piney Island nest for two years and research has shown that eagles may become less sensitive to disturbance activities over time (USFWS 2007).

To complete the project and make up schedule delays caused by the storms, PPL requested permission to blast within 1,320 feet of the Piney Island nest in the area downstream of the Norman Wood Bridge. The PGC and USFWS approved this revision of the plan, and PPL filed it with the FERC on November 7, 2011. After observing two disturbances at the Piney Island nest and consulting with the PGC and USFWS, PPL applied for a Federal Fish and Wildlife Permit (take permit) that was approved on January 30, 2012 (Permit #MB64142A-0). PPL revised the take permit on December 4, 2012, to allow construction activity in close proximity to the York County nest (Permit #MB64142A-1). The construction activities were to be monitored during the nesting season in compliance with the plan and according to the take permit.

Annual monitoring reports have been issued to the USFWS and PGC and filed with the FERC. Reports from 2009 through 2012 contain the results of monitoring the bald eagle nesting pair on Piney Island because the construction activities were closest to that nest. No disturbances occurred from 2009 through 2011, but researchers recorded disturbances during the 2011-2012 nesting season. The York County nest was monitored during the 2012-2013 monitoring season because new construction activity started in proximity to the nest. All blasting was greater than 0.5 miles from the York County nest. This report includes the results of monitoring during the 2012-2013 nesting season and summary analyses of all eagle monitoring data from 2009 through 2013.

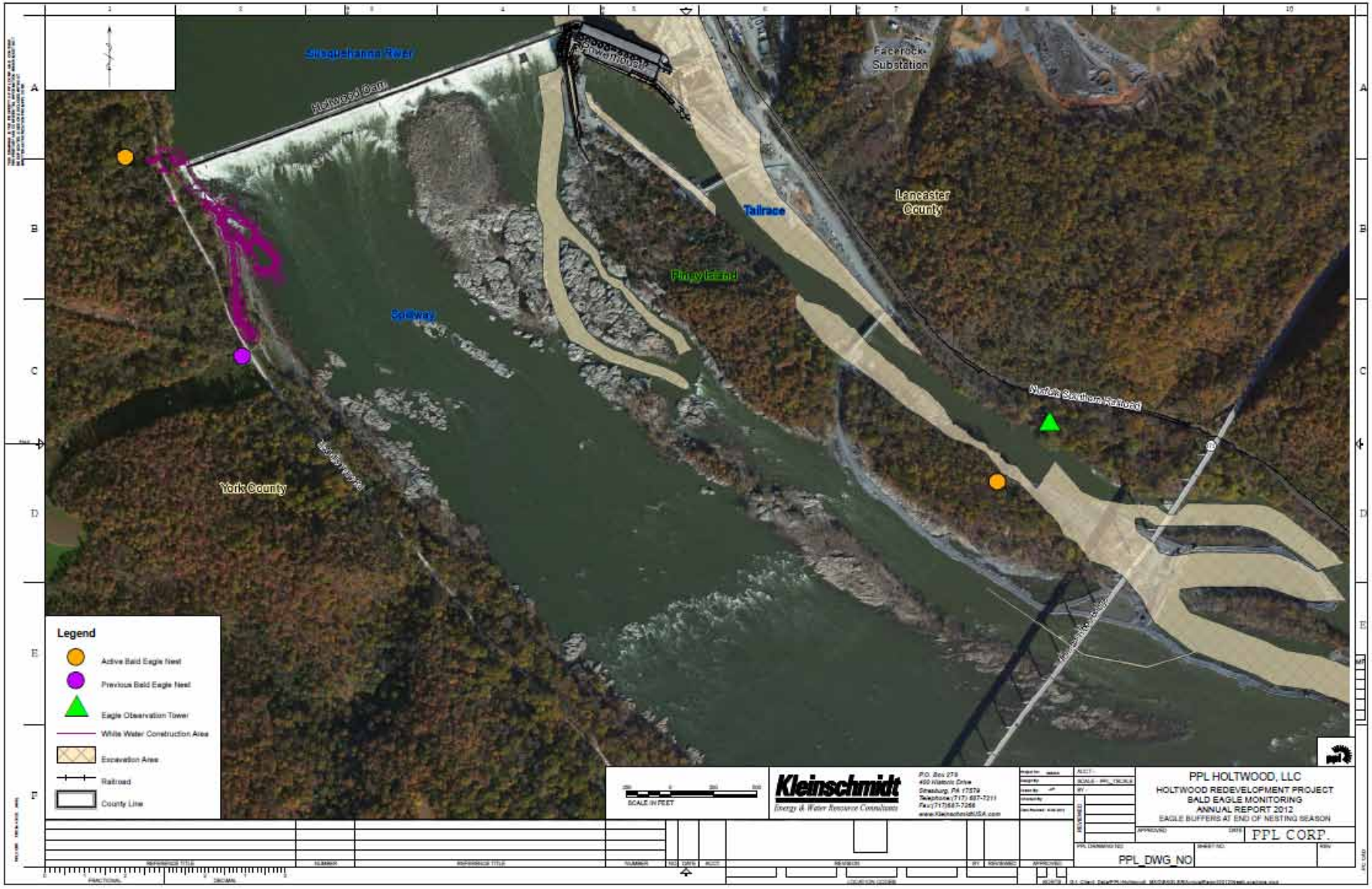


FIGURE 1-1. EAGLE NEST LOCATIONS

2.0 METHODS

PPL constructed a tower to mount monitoring equipment approximately 465 feet from the bald eagle nest on Piney Island. The tower is located on PPL's property outside of the FERC project boundary on the Lancaster County side of the project tailrace. PPL installed video surveillance equipment on the tower at a height of 70 feet to see eagle activity in the Piney Island nest. PPL also installed audio equipment on the tower at 70 feet to provide acoustic readings representing the noise at the Piney Island eagle nest (Photo 2-1). Solar panels mounted on an adjacent storage shed and a storage battery supply power for the electronics on the tower (Photo 2-2). Scientists can control the cameras and sound meter by radio signals from the Holtwood powerhouse. A radio signal transmits all video and audio to the powerhouse for potential storage and transmission to computers at remote locations. This system allowed researchers to observe and record monitoring data without introducing additional human activity near the nest that could further disturb the nesting eagles.

PHOTO 2-1. CAMERAS AND SOUND METER MOUNTED ON TOWER AT APPROXIMATELY 70 FEET

PHOTO 2-2. COMPLETED MONITORING TOWER, STORAGE SHED AND APPURTENANT EQUIPMENT

2.1 MONITORING FOR DISTURBANCE

PPL began monitoring eagle activity at the Piney Island and York County nests on December 1, 2012, using real-time video monitoring before and after each blast. The researchers monitored eagle behavior during blasting events and construction activity until July 9, 2013 because this is when the PGC, USFWS, and researchers agreed that chicks raised in both nests had fledged successfully. Researchers observed eagles visually in the field as well as used the video surveillance equipment. Field observations were required at the York County nest and other bald eagle activity in the region between the Holtwood dam and Norman Wood Bridge because the video equipment could not survey those regions. Field observers used a Zeiss Diascope 85*FL 60X spotting scope to identify eagle behavior accurately from distances that would not disturb the eagles.

During observations in the field and video surveillance, researchers recorded the behavior of a single adult eagle or pair of adults according to the following categories:

- flying to the nest
- bringing sticks to the nest
- preening chicks
- calling
- disturbed by blast
- disturbed by other activity
- eating
- flapping wings
- flying away from the nest
- incubating
- perching in nest
- perching outside of nest
- moving from perch to nest
- moving around nest
- building the nest
- preening themselves

A recorded disturbance was if an eagle was flushed from the nest or perch directly following a blast or other nearby construction activity. Researchers recorded the behavior of the eagles at the Piney Island nest for 30 minutes before and after each blast.

The York County nest was monitored beginning on December 1, 2012 as specified by the take permit. The nest was monitored for 2 hours daily, 1 hour in the morning and 1 hour in the afternoon, from December 1 through December 31. Monitoring occurred at various times during morning and afternoon observation periods to provide a greater range of time to observe eagle activity. From January 1 through January 31 monitoring increased to 4 hours daily due to the increased use of the nest by the eagles. Construction activities specified in the take permit were allowed inside of a 330-foot buffer zone around the York County nest from December 1 through January 31 but were prohibited during the rest of the nesting season (Figure 2-1). In addition to monitoring eagle behavior, researchers monitored construction activity in the buffer zone to ensure that it did not violate the take permit. They recorded if work occurred during the monitoring period and the types of construction activity occurring. These activities included foot traffic; use of hand tools; operation of a backhoe, vehicle, fork lift, haul truck, pump, crane, cement truck, bull dozer, or boat; and excavation.

2.2 ASSESSING THE MAGNITUDE OF DISTURBANCE

Researchers used a Larson Davis 831-decibel meter and a pre-amp installed on the tower to record acoustic and seismic data during construction blasting for use in determining the magnitude of construction-related effects on nesting eagles. The audio recordings included

ambient noise before and after each blast. PPL also installed an Instantel Seismograph Model Minimate Plus with Blastware software at the base of the tower at the end of January 2012 to record seismic displacement caused by the blasts.

To investigate the relationship between the magnitude of the blast and disturbance of eagles, researchers used characteristics from the contractors' blasting logs to develop a metric for comparing the magnitude of blasts. The blast magnitude was calculated by dividing the total pounds of charge used by the total volume of the blasting area. The total volume of rock blasted was estimated by multiplying the blasted area by the average drill depth. The final value associated with the blast magnitude is the pounds of charge per cubic foot of rock blasted. This value was calculated for all blasting events.

Blast Magnitude (pounds/cubic ft) = Total pounds of charge / (blast area (length ft x width ft) x average drill depth ft)

To determine how the distance between the blast and the nest affected the risk of disturbing a nesting eagle, researchers used a geographic information system (GIS) to measure the minimum distance between the nest and the blast area.

Researchers also noted the time of each blast to account for the influence of increasing ambient air temperature throughout the day on the potential severity of the effect of disturbing the eagles. If a blast were to cause an incubating eagle to leave the nest in the afternoon, the warmer air temperatures would slow the rate of cooling of the egg during the adult's absence.

3.0 RESULTS

This report presents the results of bald eagle monitoring during the 2012-2013 nesting season and summary analyses of monitoring data collected from 2009 through 2013 is included in the discussion section. The results describe the eagle behaviors observed daily and seasonally and the factors that may affect the acoustic, seismic, and visual stimuli caused by blasting at the Piney Island nest as well as construction activity within 1,000 ft of the York County nest. Each stimulus was analyzed to determine how blasting may affect bald eagle nesting and identify factors that could reduce the risk of disturbing eagles.

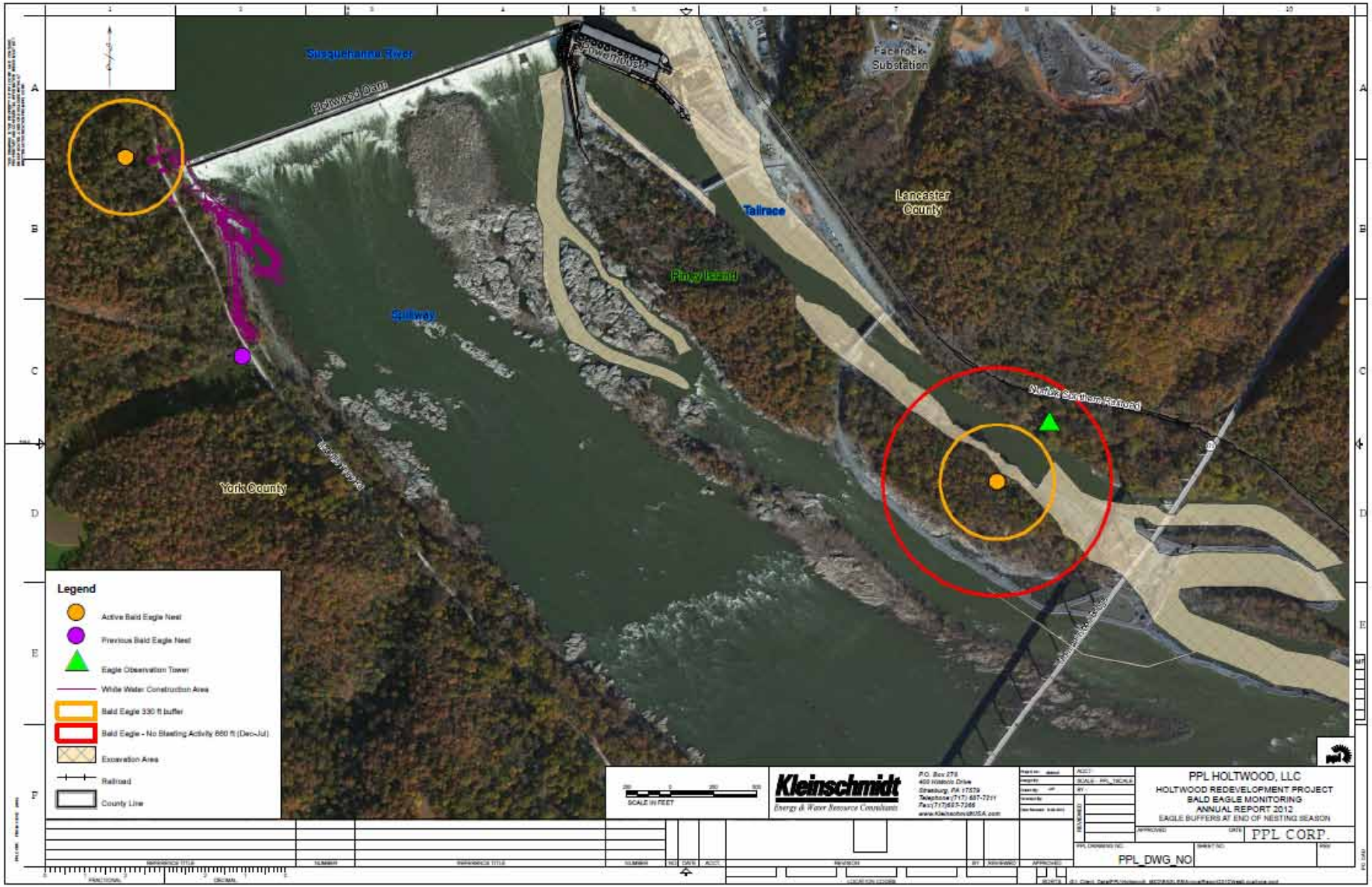


FIGURE 2-1. EAGLE NESTING BUFFERS, 2012-2013 NESTING SEASON

3.1 NESTING ACTIVITY

Eagles at both nests displayed courtship and nest-building behavior throughout December 2012. The first confirmation of incubation at the Piney Island nest was recorded on February 9; incubation at the York County nest was confirmed on February 18. The transition from incubation to brooding young occurs when the eggs hatch. Researchers were not able to confirm the date chicks hatched in the nests at Holtwood because chicks cannot be observed until they are approximately 2 weeks old due to fact that they are very small and do not move around the nest during this period. Researchers visually confirmed the presence of three chicks in the Piney Island nest on March 26. On April 8, researchers confirmed the presence of two chicks in the York County nest. Monitoring observations throughout the remainder of the nesting season confirmed the presence and activity of the chicks in both nests. Researchers confirmed that all chicks from both nests had fledged successfully by the middle of June.

During the 2012-2013 nesting season, 84% (N=83) of blasting events occurred when eagles were either incubating or perching at the Piney Island nest. Eagles were absent from the nesting area during 16% (N=16) of blasting events. No disturbance behaviors were observed as a result of blasting (Figure 3-1). On average, blasting during the nesting season occurred at 1405 hrs ± 2:10:44. All blasting events occurred between 1,000 hrs and 1830 hrs (Figure 3-2).

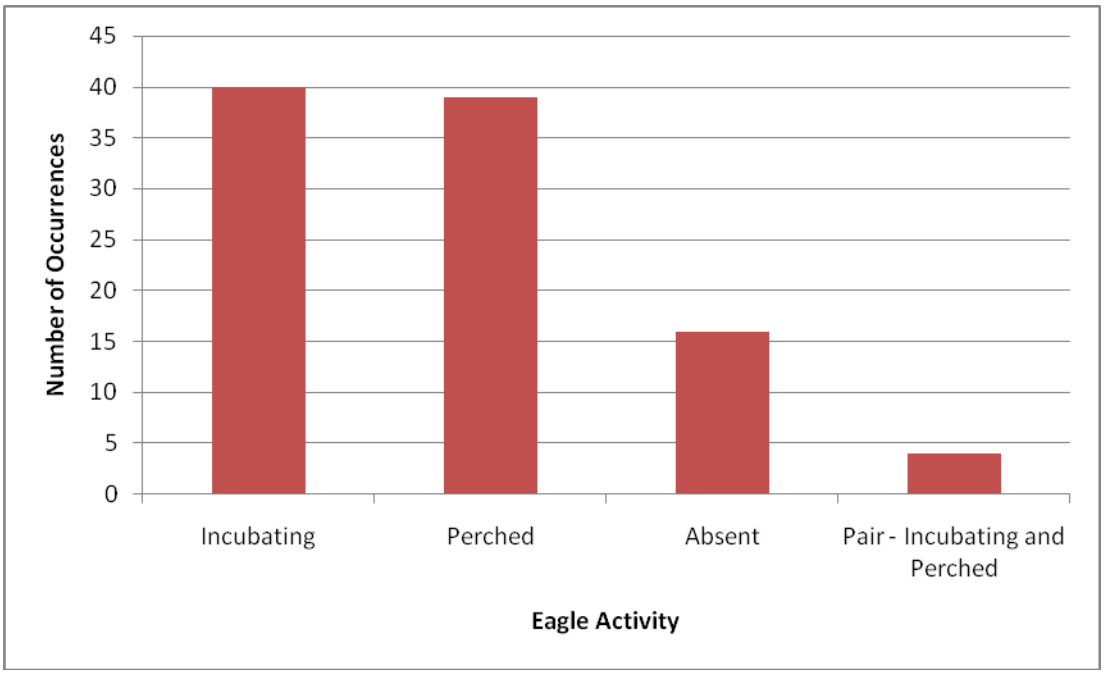


FIGURE 3-1. EAGLE ACTIVITY DURING BLASTING EVENTS, 2012-2013

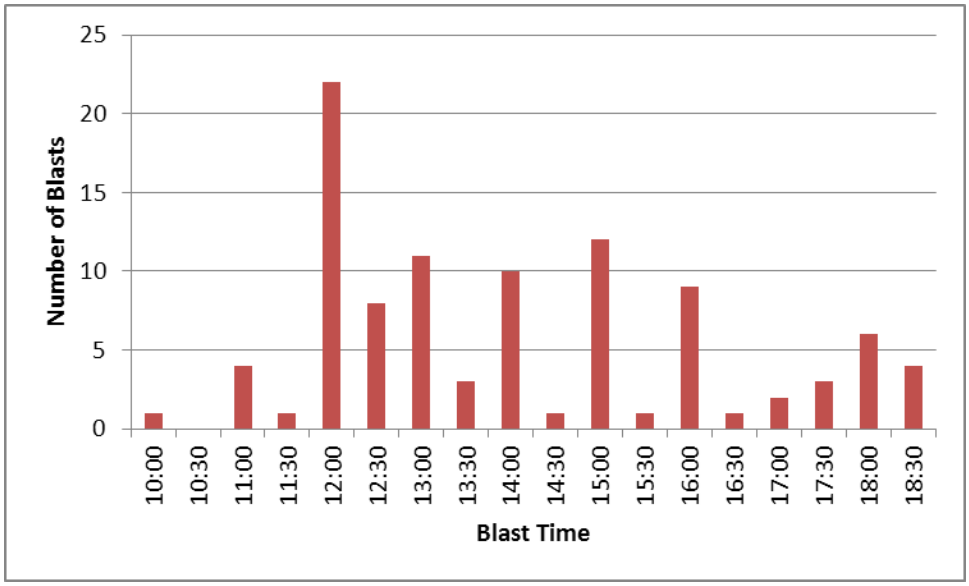


FIGURE 3-2. TIME OF BLASTING EVENTS, 2012-2013

3.2 ACOUSTIC DISTURBANCE MONITORING

During the 2012-2013 nesting season, 45 blasts were undetectable above the ambient noise in the environment. The average sound levels during recordable blasts (N=54) were 60.06 (±) 6.16 dBA, and 90.87 (±) 8.19 Peak dB (Table 3-1). The maximum sound level recorded was 75.3 dBA and 106.8 Peak dB and was produced by a precision blast (Figures3-3 and 3-4).

TABLE 3-1. ACOUSTIC READINGS, 2012 -2013

BLASTING PERIOD	PEAK DB AVERAGE	PEAK DB RANGE	DBA AVERAGE	DBA RANGE
2012-2013 Precision	90.18 (±) 8.38	73.6-106.8	59.64 (±) 6.14	49.60-75.30
2012-2013 Production	93.60 (±) 7.15	80.2-105.7	61.69 (±) 6.23	54.00-72.20
2012-2013 All Blasts	90.87 (±) 8.19	73.6-106.8	60.06 (±) 6.16	49.60-75.30

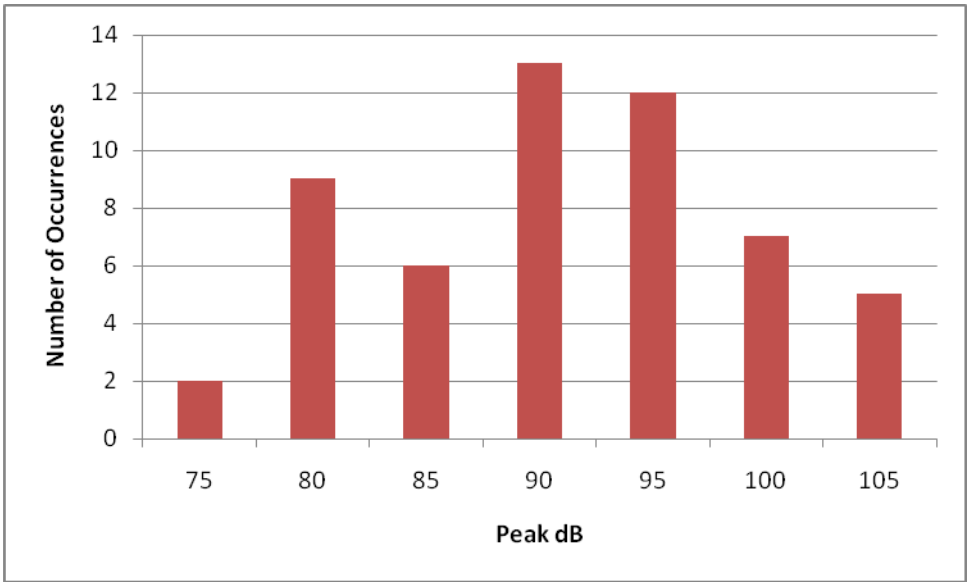


FIGURE 3-3. PEAK DECIBEL LEVELS, 2012-2013

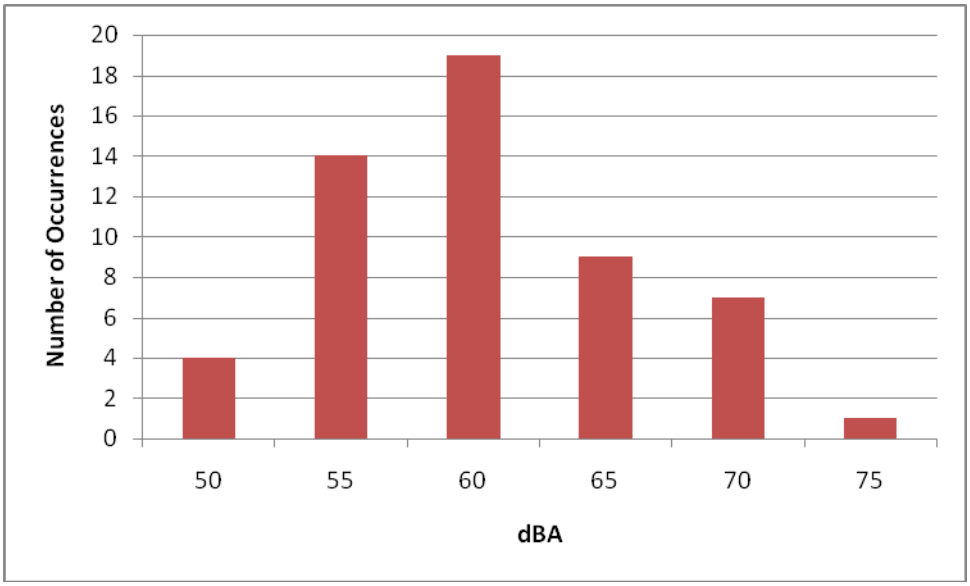


FIGURE 3-4. DECIBEL LEVELS, 2012-2013

The contractor categorized blasts as either production or precision blasts. The definition is not discrete, but factors such as location, distance to existing structures, size of material to be blasted, and purpose of the blast determined the type of blast used. Qualitatively, production blasts are typically large blasts used to break new ground or excavate large areas. A production blast occurs deep in the ground and in areas that are surrounded by other rock. This produces ground vibration but does not typically produce a loud sound. Precision blasts are smaller, more

controlled blasts used for trimming rock and breaking boulders. Precision blasts often occur close to or at the surface to excavate sensitive areas or complete excavation missed during production blasts. Since the precision blasts are closer to the surface, they often produce louder noise and less ground vibration. During the 2012-2013 monitoring season, the contractor identified 85 precision blasts and 14 production blasts. The acoustic readings related to both types of blasts were similar; however, precision blasts had a larger range and produced the highest decibel readings (Table 3-1).

3.3 SEISMIC DISTURBANCE MONITORING

During the 2012-2013 nesting season only four blasts produced seismic readings above the sensitivity limit of 0.01in/sec PPV (Peak Particle Velocity) (Figure 3.5). The average seismic reading from these four blasts was 0.111 (±) 0.083 PPV, and the maximum was 0.235 in/sec PPV. None of the four recorded blasts caused a disturbance.

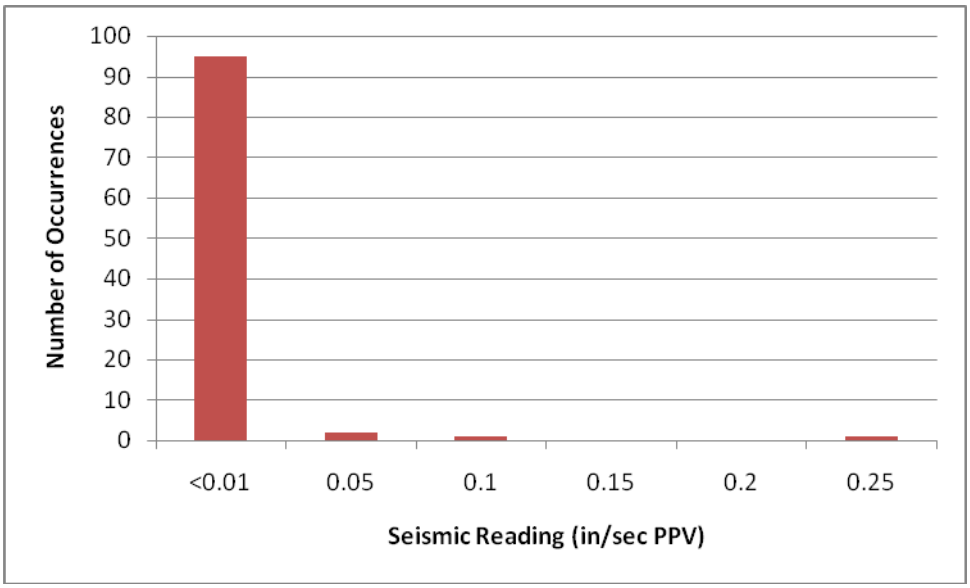


FIGURE 3-5. SEISMIC READINGS, 2012-2013

3.4 VISUAL DISTURBANCE MONITORING

Distance between the blast site and the nest may play a role in visual disturbance of eagles. Researchers assumed that a blast closer to the nest would create a larger visual effect. The minimum distance between a blast site and the Piney Island eagle nest during the 2012-2013 season was 1,074ft, and the average distance was 2,783 (±) 531ft for all blasts (Figure 3-6).

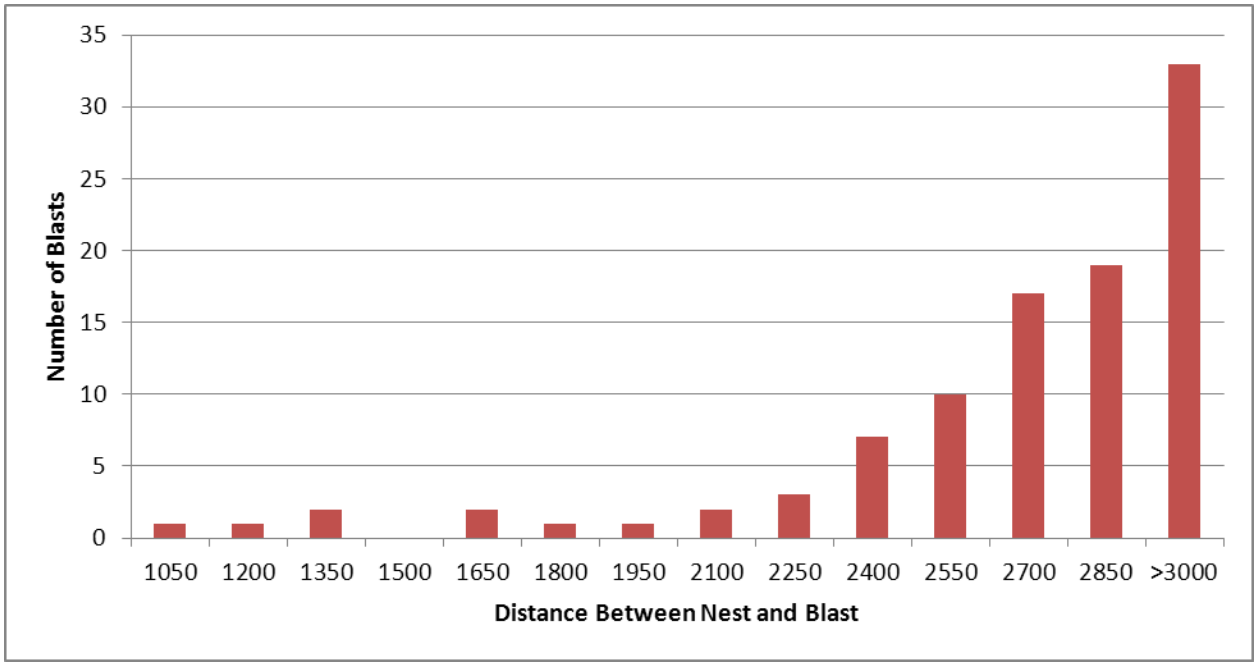


FIGURE 3-6. DISTANCE BETWEEN BLAST AND PINEY ISLAND NEST, 2012-2013

The York County nesting pair showed no disturbance behavior related to construction activities occurring in proximity to the nest (Table 3-3). The contractor constructed a visual barrier of camouflage netting alongside McCall's Ferry Road in a location that obstructed the line of sight between the whitewater-feature construction area and the nest.

TABLE 3-3. CONSTRUCTION ACTIVITY AT THE YORK COUNTY EAGLE NEST DURING THE 2012-2013 NESTING SEASON

CONSTRUCTION ACTIVITY UNDER 1000'	FOOT TRAFFIC	BACKHOE	EXCAVATION	HAND TOOLS	VEHICLE	FORK LIFT	HAUL TRUCK	NO WORK OCCURRED	PUMPS	CRANE	CEMENT TRUCK	BULL DOZER	BOAT
NUMBER OF DAYS ACTIVITY OCCURRED	76	70	68	68	65	46	40	37	31	28	22	5	3

4.0 DISCUSSION

From January 2010 to June 2013, researchers observed eagle behavior and response to blasting events and construction activity. Due to limited construction activity near the Piney Island eagle nest during the 2010-2011, nesting season observations from this period are not considered in the following analysis. A total of 368 blasting events are evaluated to examine how specific blasting parameters related to the 10 disturbances documented during monitoring.

Acoustic disturbance monitoring results show a direct relationship between dBA and peak dB levels and the risk of disturbing eagles. During blasting events when an eagle was disturbed, dBA and peak DB levels were significantly higher than during events when no disturbance was observed (($t(237) = 5.63$, $p < 0.05$); ($t(237) = 4.95$, $p < 0.05$)). Efforts to reduce dBA and peak dB levels during future blasting events could prove to be effective for reducing the chances of disturbing eagles. As expected, the results show increasing dBA and peak dB readings with decreasing distance between a blast site and the nest (Figure 4-1).

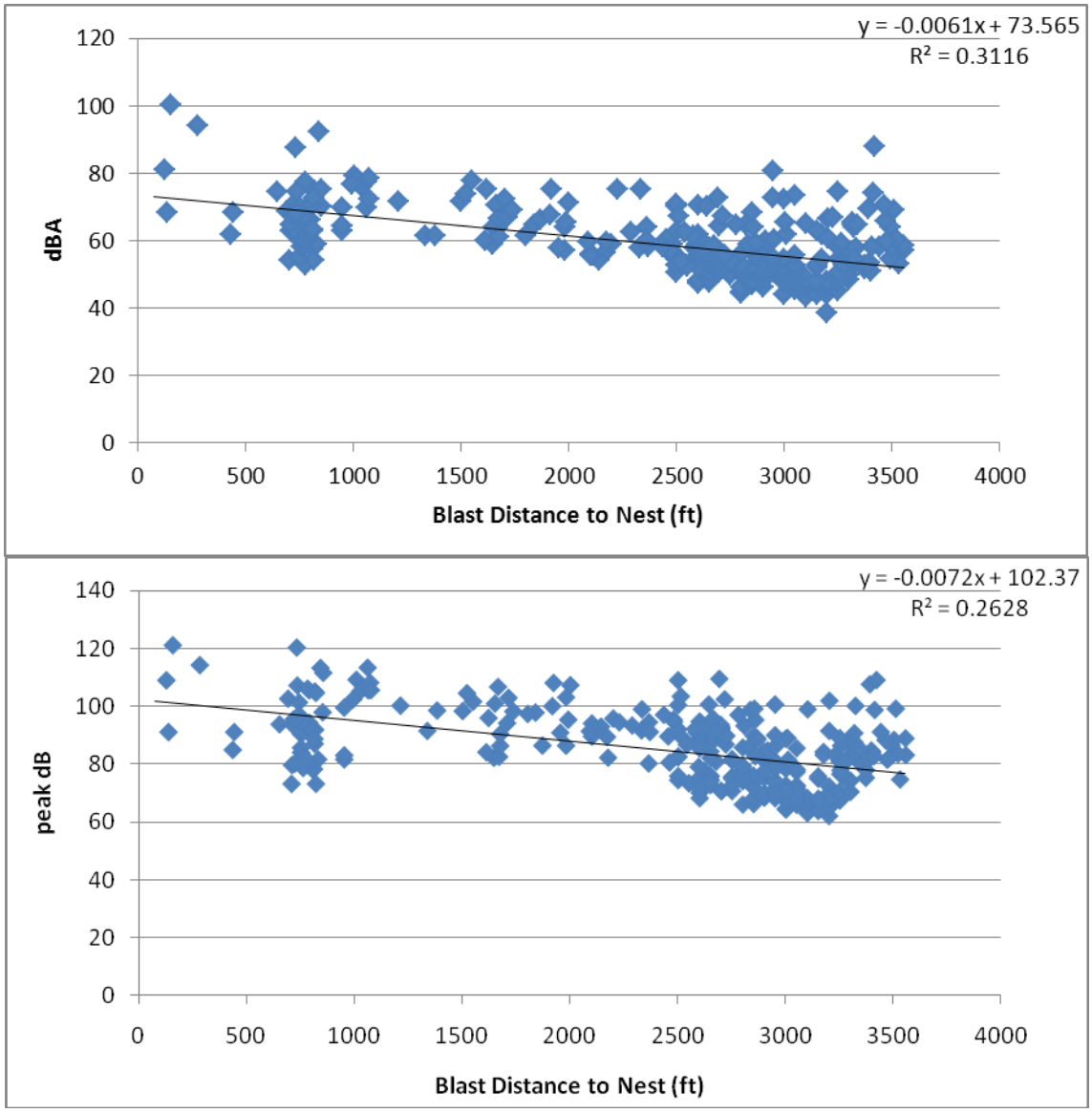


FIGURE 4-1. LINEAR REGRESSION ANALYSIS OF THE EFFECT OF BLAST DISTANCE ON ACOUSTIC LEVELS AT THE EAGLE NEST

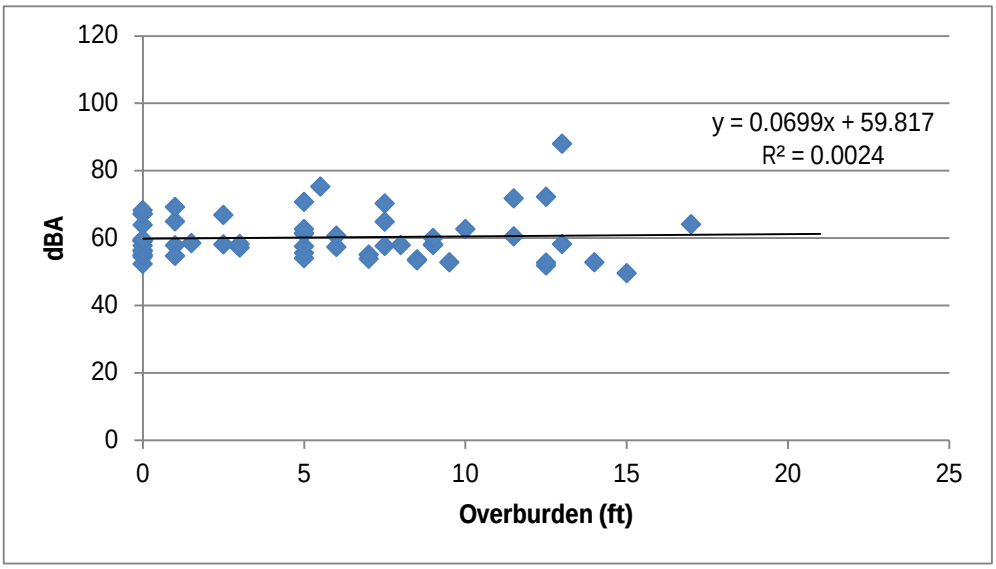
Throughout the four years of bald eagle monitoring during construction at Holtwood, the blasting contractor often covered the blasting area with mats 85% (N=311) to prevent rock from flying into the air. Blast matting consisted of stacked rubber mats made out of tires placed atop the blasting area. The contractor suggested that these coverings are likely to reduce the noise produced by the blast but may increase ground vibration. The researchers evaluated whether covering the blast area or reducing the size of the blast would reduce the noise that has been shown to cause bald eagle disturbances.

Average dBA and peak dB readings were higher when no blast matting was used but were not significantly different from blasts that were covered with matting (Table 4-1). As previously discussed, the researchers found that higher dBA and peak dB caused eagle disturbances. The researchers also found that 40% of the disturbances occurred during the 15% of blasts that were not matted. The blast matting appears to have had a positive effect on reducing dBA and peak dB. Therefore, this study demonstrates that matting can be an effective tool for minimizing blast noise and reduce the risk of disturbing nearby eagles.

TABLE 4-1. BLAST MATTING DETAILS 2010-2013

BLASTING AREA COVERAGE	PEAK DBA AVERAGE	DBA AVERAGE	AVERAGE SEISMIC (IN/SEC PPV)	N
Blast Matting	83 (±) 13	58 (±) 10	0.015 (±) 0.016	Acoustic-221 Seismic-83
No Blast Matting	92 (±) 12	67 (±) 10	0.052 (±) 0.050	Acoustic-31 Seismic-22

Data suggests that the presence of overburden, burden, or water did not reduce noise levels at the eagle nest. Average depths of overburden (Figure 4-2), burden (Figure 4-3) and water (Figure 4-4) at blasting sites were analyzed to determine if these coverings lowered dBA and peak dB readings and reduced the risk of eagle disturbance, but no correlation was found. Also, reducing the magnitude of the blast did not affect the noise levels at the eagle nest (Figure 4-5).



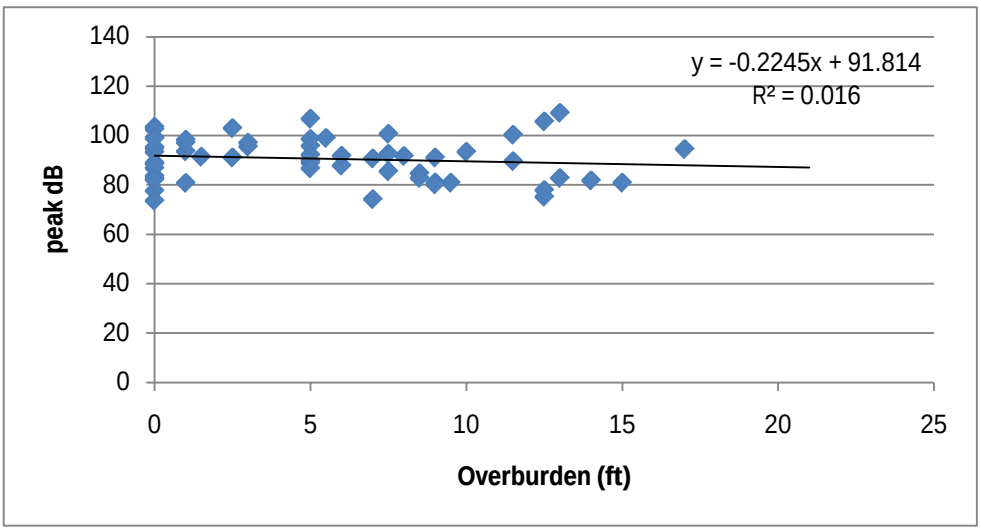
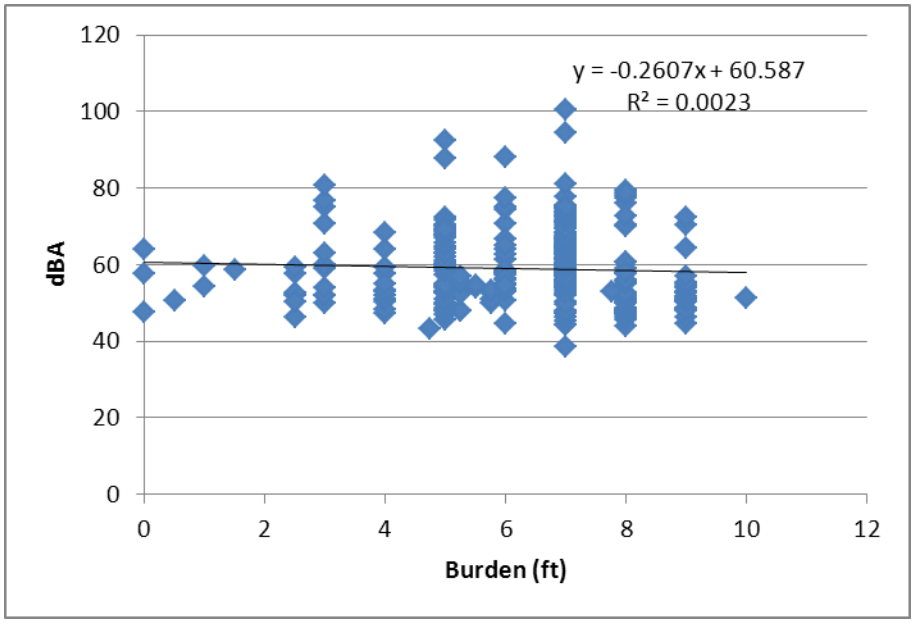


FIGURE 4-2. LINEAR REGRESSION ANALYSIS OF THE EFFECT OF OVERBURDEN ON ACOUSTIC LEVELS AT THE EAGLE NEST



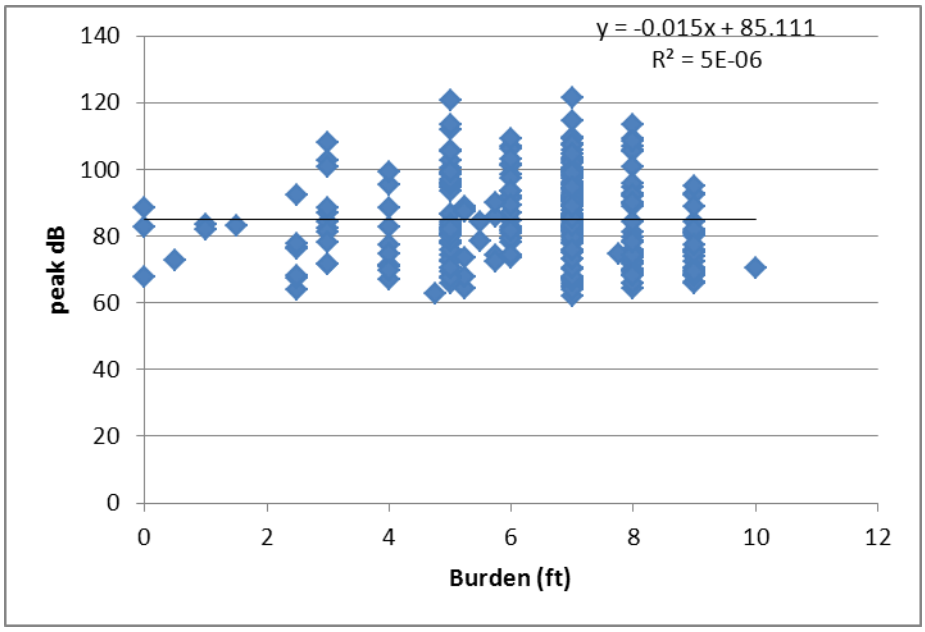
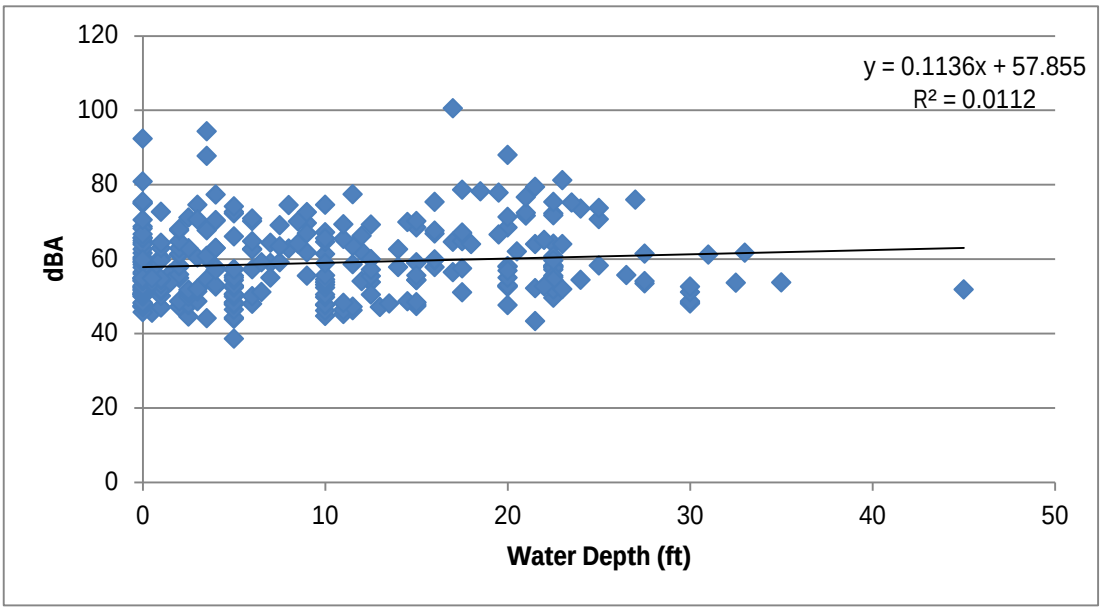


FIGURE 4-3. LINEAR REGRESSION ANALYSIS OF THE EFFECT OF BURDEN ON ACOUSTIC LEVELS AT THE EAGLE NEST



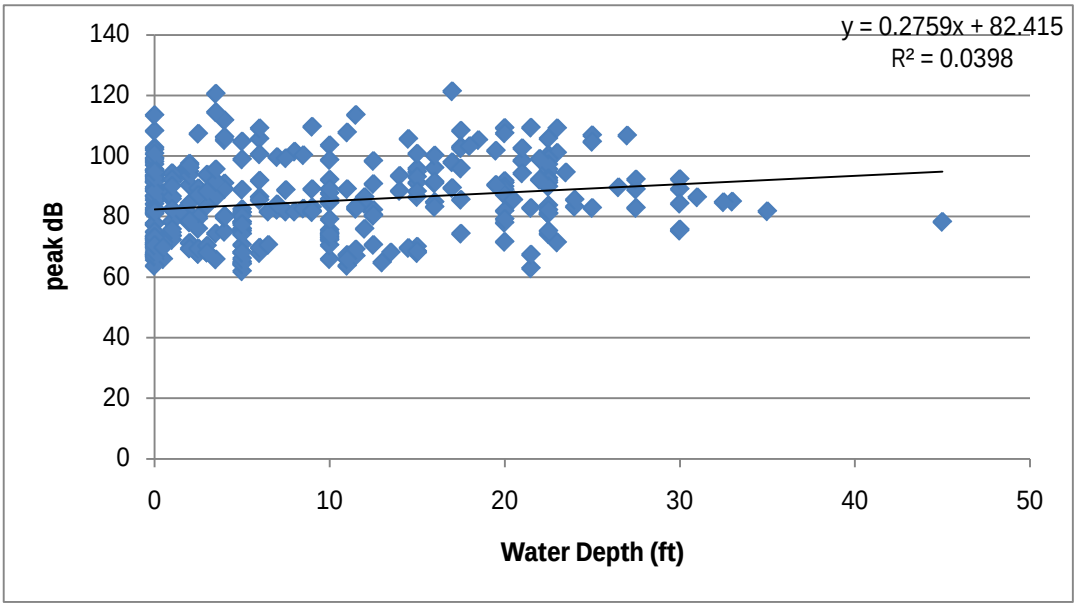
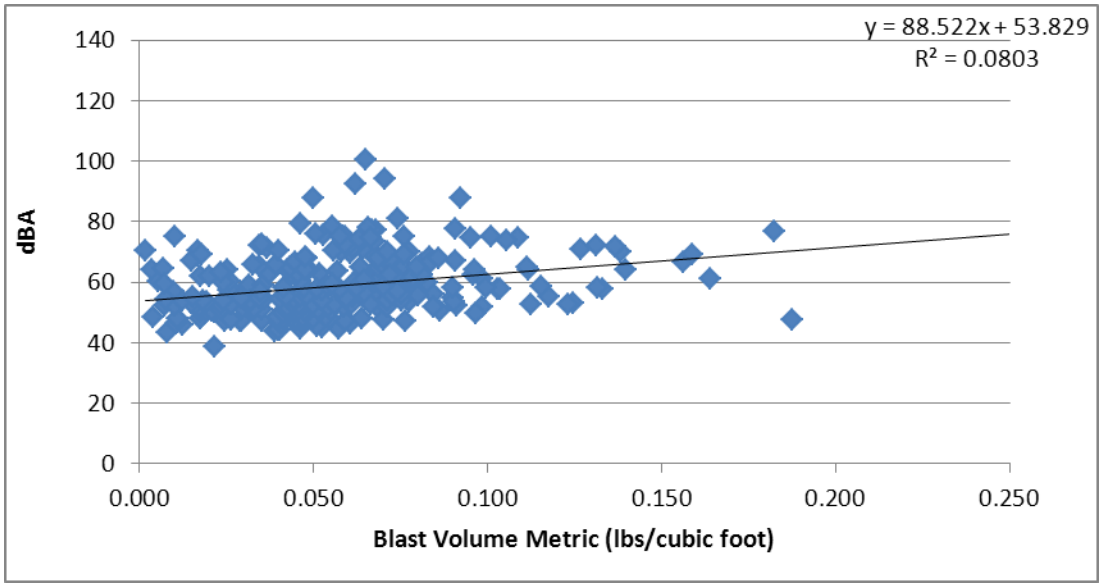


FIGURE 4-4. LINEAR REGRESSION ANALYSIS OF THE EFFECT OF AVERAGE WATER DEPTH ON ACOUSTIC LEVELS AT THE EAGLE NEST



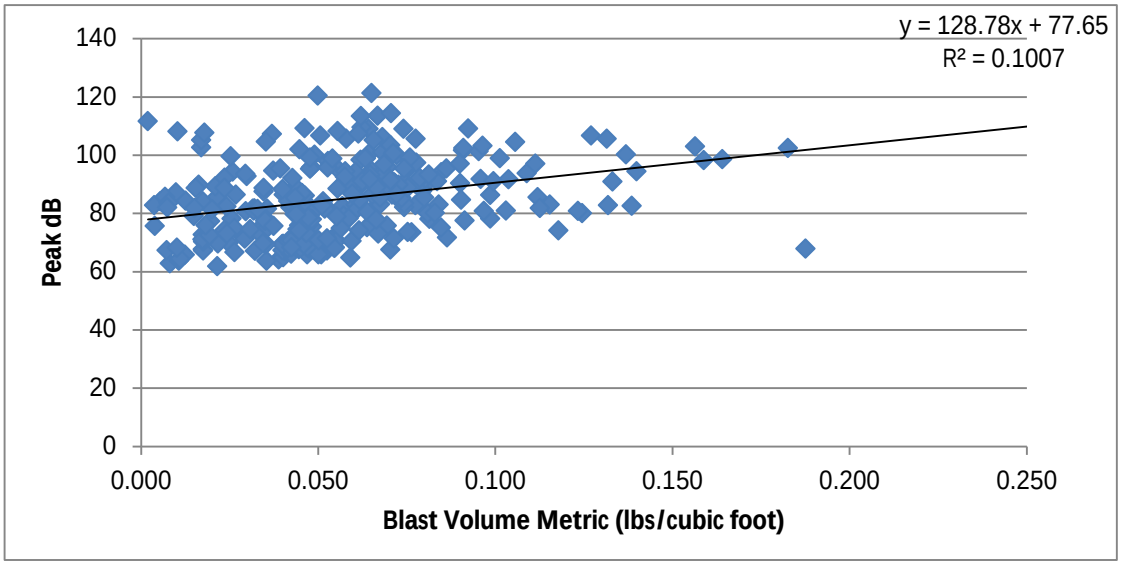


FIGURE 4-5. LINEAR REGRESSION ANALYSIS OF THE EFFECT OF BLAST MAGNITUDE ON ACOUSTIC LEVELS AT THE EAGLE NEST

Seismic effects associated with blasting events were considered as a variable that may disturb eagles. Although the data show no statistical relationship between seismic readings and eagle disturbances ($t(35) = 1.10$, $p > 0.05$), this factor should still be considered during future blast monitoring near eagle nests. Our dataset for seismic monitoring is smaller than our acoustic dataset and may not be representative of the relationship (Table 4-2). As in the case of acoustic monitoring, neither covering the blasts with matting nor the presence of overburden, burden, or water reduced the seismic levels at the eagle nest. The data show that seismic activity decreased with increased distance between the eagle nest and the blast site (Figure 4-6).

TABLE 4-2. SEISMIC READINGS, 2010 THROUGH 2013

BLASTING PERIOD	AVERAGE SEISMIC (IN/SEC PPV)	SEISMIC RANGE (IN/SEC PPV)	N
2012-2013 Precision	0.063 (+-) 0.004	0.00-0.065	2
2012-2013 Production	0.160 (+-) 0.106	0.00-0.235	2
2012-2013 All Blasts	0.11 (+-) 0.083	0.00-.235	4
2010-2013 Blasts No Disturbance, Eagle Present	0.031 (+-) 0.019	0.00-0.090	30
2011-2012 Blasts Disturbance	0.041 (+-) 0.028	0.00-0.070	7

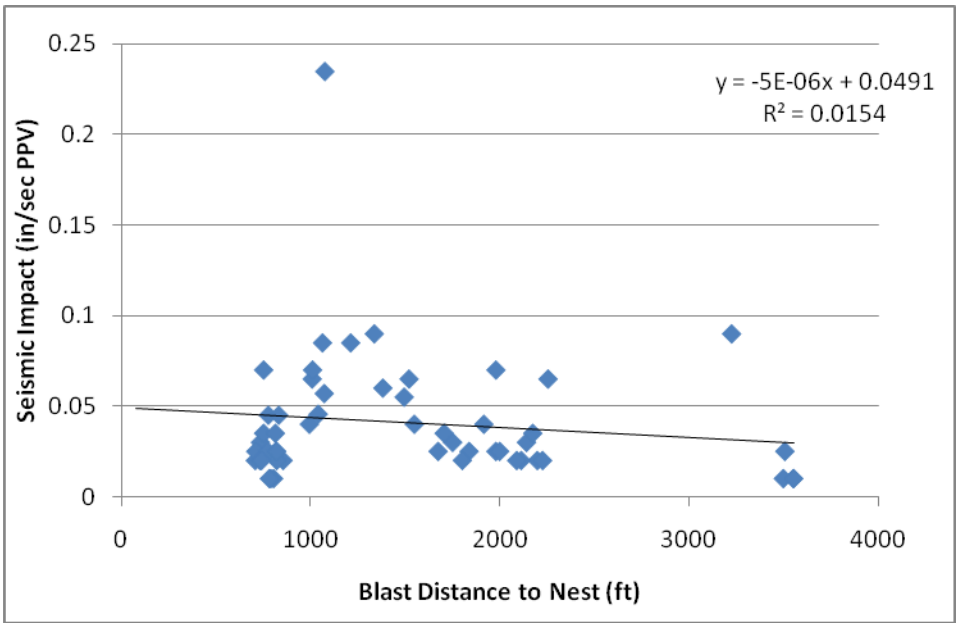


FIGURE 4-6. LINEAR REGRESSION ANALYSIS OF SEISMIC READINGS 2010-2013

The data show that the distance of the blast location from the nest was a significant variable related to eagle disturbances ($t(281)=-7.89$, $p>0.05$). Similarly, other studies have shown that flushing of eagles decreased with increasing distance from firing events (Stalmaster and Kaiser 1997) and increased sensitivity of eagles to human activities as the distance decreases (Grubb and King 1991). The average distance from the blast location to the Piney Island eagle nest during all disturbances was 1,001 ± 322 ft. In comparison, the average distance from the blast location to the Piney Island eagle nest that did not cause disturbance was 2,724 ± 687 ft. Many of

these blasts (N=143) were less than the USFWS recommendation of 2,640 feet found in the guidelines.

The study results are not necessarily clear if the blasting methodology reduced the risk of disturbance. Studies have shown that individual eagles have different sensitivity to human activities and this study could not measure this variable (USFWS 2007). Future studies of other bald eagles with similar blasting and construction activities would contribute to supporting this research. The methods were effective at detecting the acoustic and seismic stimuli, but may not have accurately measured the potential visual effects of the activities on the nesting eagles. A nest specific visual survey would be useful for determining which activities are visible from the bald eagle nest. These improvements in future studies may help contribute to the knowledge of how blasting and construction activity affect nesting bald eagles.

5.0 CONCLUSIONS

PPL worked actively with the USFWS and PGC to follow the recommended monitoring and construction activity guidelines specified in the take permit. As a result, the construction activities did not disturb bald eagles at the Piney Island and York County nests during the 2012-2013 nesting season. Activities such as installing a visual barrier at the York County nest and increasing the average distance between the blast area and the Piney Island nest are likely variables which eliminated disturbances during the 2012-2013 nesting season.

The distance of a blast from the eagle nest was a significant variable in predicting eagle disturbance. The USFWS has recognized distance as a guideline for managing disturbance risk for bald eagles and wrote the National Bald Eagle Management Guidelines to provide landowners recommendations for maintaining safe distances from eagle activity (USFWS 2007). The current guidance from the USFWS is to maintain a distance of one-half of a mile (2,640 ft) between blasting and all eagle nests. This study has proven that not all blasting at distances less than one-half of a mile disturbs eagles. In addition, the data from this study suggests that blast matting was an effective tool for reducing blasting noise and helped reduce the risk of disturbance. Further research will be necessary to determine if blast noise can be reduced by other methods or if seismic activity plays a greater role than could be measured during this study.

PPL will continue to provide the resources for the management and monitoring required by the Holtwood Bald Eagle Management and Monitoring Plan and the take permit. The contractor has completed blasting, but construction activity may continue at the Holtwood Project during the coming nesting season. Monitoring will continue based on the methods described in the plan as revised in the take permit, but blast monitoring is not anticipated. PPL will remain in consultation with the USFWS and PGC as conditions change that would affect the implementation of these guidance documents.

6.0 LITERATURE CITED

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APPENDIX A

BLAST DATA

APPENDIX A

BLAST DATA

DATE	BLAST TIME	BLAST NUMBER	COVERAGE DETAILS				BLAST VOLUME METRIC (LBS/CUBIC FOOT)	BLAST DISTANCE TO NEST (FT)	dBA	PEAK dB	SEISMIC IMPACTS (IN/SEC PPV)	EAGLE ACTIVITY	DISTURBANCE
			MATTED	WATER DEPTH (FT)	OVER BURDEN (FT)	BURDEN (FT)							
1/27/2010	9:32	1	Yes	0	NA	8	0.0429	2550	56.5	91.7	NA	Not in Nest	No
1/27/2010	13:32	2	Yes	0	NA	8	0.0860	2550	56.6	92.2	NA	Not in Nest	No
1/28/2010	14:39	3	Yes	0	NA	9	0.0559	2600	70.5	94.8	NA	Two Eagles sitting in Nest	No
2/1/2010	12:04	4	Yes	0	NA	9	0.0298	2700	54.8	92.8	NA	One Eagle Perched Above Nest	No
2/2/2010	14:11	5	Yes	0	NA	5	0.0054	2750	54	71	NA	Not in Nest	No
2/4/2010	13:05	6 (dual)	Yes	0	NA	7.5	0.0194	2900	50	88.4	NA	Not in Nest	No
2/8/2010	13:59	7	Yes	0-3	NA	4	0.0145	2800	None	None	NA	One Eagle in Nest, incubating	No
2/9/2010	12:01	8	Yes	0-7	NA	9	0.0331	2800	51.1	70.8	NA	Not in Nest	No
2/12/2010	15:05	9 (Dual)	Yes	0-5	NA	6	0.0572	2800	44.5	79.2	NA	One Eagle in Nest	No
2/13/2010	12:30	10 (Dual)	Yes	0-40	NA	5.25	0.0277	2800	59.8	88.1	NA	NA	No
2/17/2010	12:09	11 (Dual)	Yes	0-40	NA	5.25	0.0099	2600	56.9	87.2	NA	One Eagle in Nest, incubating	No
2/18/2010	13:29	12 (Dual)	Yes	0-40	NA	5.25	0.0154	2600	55	88.8	NA	One Eagle in Nest, incubating	No
2/22/2010	9:05	13	Yes	20-40	NA	8	0.0638	2600	48	75.3	NA	Incubating	No
2/22/2010	15:03	14 (Dual)	Yes	0-20	NA	5	0.0174	2650	48.7	72.7	NA	Eating/Incubating	No
2/23/2010	10:07	15	No	10-30	NA	8	0.0471	2600	47.6	71.6	NA	Incubating	No
2/23/2010	15:10:42	16	Yes	10-19	NA	9	0.0402	2900	48.6	69.6	NA	Incubating	No
2/24/2010	15:38	17	Yes	0	NA	9	0.0296	2950	51.5	80.8	NA	Incubating	No
2/27/2010	11:59	18	Yes	10-20	NA	8	0.0474	2600	47.3	70	NA	Incubating	No
2/27/2010	12:25	19	Yes	1-43	NA	2.5	0.0611	2500	52.7	92.1	NA	Incubating	No

Date	Blast Time	Blast Number	Coverage Details				Blast Volume Metric (lbs/cubic foot)	Blast Distance to Nest (ft)	dBA	Peak dB	Seismic Impacts (in/sec PPV)	Eagle Activity	Disturbance
			Matted	Water Depth (ft)	Over Burden (ft)	Burden (ft)							
3/1/2010	15:01	20	Yes	2-25	NA	8	0.0414	2600	49	68.1	NA	Incubating	No
3/2/2010	13:51:21	21	Yes	23	NA	3	0.0714	2600	51.9	71.4	NA	One incubating, second returns to nest at blast time	No
3/2/2010	15:19	22	Yes	0-10	NA	8	0.0445	3300	49.9	74.2	NA	Incubating	No
3/3/2010	12:11:17	23	Yes	0-10	NA	8	0.0615	2650	55	74.2	NA	Sitting in nest	No
3/3/2010	15:06	24	Yes	30	NA	8	0.0039	2650	49.7	75.7	NA	Incubating	No
3/4/2010	12:20:58	25	Yes	0-10	NA	8	0.0608	2900	46.4	81.3	NA	Incubating	No
3/4/2010	15:01	26	Yes	30	NA	8	0.0235	2700	52.6	92.3	NA	Incubating	No
3/5/2010	11:00	27	Yes	0-2	NA	8	0.0590	2950	72.7	90	NA	Incubating	No
3/5/2010	15:28	28	Yes	30	NA	8	0.0436	3300	49.4	89	NA	Incubating	No
3/8/2010	9:30	29	Yes	30	NA	9	0.0514	3400	51.1	84.2	NA	Incubating	No
3/8/2010	12:15:36	30	Yes	0-5	NA	8	0.0434	3000	49.8	79.8	NA	Incubating /preening	No
3/9/2010	9:45	31	Yes	0-2	NA	8	0.0586	3000	51.9	78.3	NA	Incubating	No
3/9/2010	13:01	32	Yes	0-8	NA	8	0.0264	2750	52.6	74.9	NA	Incubating	No
3/10/2010	12:32	33 (dual)	Yes	0-5	NA	6	0.0210	2650	50.7	89.3	NA	Incubating	No
3/11/2010	9:31	34	No	3	NA	10	0.0175	3300	51.3	70.3	NA	Incubating	No
3/11/2010	14:25	35	Yes	0-2	NA	9	0.0428	2700	64.3	92.2	NA	Incubating	No
3/16/2010	12:45:14	36 (dual)	Yes	0-70	NA	6	0.0320	2750	53.7	81.7	NA	Incubating	No
3/17/2010	16:59:11	37	Yes	45	NA	3	0.0986	2800	51.8	78.2	NA	Incubating	No
3/18/2010	17:53	38	Yes	0-10	NA	9	0.0446	2800	52.7	75.9	NA	Incubating	No
3/19/2010	16:38	39 (Dual)	Yes	0-40	NA	6	0.0149	2800	52.9	79.1	NA	One eagle at nest	No
3/20/2010	10:28	40	Yes	0-10	NA	9	0.0358	2900	54.3	75.1	NA	Incubating	No
3/23/2010	16:44	41 (Dual)	Yes	0-20	NA	5.5	0.0126	2650	53.8	84.4	NA	One eagle incubating	No
3/25/2010	14:47	42 (Dual)	Yes	0-1	NA	5.75	0.0194	2750	53.3	72.5	NA	One eagle perched above nest	No
3/26/2010	14:06	43 Dual)	Yes	0-2	NA	5.75	0.0215	2800	50.1	85.7	NA	One eagle incubating	No

Date	Blast Time	Blast Number	Coverage Details				Blast Volume Metric (lbs/cubic foot)	Blast Distance to Nest (ft)	dBA	Peak dB	Seismic Impacts (in/sec PPV)	Eagle Activity	Disturbance
			Matted	Water Depth (ft)	Over Burden (ft)	Burden (ft)							
3/27/2010	13:19	44 (Dual)	Yes	0-35	NA	5.75	0.0236	2800	51	74.3	NA	One eagle incubating	No
3/29/2010	17:01	45 (Dual)	Yes	0-40	NA	5.75	0.0162	2850	52.5	89.8	NA	One eagle incubating	No
3/31/2010	18:53	46 (Dual)	Yes	0-2	NA	5.5	0.0350	2950	54.6	78.3	NA	Perched/Preening	No
4/1/2010	18:20	47 (Dual)	Yes	0-20	NA	6	0.0446	2950	54.5	74.2	NA	One eagle incubating	No
4/2/2010	12:29	48	Yes	0-4	NA	8	0.0416	2900	58.1	84.3	NA	One eagle eating in nest	No
4/5/2010	15:06	49	Yes	0-3	NA	9	0.0318	2950	53.8	81	NA	Adult preening chicks	No
4/6/2010	12:32	50	Yes	0-10	NA	9	0.0460	2950	52.8	80.1	NA	Adult perched on nest rim	No
4/7/2010	17:01	51 (Dual)	Yes	0-24	NA	5	0.0182	2650	54	75.9	NA	Brooding	No
4/9/2010	17:01	52 (Dual)	Yes	0-30	NA	5.25	0.0720	2600	55.6	88.2	NA	Two eagles in nest	No
4/12/2010	12:59	53 (Dual)	Yes	0-20	NA	5.25	0.0466	2550	52.3	73.3	NA	One eagle in nest	No
4/12/2010	18:38	54 (Dual)	Yes	0-50	NA	5.75	0.0268	2900	NA	NA	NA	Eagle perched near nest	No
4/13/2010	13:44	55 (Dual)	Yes	0-20	NA	7.75	0.0442	2650	53.1	74.6	NA	One eagle perched above nest, one feeds in nest	No
4/14/2010	11:44	56	Yes	0-25	NA	9	0.0422	2650	55.4	82.1	NA	One eagle in nest	No
4/14/2010	18:39	57	Yes	0-25	NA	9	0.0552	2700	50.4	70.6	NA	Eagle perched near nest	No
4/15/2010	15:35	58	Yes	0-10	NA	9	0.0346	3000	72.2	88.8	NA	One eagle brooding in nest	No
4/16/2010	12:47	59	Yes	0-10	NA	9	0.0425	2750	50.6	70.6	NA	Adult and chick in nest	No
4/16/2010	16:06	60	Yes	0	NA	8	0.0864	2850	50.5	71.8	NA	One adult and chick feeding	No
4/19/2010	11:01	61	Yes	0-2	NA	8	0.0764	2850	47	73.5	NA	Adult and chick in nest	No

Date	Blast Time	Blast Number	Coverage Details				Blast Volume Metric (lbs/cubic foot)	Blast Distance to Nest (ft)	dBA	Peak dB	Seismic Impacts (in/sec PPV)	Eagle Activity	Disturbance
			Matted	Water Depth (ft)	Over Burden (ft)	Burden (ft)							
4/19/2010	13:04	62	Yes	0	NA	3	NA	2750	49.9	81.2	NA	Adult and chick in nest	No
4/20/2010	14:28	63	Yes	0-20	NA	9	0.0482	2750	50.4	75.5	NA	Adult preening, chick is active in nest	No
4/21/2010	9:03	64	Yes	0	NA	3	NA	2950	80.8	100.7	NA	Adult perched above nest, chick in nest	No
4/21/2010	12:00	65	Yes	0-1	NA	3	0.0525	2950	53.8	71.4	NA	Eagle brooding	No
4/22/2010	12:01	66	Yes	0-20	NA	9	0.0469	2800	46.1	65.9	NA	Adult preening, chick is active in nest	No
4/23/2010	15:03	67	Yes	0-20	NA	9	0.0463	2800	44.7	74	NA	Adult and chick in nest	No
4/24/2010	11:17	68	Yes	0-5	NA	9	0.0471	2850	51.7	75.9	NA	Adult and chick in nest	No
4/24/2010	16:11	69	Yes	0-10	NA	9	0.0450	2850	49.1	68.1	NA	Adult and chick in nest	No
4/26/2010	14:03	70	Yes	0-10	NA	9	0.0492	2900	52.7	81.2	NA	Adult enters nest just prior to blast	No
4/26/2010	18:16	71	Yes	0-10	NA	9	0.0424	2850	48.4	66.1	NA	Adult preening on perch above nest	No
4/27/2010	15:29	72	Yes	0-30	NA	9	0.0470	2900	49.5	68.5	NA	One eagle perched above nest	No
4/28/2010	15:29	73	Yes	0-30	NA	9	0.0548	2900	48.2	68.3	NA	Adult calling	No
4/29/2010	10:27	74	Yes	0	NA	4	0.0537	3000	48.3	71.1	NA	Chick in nest not seen	No
4/29/2010	13:28	75	Yes	0	NA	4	0.0501	3050	52.8	70.8	NA	Adult in nest	No
4/29/2010	16:26	76	Yes	0	NA	4	0.0195	3050	50.4	77.3	NA	Chick active in nest. No adults	No
4/30/2010	12:09	77	Yes	0	NA	4	0.0322	3050	50.8	67.1	NA	Chick in nest, no reaction	No

Date	Blast Time	Blast Number	Coverage Details				Blast Volume Metric (lbs/cubic foot)	Blast Distance to Nest (ft)	dBA	Peak dB	Seismic Impacts (in/sec PPV)	Eagle Activity	Disturbance
			Matted	Water Depth (ft)	Over Burden (ft)	Burden (ft)							
4/30/2010	16:28	78	Yes	0	NA	4	0.0174	3050	52	71.1	NA	Adult standing before blast, settles just after	No
5/1/2010	10:30	79	Yes	1	NA	8	0.0331	2950	51.4	73.5	NA	Adult preening	No
5/1/2010	15:29	80	Yes	2	NA	8	0.0482	3050	55.8	78	NA	Adult perched above nest, chick in nest	No
5/3/2010	17:07	81	Yes	3-10	NA	5	0.0527	2700	51.1	70.6	NA	Adult perched above nest.	No
5/4/2010	11:30	82	Yes	0	NA	8	0.0425	3050	51.7	68.4	NA	No adult in nest, chick not visible	No
5/4/2010	17:32	83	Yes	0	NA	8	0.0353	3050	50.9	69.5	NA	Adult and chick settled in nest	No
5/7/2010	15:31	84	Yes	0-10	NA	2.5	0.0101	3050	52.3	68.2	NA	Only chick in nest, no reaction	No
5/11/2010	13:13	85	Yes	0	NA	9	0.0448	3050	50.5	72.5	NA	Chick in nest, no reaction	No
5/11/2010	18:00	86 (Dual)	Yes	0-10	NA	5.25	0.0110	3000	47.8	64.4	NA	Adult perched above nest, chick in nest. No reaction	No
5/14/2010	15:25	87	Yes	0	NA	5	0.0477	2800	52.5	77.7	NA	Adult preening chick	No
5/17/2010	15:32	88	Yes	0-10	NA	9	0.0350	2900	57.1	77.4	NA	Chick alone in nest	No
5/18/2010	11:01	89	Yes	0	NA	5	0.0594	3000	54.5	70.5	NA	Chick perched on edge of nest, adult perched above nest	No
5/19/2010	18:34	90	Yes	0-5	NA	9	0.0459	2900	51.1	69.4	NA	Adult preening in nest, chick laying down	No
5/20/2010	12:59	91	Yes	0-6	NA	8	0.0546	2950	52	68.1	NA	Chick alone in nest	No

Date	Blast Time	Blast Number	Coverage Details				Blast Volume Metric (lbs/cubic foot)	Blast Distance to Nest (ft)	dBA	Peak dB	Seismic Impacts (in/sec PPV)	Eagle Activity	Disturbance
			Matted	Water Depth (ft)	Over Burden (ft)	Burden (ft)							
5/21/2010	9:38	92	Yes	0-1	NA	4	0.0344	2950	54.8	69.8	NA	Chick in nest flapping wings	No
5/25/2010	12:14	93	Yes	0	NA	0.5	0.0473	3000	50.5	72.7	NA	Chick alone in nest	No
5/26/2010	12:15	94	Yes	1	NA	8	0.0509	3050	45.5	65.9	NA	Adult preening chick and nest	No
5/26/2010	16:29	95	Yes	2	NA	5	0.0398	3050	49.6	69.4	NA	Adult perched on side of nest, chick in nest	No
5/27/2010	12:17	96	Yes	0-30	NA	0	0.1875	3100	47.7	67.9	NA	Chick slightly active in nest	No
5/27/2010	17:09	97	Yes	0-6	NA	9	0.0439	3100	48.6	68.1	NA	Chick perched in nest	No
5/28/2010	17:05	98	Yes	0-10	NA	8	0.0388	3000	43.9	64.2	NA	Chick stretching and flapping wings in nest	No
6/1/2010	12:40	99	Yes	0-4	NA	4	0.0293	3050	47.2	71.3	NA	Chick stretching and flapping wings in nest	No
6/1/2010	16:29	100	Yes	0-5	NA	7	0.0703	3250	47.6	67.6	NA	Chick perched on side of nest	No
6/2/2010	13:59	101	Yes	0-7	NA	7	0.0405	3150	44.1	65.8	NA	Chick preening	No
6/3/2010	8:09	102	Yes	0-5	NA	7	0.0522	3250	N/A	N/A	NA	Blast not monitored	No
6/3/2010	12:59	103	Yes	0-5	NA	5.25	0.0446	3100	47.9	67.7	NA	Chick perched	No
6/3/2010	16:56	104	Yes	0-12	NA	7	0.0474	3150	48.7	67.9	NA	Chick perched on side of nest	No
6/4/2010	9:37	105	Yes	0	NA	7	0.0264	3100	47.4	66.7	NA	Chick perched	No
6/4/2010	14:56	106	Yes	0-20	NA	7	0.0664	3250	74.6	89	NA	Chick hopping and flapping wings in nest	No
6/5/2010	9:19	107	Yes	0-10	NA	7	0.0215	3200	38.6	61.9	NA	Chick laying in nest	No

Date	Blast Time	Blast Number	Coverage Details				Blast Volume Metric (lbs/cubic foot)	Blast Distance to Nest (ft)	dBA	Peak dB	Seismic Impacts (in/sec PPV)	Eagle Activity	Disturbance
			Matted	Water Depth (ft)	Over Burden (ft)	Burden (ft)							
6/5/2010	12:22	108	Yes	0-43	NA	2.5	0.0072	3150	52.1	67.4	NA	Chick perched in nest	No
6/5/2010	15:59	109	Yes	0-20	NA	7	0.0416	3250	49.7	70.5	NA	Chick sitting in nest	No
6/7/2010	12:08	110	Yes	0-22	NA	7	0.0525	3250	45.2	67.3	NA	Perched on side of nest	No
6/7/2010	19:48	111	Yes	0-43	NA	4.75	0.0081	3100	43.3	62.9	NA	Chick laying in nest	No
6/8/2010	10:34	112	Yes	0	NA	7	0.0564	3150	52.6	74.9	NA	Chick sitting in nest	No
6/8/2010	14:29	113	Yes	0	NA	7	0.0399	3150	47.1	67.4	NA	Chick perched at edge of nest	No
6/8/2010	18:21	114	Yes	0	NA	7	0.0354	3150	47.3	63.7	NA	Chick perched on branch just off of nest	No
6/9/2010	14:00	115	Yes	0-2	NA	7	0.0374	3150	63	75.7	NA	Chick perched on branch just off of nest	No
6/10/2010	10:45	116	Yes	0-10	NA	7	0.0401	3200	44.2	65	NA	Chick eating	No
6/10/2010	13:29	117	Yes	0	NA	7	0.0247	3200	47.3	69.9	NA	Chick perched and preening	No
6/10/2010	16:03	118	Yes	0	NA	5	0.0123	3200	45.7	65.8	NA	Chick perched on side of nest	No
6/10/2010	19:31	119	Yes	0	NA	5	0.0175	3200	48.1	67.7	NA	Chick perched on side of nest	No
6/11/2010	10:58	120	Yes	0-22	NA	8	0.0501	3050	49.4	65.9	NA	Chick in nest adults perched near nest	No
6/11/2010	15:58	121	Yes	0	NA	5	0.0176	3000	50.1	67.2	NA	Chick perched near nest	No
6/11/2010	18:08	122	Yes	0-12	NA	8	0.0217	2900	50	69.7	NA	Chick and adult perched near nest	No
6/12/2010	11:10	123	Yes	0-20	NA	8	0.0452	3050	47.6	72.2	NA	Chick flapping wings	No

Date	Blast Time	Blast Number	Coverage Details				Blast Volume Metric (lbs/cubic foot)	Blast Distance to Nest (ft)	dBA	Peak dB	Seismic Impacts (in/sec PPV)	Eagle Activity	Disturbance
			Matted	Water Depth (ft)	Over Burden (ft)	Burden (ft)							
6/12/2010	13:33	124	Yes	0-2	NA	5	0.0290	3200	47	72.2	NA	Chick perched near nest	No
6/12/2010	16:28	125	Yes	0-22	NA	2.5	0.0106	3100	46.3	63.7	NA	Chick had fledged. No eagle in nesting area	No
6/14/2010	12:09	126	Yes	0-22	NA	8	0.0338	3000	45.5	62.9	NA	No eagle in nesting area	No
6/14/2010	14:34	127	Yes	1-10	NA	6	0.0144	3200	48.9	66.7	NA	No eagle in nesting area	No
6/14/2010	18:28	128	Yes	0-23	NA	8	0.0479	3100	47.9	63.5	NA	No eagle in nesting area	No
6/15/2010	9:19	129	Yes	0-23	NA	8	0.0443	3050	47.2	69.1	NA	Chick preening on perch above nest	No
6/15/2010	13:10	130	Yes	0-23	NA	7	0.0409	3100	46.2	66.9	NA	Adult perched above nest, no chick in site	No
6/15/2010	18:25	131	Yes	0-24	NA	8	0.0297	3100	43.6	65.1	NA	No eagle in nesting area	No
6/16/2010	12:31	132	Yes	0-25	NA	7	0.0443	3150	48.3	65.6	NA	No eagle in nesting area	No
6/16/2010	16:46	133	Yes	0-25	NA	7	0.0376	3100	51.1	74.8	NA	No eagle in nesting area	No
6/17/2010	14:49	134	Yes	0-24	NA	7	0.0417	3150	49.3	69.7	NA	No eagle in nesting area	No
6/17/2010	19:51	135	Yes	0-19	NA	6	0.0156	3250	44.5	64.8	NA	No eagle in nesting area	No
6/18/2010	13:59	136	Yes	0-24	NA	7	0.0501	3100	46.8	64.8	NA	No eagle in nesting area	No
6/18/2010	18:58	137	Yes	0-26	NA	7	0.0591	3200	47.1	64.8	NA	Chick and adult perched near nest	No
6/19/2010	14:32	138	Yes	0-22	NA	7	0.0449	3100	NA	NA	NA	Blasts no longer monitored	No
12/5/11	14:58	T-116	Yes	0	NA	5	0.0621	840	92.3	113.4	NA	Absent	No

Date	Blast Time	Blast Number	Coverage Details				Blast Volume Metric (lbs/cubic foot)	Blast Distance to Nest (ft)	dBA	Peak dB	Seismic Impacts (in/sec PPV)	Eagle Activity	Disturbance
			Matted	Water Depth (ft)	Over Burden (ft)	Burden (ft)							
12/5/11	15:05	T-115	No	32-34	NA	7	0.0728	433	61.7	84.9	NA	Absent	No
12/6/11	10:00	T-117	No	0	NA	6	0.0591	815	74.9	91.9	NA	Absent	No
12/6/11	15:00	T-118	No	5	NA	6	0.0256	810	57.3	78.2	NA	Absent	No
12/6/11	15:06	T-119	Yes	0-34	NA	7	0.0651	155	100.5	121.3	NA	Absent	No
12/7/11	12:05	T-120	Yes	4	NA	6	0.0681	780	77.3	106.2	NA	Absent	No
12/12/11	16:17	T-121	No	3.5	NA	7	0.0705	280	94.3	114.4	NA	Absent	No
12/13/11	10:55	T-122	Yes	18-28	NA	7	0.0741	125	81.2	109.1	NA	Absent	No
12/13/11	16:01	T-123	Yes	8	NA	6	0.0953	740	74.5	101.4	NA	Absent	No
12/14/11	11:06	T-124	No	3	NA	7	0.1088	650	74.6	93.8	NA	Absent	No
12/14/11	15:05	T-125	No	0-30	NA	7	0.0835	440	68.5	91.1	NA	Absent	No
12/14/11	15:05	T-126	No	20	NA	7	0.0677	135	68.5	91.1	NA	Absent	No
12/15/11	11:01	T-127	Yes	2	NA	7	0.0188	820	Na	Na	NA	Absent	No
12/15/11	12:08	T-128	No	0-30	NA	7	0.0496	440	Na	Na	NA	Absent	No
12/15/11	15:58	T-129	No	4	NA	7	0.0745	650	Na	Na	NA	Absent	No
12/15/11	16:01	T-130	Yes	0-28	NA	7	0.0356	76	Na	Na	NA	Absent	No
12/16/11	10:57	T-131	Yes	1	NA	7	0.0259	788	60.4	94.3	NA	Absent	No
12/16/11	16:01	T-132	Yes	0	NA	7	0.1119	750	64.3	85.6	NA	Absent	No
12/17/11	9:58	T-133	Yes	0	NA	7	0.0528	850	75.4	98	NA	Absent	No
12/17/11	15:05	T-134	Yes	0	NA	7	NA	900	NA	NA	NA	Perched	Yes
12/17/11	15:05	T-135	Yes	0	NA	6	NA	840	NA	NA	NA	don’t count	No
12/19/11	10:58	T-136	No	0-24	NA	7	0.0708	1870	66.2	86.4	NA	Absent	No
12/22/11	11:58	T-137	No	0-23	NA	7	0.0568	1669	63.5	82.5	NA	Absent	No
12/28/11	12:00	T-138	No	12-34	NA	6	0.0681	1650	64	101	NA	Absent	No
12/31/11	12:00	T-139	No	10-32	NA	7	0.0619	1500	71.6	98.4	NA	Absent	No
1/3/12	13:00	T-140	Yes	7	NA	7	0.0253	950	64.3	99.6	NA	Absent	No
1/4/12	13:00	T-141	Yes	9	NA	7	0.0606	950	69.7	83	NA	Absent	No
1/4/12	15:59	T-142	Yes	8	NA	7	0.0519	950	62.8	81.6	NA	Absent	No

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			Matted	Water Depth (ft)	Over Burden (ft)	Burden (ft)							
1/5/12	11:53	T-143	No	0-32	NA	7	0.0760	1620	75.3	96	NA	Perched out of nest	Yes
1/9/12	11:50	P-57	Yes	0-7	NA	6	0.0597	2,500	NA	NA	NA	Absent	No
1/9/12	16:45	P-58	Yes	10	NA	6	0.0732	2,500	NA	NA	NA	Absent	No
1/10/12	12:30	P-59	Yes	5-7	NA	6	0.0502	2,500	NA	NA	NA	Absent	No
1/10/12	15:15	P-60	Yes	5-7	NA	6	0.0542	2,500	NA	NA	NA	Perched	No
1/11/12	11:22	P-61	Yes	0-7	NA	6	0.7629	2,500	NA	NA	NA	Perched out of nest	No
1/11/12	4:07	P-62	Yes	0-7	NA	6	0.0332	2,500	54.5	74.4	NA	Absent	No
1/12/12	9:33	P-63	Yes	0-10	NA	7	0.0520	2,500	55.5	82.4	NA	Absent	No
1/12/12	1:04	P-64	Yes	0-10	NA	7	0.0694	2,500	50.4	75.8	NA	Absent	No
1/12/12	3:01	P-65	No	0-17	NA	5	0.1385	2,500	70.1	82.6	NA	Absent	No
1/13/12	9:26	P-66	Yes	6	NA	7	0.0642	2,500	70.9	109.1	NA	Absent	No
1/13/12	1:08	P-67	Yes	6	NA	7	0.0643	2,500	62.7	100.5	NA	Absent	No
1/20/12	5:32	T-144	Yes	0-3	NA	7	0.0847	2,100	56	94.1	NA	Absent	No
1/25/12	11:56	P-69	Yes	0-8	NA	7	0.0581	3,555	NA	NA	NA	Absent	No
1/25/12	15:38	P-68	Yes	0-15	NA	6	0.8256	3,555	NA	NA	NA	Absent	No
1/26/12	16:56	T-145	Yes	15-38	NA	7	0.0671	2,100	55.7	89.6	NA	Perched out of nest	No
2/2/12	11:56	T-146	No	5-34	NA	7	0.0909	1,548	77.8	101.7	0.08	Pair - Nest building	Yes
2/4/12	13:08	T-147	Yes	0-10	NA	7	0.0814	803	66.1	78.1	0.02	Perched out of nest	Yes
2/6/12	16:05	T-148	Yes	0-15	NA	7	0.0315	775	59.1	81.6	0.045	Absent	No
2/7/12	15:18	T-149	Yes	0-13	NA	7	0.0356	830	59.1	81.6	0.045	Absent	No
2/8/12	11:11	T-150	Yes	0-5	NA	7	0.0369	733	71.1	107.3	0.03	Absent	No
2/8/12	15:15	T-151	Yes	0-10	NA	7	0.0352	819	72.7	104.7	0.025	Perched out of nest	No
2/9/12	13:09	T-152	Yes	0	NA	7	0.0877	1751	No Data	No Data	0.03	Absent	No
2/9/12	16:01	T-153	Yes	0-8	NA	7	0.0438	708	62.9	79.6	0.025	Perched out of nest	No

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			Matted	Water Depth (ft)	Over Burden (ft)	Burden (ft)							
2/10/12	15:02	T-154	Yes	0	NA	7	0.0242	819	54.1	73.1	0.02	Incubating	No
2/10/12	15:02	T-155	Yes	0	NA	7	0.0670	706	54.1	73.1	0.02	Incubating	No
2/13/12	11:56	PC-69	Yes	0-8	NA	7	0.0581	3555	57	88.9	<0.02	Incubating	No
2/14/12	14:01	T-156	Yes	0-13	NA	7	0.0236	812	63.4	88.7	0.035	Incubating	No
2/15/12	13:06	PC-70	Yes	3-25	NA	0	NA	3502	57.8	88.4	<0.02	Incubating	No
2/15/12	14:03	T-157	No	0	NA	7	0.0743	2175	59.8	82.2	0.035	Incubating	No
2/15/12	15:07	T-158	Yes	0-12	NA	7	0.0775	788	70.2	105.6	<0.02	Incubating	Yes
2/16/12	15:17	PC-71	Yes	3-20	NA	1.5	0.1153	3557	58.6	83.1	<0.02	Incubating	No
2/17/12	13:42	P-72	Yes	0-2	NA	5	0.0403	3490	54.4	86.5	<0.01	Incubating	No
2/18/12	8:59	P-73	Yes	0	NA	5	0.0328	3470	65.7	81.5	<0.01	Incubating	No
2/18/12	14:01	T-159	No	0	NA	7	0.0393	1990	65.6	95.4	<0.01	Incubating	No
2/19/12	12:14	P-74	Yes	0-2	NA	4	0.0308	3530	53.3	74.6	<0.01	Incubating	No
2/21/12	12:03	P-75	Yes	0-6	NA	5	0.0743	3520	60.4	83.5	<0.01	Incubating	No
2/21/12	14:02	T-160	Yes	0-12	NA	7	0.0958	800	62.5	91.8	<0.01	Incubating	No
2/22/12	12:14	T-161	Yes	0-14	NA	7	0.0462	750	55	84	0.035	Incubating	No
2/23/12	18:07	P-76	Yes	0-15	NA	5	0.0759	3510	69.1	99.2	0.025	Too dark to see	No
2/23/12	12:01	T-162	No	25	NA	7	0.1056	1520	73.7	104.6	0.065	Incubating	No
2/23/12	18:38	T-163	No	0-25	NA	7	0.0639	2460	57.1	80.5	<0.01	Too dark to see	No
2/24/12	13:10	T-164	Yes	0-7	NA	5	0.0498	730	87.7	120.5	<0.01	Incubating	Yes
2/25/12	14:27	T-165	No	10-30	NA	7	0.0613	2000	71.3	107.4	0.025	Incubating	No
2/27/12	17:00	T-166	No	15-26	NA	7	0.0735	2600	62	85.4	<0.01	Incubating	No
2/28/12	12:05	T-167	Yes	0-8	NA	5	0.1245	780	52.9	80.1	0.01	Incubating	No
2/28/12	15:11	T-168	Yes	0-8	NA	5	0.0810	720	63	80.1	<0.01	Incubating	No
2/29/12	10:09	T-169	Yes	0-18	NA	7	0.0201	3010	61.8	81.4	<0.01	Incubating	No
2/29/12	12:03	T-170	Yes	0-4	NA	5	0.0473	760	58.2	78.6	<0.01	Moving around nest	No
3/1/12	10:06	T-171	Yes	0-4	NA	5	0.0373	755	62.9	94.7	<0.01	Incubating	No
3/1/12	13:03	T-172	Yes	0-4	NA	5	0.0696	755	61.1	96	<0.01	Incubating	No

Date	Blast Time	Blast Number	Coverage Details				Blast Volume Metric (lbs/cubic foot)	Blast Distance to Nest (ft)	dBA	Peak dB	Seismic Impacts (in/sec PPV)	Eagle Activity	Disturbance
			Matted	Water Depth (ft)	Over Burden (ft)	Burden (ft)							
3/2/12	10:01	T-173	Yes	0-4	NA	5	0.0686	739	68	96.9	0.02	Incubating	No
3/2/12	12:39	T-174	Yes	0-4	NA	5	0.0688	711	64.8	93.6	<0.01	Incubating	No
3/2/12	15:03	T-175	Yes	0-4	NA	5	0.0481	730	67.7	95.9	0.02	Incubating	No
3/3/12	12:00	T-176	Yes	0-7	NA	5	0.0862	716	67.7	95.5	<0.01	Incubating	No
3/3/12	14:00	T-177	Yes	20-24	NA	7	0.0635	3101	65.1	99	<0.01	Incubating	No
3/5/12	13:52	F-1	Yes	0-6	NA	3	0.0400	3462	70.6	88.3	<0.01	Incubating	No
3/5/12	15:10	T-178	Yes	15-24	NA	7	0.0717	1674	66.6	90.4	<0.01	Incubating	No
3/6/12	12:05	T-179	No	22-40	NA	7	0.0986	1674	61.2	86.3	0.025	Incubating	No
3/7/12	12:05	T-180	Yes	24	NA	7	0.0675	3175	54.4	83.2	<0.01	Incubating	No
3/7/12	12:05	T-181	Yes	24	NA	7	0.0675	3050	73.5	85.5	<0.01	Incubating	No
3/8/12	11:29	PC-78	Yes	0-10	NA	7	0.0633	3412	74.1	98.8	<0.01	Incubating	No
3/8/12	14:57	T-182	Yes	0	NA	7	0.0447	3202	66.7	102	<0.01	Incubating	No
3/9/12	15:22	PC-79	Yes	10-12	NA	7	0.0179	3390	69.3	107.7	<0.01	Incubating	No
3/9/12	11:02	T-183	Yes	10-12	NA	7	0.0700	3007	65.4	89	<0.01	Incubating	No
3/10/12	12:58	PC-80	Yes	5-12	NA	7	0.0489	3323	64.1	100.2	<0.01	Incubating	No
3/10/12	14:58	T-184	Yes	3-4	NA	7	0.0656	3201	60.8	91.5	<0.01	Incubating	No
3/12/12	10:27	T-185	Yes	3-4	NA	7	0.0463	2951	60.2	86.1	<0.01	Incubating	No
3/14/12	14:00	T-186	Yes	12-20	NA	7	0.0782	2090	59.7	91.4	0.02	Incubating	No
3/15/12	10:06	T-187	Yes	10-22	NA	7	0.0840	3228	66.8	83.1	0.09	Incubating	No
3/15/12	17:13	T-188	Yes	21	NA	3	0.1825	992	76.6	102.5	0.04	Incubating	No
3/16/12	17:22	T-189	Yes	0-20	NA	7	0.0803	2114	55.6	92.1	0.02	Incubating	No
3/17/12	11:20	T-190	Yes	10-20	NA	7	0.0652	3256	54.4	86.4	<0.01	Incubating	No
3/17/12	15:18	T-191	Yes	10-22	NA	7	0.0617	2915	59.9	84.7	<0.01	Incubating	No
3/19/12	12:58	T-192	No	10-30	NA	7	0.0710	1494	NA	NA	0.055	Incubating	No
3/19/12	16:24	T-193	Yes	5	NA	7	0.0397	3282	NA	NA	<0.01	Incubating	No
3/20/12	13:56	T-194	Yes	0-2	NA	5	0.0241	760	59.7	82.4	<0.01	Incubating	No
3/20/12	17:31	T-195	Yes	0-30	NA	7	0.0672	2142	54.3	93	0.03	Incubating	No
3/21/12	12:28	T196	Yes	0-5	NA	3	0.0454	813	62.9	87	<0.01	Perched	No

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			Matted	Water Depth (ft)	Over Burden (ft)	Burden (ft)							
3/21/12	15:01	T-197	Yes	0-18	NA	7	0.0614	2866	55.5	89	<0.01	Perched	No
3/21/12	15:35	T-198	Yes	0-12	NA	7	0.0435	3314	64.8	85.4	<0.01	Perched	No
3/22/12	14:13	T-199	Yes	0-8	NA	5	0.0170	814	70.4	105.2	0.025	Absent	No
3/23/12	12:03	T-200	Yes	0-18	NA	5	0.0151	772	66.9	81.8	0.025	Perched	No
3/23/12	13:53	T-201A	Yes	10	NA	7	0.0346	3318	65.5	87.6	<0.01	Perched	No
3/23/12	13:53	T-201B	Yes	10	NA	7	0.0068	2825	64.6	85.7	<0.01	Perched	No
3/24/12	13:53	T-202	No	2	NA	7	0.0901	750	54.9	90.4	0.07	Perched	Yes
3/24/12	13:54	T-203	Yes	0-12	NA	5	0.0267	1980	57.2	86.4	0.07	Absent	No
3/26/12	16:01	T-204	Yes	4-32	NA	7	0.0964	1980	64	103.2	0.025	Perched	No
3/28/12	12:03	T-205	Yes	0-8	NA	5	0.0019	853	70.3	111.7	0.02	Perched	Yes
3/28/12	16:31	T-206	Yes	0-34	NA	7	0.0799	2170	56.4	89.4	<0.01	Absent	No
3/29/12	13:58	T-207	Yes	0-18	NA	7	0.0622	2691	72.6	109.6	<0.01	Absent	No
3/30/12	12:00	T-208	No	0	NA	7	0.0687	1336	61.6	91.5	0.09	Absent	No
3/31/12	15:02	T-209	Yes	0-32	NA	7	0.0744	1953	57.8	90.9	<0.01	Absent	No
3/31/12	15:03	T-210	Yes	0-8	NA	7	0.1331	2586	57.8	90.9	<0.01	Absent	No
4/3/12	18:05	T-211	Yes	0-20	NA	7	0.0552	2595	58.8	79	<0.01	Perched out of nest	No
4/4/12	11:59	T-212	Yes	12-30	NA	7	0.0606	1706	72.4	94.2	0.035	Perched	No
4/6/12	11:59	T-213	Yes	0-30	NA	7	0.0753	2199	58.9	95.8	0.02	Absent	No
4/10/12	16:02	T-214	Yes	2	NA	7	0.0777	1802	61.3	97.4	0.02	Pair Perched in nest	No
4/12/12	14:59	T-215	Yes	0-32	NA	7	0.0722	1916	67.6	100.1	0.04	Perched	No
4/14/12	9:00	T-216	Yes	7-17	NA	5	0.0175	3175	62	84.2	<0.01	Absent	No
4/16/12	14:59	T-217	Yes	0	NA	5	0.0170	690	68.7	102.7	<0.01	Absent	No
4/17/12	14:03	T-218	Yes	0-34	NA	7	0.0757	1838	64.6	97.9	0.025	Absent	No
4/23/12	13:58	T-219	Yes	10-37	NA	7	0.0576	2227	75.2	94.5	0.02	Perched	No
4/26/12	12:57	T-220	Yes	0-23	NA	8	0.0667	1059	77.4	113.5	<0.01	Absent	No
4/27/12	13:58	T-221	No	5-24	NA	8	0.0579	1062	69.9	105.6	0.085	Absent	No
4/28/12	13:02	T-222	No	0-24	NA	8	0.0641	1009	NA	NA	0.07	Perched	Yes

Date	Blast Time	Blast Number	Coverage Details				Blast Volume Metric (lbs/cubic foot)	Blast Distance to Nest (ft)	dBA	Peak dB	Seismic Impacts (in/sec PPV)	Eagle Activity	Disturbance
			Matted	Water Depth (ft)	Over Burden (ft)	Burden (ft)							
4/30/12	17:11	F-2	Yes	12-31	NA	0	0.0037	3490	64	82.8	<0.01	Absent	No
5/2/12	13:09	T-223	Yes	15-28	NA	8	0.0462	1007	79.4	109.3	0.065	Perched	Yes
5/4/12	11:03	T-224	No	14-23	NA	8	0.0657	1024	78.2	105.2	<0.01	Absent	No
5/5/12	11:06	T-225	No	27	NA	8	0.0506	1039	75.9	106.7	0.0456	Absent	No
5/8/12	12:03	T-226	No	12-23	NA	8	0.0555	1071	78.6	108.3	0.057	Absent	No
5/9/12	14:10	T-227	Yes	0	NA	3	0.0054	1610	60.1	84.1	<0.01	Absent	No
5/10/12	17:02	SW-1	No	NA	NA	2	NA	>3,500	NA	NA	<0.01	Absent	No
5/10/12	13:00	T-228	Yes	0	NA	3	0.0103	1,922	75.1	108.2	<0.01	Absent	No
5/12/12	9:30	SW-2	NA	NA	NA	NA	NA	>3,500	NA	NA	<0.01	Absent	No
5/14/12	11:00	T-229	Yes	0-14	NA	3	NA	1,645	58.9	82.2	<0.01	Absent	No
5/24/12	16:15	SW-3	No	NA	NA	2	NA	>3,500	NA	NA	<0.01	Absent	No
5/31/12	14:58	T-230	Yes	26	NA	6	0.0702	>3,500	NA	NA	<0.01	Absent	No
12/6/2012	14:00	T-337	Yes	20-25	6-10	5	0.2657	2165	NA	NA	NA	Absent	No
12/14/2012	14:10	T-338	No	20-25	7-20	6	0.0934	2251	NA	NA	NA	Absent	No
12/21/2012	12:56	T-339	No	20-25	10-24	5	0.1398	2364	64.1	94.5	NA	Absent	No
1/7/2013	13:59	T-340	No	10-15	7-11	5	0.0829	2363	60	80.2	NA	Pair Perched - One in nest and one out of nest	No
1/11/2013	13:29	T-341	Yes	0	0	6	0.0753	2646	56.0	73.6	NA	Perched out of nest	No
1/12/2013	10:57	T-342	No	10-15	0-2	5	0.1588	1735	69.2	98.3	NA	Perched	No
1/15/2013	12:12	T-343	Yes	0	0-3	6	0.0703	2673	58.5	91.4	NA	Perched	No
1/16/2013	12:12	T-344	Yes	0-4	0-2	6	0.0649	2676	57.8	80.8	NA	Absent	No
1/17/2013	12:15	T-345	Yes	0	0-2	6	0.0633	2541	69.7	97.4	NA	NA	No
1/18/2013	12:12	T-346	Yes	0	0-2	6	0.0294	2698	54.7	93.6	NA	Perched	No
1/19/2013	12:13	T-347	Yes	0	0	6	0.0596	2721	54.9	86.8	NA	Perched	No
1/21/2013	12:15	T-348	Yes	0-5	0	8	0.0552	2752	NA	NA	NA	Absent	No
1/23/2013	12:13	T-349	Yes	0	0	7	0.0781	2594	NA	NA	NA	Absent	No

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			Matted	Water Depth (ft)	Over Burden (ft)	Burden (ft)							
1/25/2013	12:14	T-350	Yes	0	0	7	0.0913	2620	52.3	77.6	NA	Absent	No
1/28/2013	12:15	T-351	Yes	0-1	0-12	7	0.0794	2659	57.3	87.8	NA	Absent	No
1/29/2013	12:16	T-352	Yes	0	0	7	0.0714	2692	55.0	89.0	NA	Absent	No
1/30/2013	12:58	T-353	Yes	0	0-10	7	0.0721	2540	62.6	86.7	NA	Perched	No
1/31/2013	12:12	T-354	Yes	15-20	0	7	0.0909	2716	67.1	102.5	NA	Perched	No
1/31/2013	15:00	T-355	No	25	5	6	0.1270	1664	70.7	106.8	NA	Absent	No
2/1/2013	12:12	T-356	Yes	0-20	0	7	0.0704	2512	67.2	103.5	NA	Absent	No
2/4/2013	13:31	T-357	Yes	10-20	0	8	0.0650	2482	59.1	94.7	NA	Absent	No
2/5/2013	12:17	T-358	Yes	0	0	6	0.0507	2780	NA	NA	NA	Perched	No
2/6/2013	16:01	T-359	Yes	0	8-15	8	0.0686	2454	60.5	89.6	NA	Absent	No
2/7/2013	11:03	T-360	Yes	0	0	6	0.1007	2814	NA	NA	NA	Perched	No
2/8/2013	16:00	T-361	Yes	0	0	7	0.1024	2753	NA	NA	NA	Perched	No
2/9/2013	13:59	T-362	Yes	0	0	6	0.0747	2774	NA	NA	NA	Incubating	No
2/11/2013	14:02	T-363	Yes	0	0-3	6	0.0750	2797	NA	NA	NA	Pair -Incubating and Perched	No
2/12/2013	14:58	T-364	No	3-25	10	6	0.0812	2287	62.6	93.4	NA	Pair - Incubating and Perched	No
2/13/2013	14:06	T-365	Yes	0	0	4	0.0404	2838	NA	NA	NA	Incubating	No
2/14/2013	14:16	T-366A&B	Yes	0-25	0-20	4-6	0.0494	2752	NA	NA	NA	Incubating	No
2/15/2013	11:59	T-367B	No	15-20	0-5	6	0.1564	1713	66.8	103	NA	Incubating	No
2/16/2013	12:10	T-368	Yes	0	0	4	0.0555	2868	59.3	88.5	NA	Incubating	No
2/18/2013	14:58	T-369	No	20	8	6	0.1037	2330	57.9	91.7	NA	Incubating	No
2/19/2013	14:02	T370A&B	Yes	0	0	6	0.0707	2753	NA	NA	NA	Incubating	No
2/20/2013	12:03	T-371	Yes	0	0	5	0.0540	2835	59.1	98.8	NA	Incubating	No
2/21/2013	10:00	T-372	Yes	0	0	4	0.0489	2852	NA	NA	NA	Incubating	No
2/21/2013	16:04	T-373	Yes	0	0	4	0.0505	2869	NA	NA	NA	Incubating	No
2/22/2013	12:01	T-375	No	10	5	6	0.1640	1381	61.3	98.6	0.06	Incubating	No
2/22/2013	12:01	T-374	Yes	0	0	5	0.0535	2835	NA	NA	NA	Incubating	No

Date	Blast Time	Blast Number	Coverage Details				Blast Volume Metric (lbs/cubic foot)	Blast Distance to Nest (ft)	dBA	Peak dB	Seismic Impacts (in/sec PPV)	Eagle Activity	Disturbance
			Matted	Water Depth (ft)	Over Burden (ft)	Burden (ft)							
2/23/2013	11:15	T-376	Yes	0	0	4	0.0477	2854	68.2	99.2	NA	Incubating	No
2/24/2013	16:04	T-377	Yes	0	0-2	6	0.1113	2780	64.9	97.1	NA	Incubating	No
2/25/2013	11:04	T-378	Yes	0	0	6	0.0706	2808	NA	NA	NA	Incubating	No
2/25/2013	16:00	T-379	No	22	10	6	0.1151	2256	NA	NA	0.065	Incubating	No
2/26/2013	12:04	T-380	Yes	0	0	6	0.0581	2823	NA	NA	NA	Incubating	No
2/26/2013	17:36	T-381	No	10-20	5-8	6	0.1559	2167	NA	NA	NA	Incubating	No
2/27/2013	18:15	T-383	No	10-20	8	6	0.0998	1957	NA	NA	NA	Incubating	No
2/27/2013	15:16	T-382	Yes	0	0	6	0.0589	2842	NA	NA	NA	Incubating	No
2/28/2013	12:04	T-384	Yes	0	0	4	0.0477	2858	63.9	95.3	NA	Incubating	No
3/1/2013	14:03	T-385	Yes	0	0	4	0.0510	2858	57.7	82.7	NA	Incubating	No
3/2/2013	15:09	T-386	Yes	0	0	6	0.0646	2808	56.4	93.3	NA	Incubating	No
3/3/2013	12:19	T-387A&B	no	10-20	10-15	6	0.1183	1317	NA	NA	NA	Incubating	No
3/3/2013	17:06	T-388	Yes	0	0	4	0.0418	2858	NA	NA	NA	Incubating	No
3/5/2013	12:07	T-389	Yes	0	0	6	0.1163	2817	NA	NA	NA	Incubating	No
3/6/2013	10:59	FB-20	Yes	8	9	5	0.0358	3271	NA	NA	NA	Incubating	No
3/6/2013	15:59	FB-21	Yes	20	16	6	0.0975	3438	NA	NA	NA	Incubating	No
3/7/2013	12:58	FB-22	Yes	0	0	5	0.0369	3261	NA	NA	NA	Incubating	No
3/8/2013	15:54	FB-23	Yes	2-4	0-2	6	0.0336	3280	NA	NA	NA	Incubating	No
3/9/2013	14:12	FB-24	Yes	20-25	10-15	6	0.1081	3341	NA	NA	NA	Incubating	No
3/14/2013	13:10	T-390	Yes	10-20	0-15	8	0.0712	2643	70.2	100.7	NA	Incubating	No
3/15/2013	11:59	FB-25	Yes	20-30	12-14	6	0.1318	3409	58.2	82.8	NA	Incubating	No
3/15/2013	17:51	T-391	Yes	15-20	0-10	8	0.0527	2662	57.5	95.8	NA	Incubating	No
3/17/2013	15:12	T-392A & T-392B	Yes	20-25	0-15	8	0.0576	2625	57.6	92.6	NA	Incubating	No
3/18/2013	17:43	T-393	Yes	20-25	0-10	8	0.0726	2723	55.5	89.8	NA	Incubating	No
3/19/2013	18:01	T-394 &T-395	Yes	20-25	0-12	8	0.0645	2607	60.7	91.8	NA	Pair - Incubating and Perched	No

Date	Blast Time	Blast Number	Coverage Details				Blast Volume Metric (lbs/cubic foot)	Blast Distance to Nest (ft)	dBA	Peak dB	Seismic Impacts (in/sec PPV)	Eagle Activity	Disturbance
			Matted	Water Depth (ft)	Over Burden (ft)	Burden (ft)							
3/22/2013	18:25	T-396 & T-397A	Yes	20-35	0-10	7	0.0786	2578	61.4	92.2	NA	Pair - Incubating and Perched	No
3/23/2013	12:32	T-398	Yes	20-25	0-6	7	0.0900	2434	58.2	97.1	NA	Incubating	No
3/24/2013	14:53	T-399	Yes	25-30	0-10	7	0.0752	2522	54.0	88.9	NA	Incubating	No
3/26/2013	15:04	T-400	Yes	20-25	0-6	7	0.0742	2478	57.1	95.5	NA	Perched	No
3/27/2013	17:42	T-401	No	20-25	3-8	7	0.1013	2332	75.3	99	NA	Perched	No
3/29/2013	13:13	T-402	Yes	20-25	0-5	7	0.0624	2369	58.1	91.1	NA	Perched	No
4/2/2013	12:12	FB-26	Yes	20-25	0	1	0.0078	3327	54.4	83.6	NA	Incubating	No
4/4/2013	12:47	FB-27	Yes	20-25	0	1	0.0074	3478	59.6	82.1	NA	Incubating	No
4/5/2013	13:01	FB-28	Yes	10-15	4-10	7	0.0714	3318	53.8	90.7	NA	Nest Maintenance	No
4/8/2013	13:59	FB-29	Yes	20	14	6	0.1126	3388	52.8	81.8	NA	Perched	No
4/9/2013	16:55	FB-30	Yes	15-20	5-10	7	0.0799	3341	64.8	85.5	NA	Perched	No
4/11/2013	15:59	FB-31	Yes	20-25	10-15	7	0.0846	3371	51.8	75.2	NA	Perched	No
4/13/2013	12:30	FB-32	Yes	15-20	6-10	7	0.0903	3410	NA	NA	NA	Perched	No
4/15/2013	12:58	FB-33	Yes	15-20	7-11	7	0.0778	3499	NA	NA	NA	Perched	No
4/16/2013	13:02	FB-34	Yes	20-25	10-15	7	0.0905	3324	NA	NA	NA	Perched	No
4/17/2013	12:00	FB-35	Yes	20-25	7-15	7	0.1103	3467	NA	NA	NA	Perched	No
4/19/2013	13:00	FB-36	Yes	20	9	6	0.0995	3441	58.1	91.1	NA	Perched	No
4/20/2013	12:03	FB-37	Yes	20	13	6	0.0923	3421	88	109.2	NA	Perched	No
4/23/2013	14:59	FB-38	Yes	30-35	7-10	7	0.0903	3396	53.6	84.7	NA	Perched	No
4/24/2013	14:59	FB-39	Yes	20-25	8-10	7	0.1030	3334	57.9	81	NA	Perched	No
4/26/2013	16:17	FB-40	Yes	25-30	5-12	7	0.0774	3296	53.4	82.8	NA	Perched	No
5/1/2013	12:51	FB-41	Yes	20-25	5-9	5	0.1178	3288	55.1	74.2	NA	Perched	No
5/3/2013	15:03	FB-42	Yes	20-25	8-11	5	0.1233	3278	52.8	80.9	NA	Perched	No
5/9/2013	15:05	FB-43	Yes	20-25	10-20	5	0.0968	3250	49.6	80.9	NA	Perched	No
5/15/2013	18:44	CW-01	No	NA	NA	2.5	NA	3287	NA	NA	NA	Laying down in nest	No
5/16/2013	18:14	CW-02	No	NA	NA	2.5	NA	3277	NA	NA	NA	Perched	No
5/17/2013	18:15	CW-03	No	NA	NA	2.5	NA	3253	57.7	76.5	NA	Perched	No

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			Matted	Water Depth (ft)	Over Burden (ft)	Burden (ft)							
5/18/2013	18:14	CW-04	No	NA	NA	2.5	NA	3263	59.2	76.2	NA	Perched	No
5/20/2013	18:14	CW-05	No	NA	NA	2.5	NA	3253	50.4	77.8	NA	Perched	No
5/22/2013	18:00	FB-44	Yes	18-22	10-15	5	0.0664	3371	52.7	77.9	NA	Perched	No
6/5/2013	15:01	FB-45	Yes	25-30	20-22	5	0.1046	3385	NA	NA	NA	Laying down	No
6/10/2013	13:30	FB-46	Yes	20-30	15-18	5	0.0679	3420	NA	NA	NA	Perched	No
6/12/2013	11:57	FB-47	Yes	20-30	8-10	5	0.1188	3344	NA	NA	NA	Laying down	No
6/17/2013	15:55	TR-403	No	20-25	10-15	5	0.1314	1074	72.2	105.7	0.235	Absent	No
6/21/2013	12:00	TR-404	No	20-25	10-13	5	0.1369	1211	71.7	100.3	0.085	Absent	No