PINEDALE ANTICLINE PROJECT AREA SAGE GROUSE MONITORING

NOISE MONITORING REPORT

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1.0 Introduction

Appendix B of the Record of Decision (ROD), Final Supplemental Environmental Impact Statement for the Pinedale Anticline Oil and Gas Exploration and Development Project is a wildlife monitoring and mitigation matrix (BLM, 2008). This matrix lists species of concern in the Pinedale Anticline Project Area, and various criteria that require monitoring for each species. For sage grouse, the required monitoring criteria include noise levels at leks. The changes in background noise that the ROD specifies will be monitored are: "Noise levels demonstrated to impact peak lek use by male sage grouse and a concurrent change in the total average 2-year numbers of males attending development area lek complexes (the Mesa, Duke's Triangle, or Yellow Point lek complex), compared to the East Fork, Speedway, or Ryegrass reference lek complexes."

Appendix B of the ROD indicates that the specific change in noise monitoring that will require mitigation is as follows: "Decibel levels at the lek more than 10 dBA above background measured from the edge of the lek (2000 ROD, p.27), and a concurrent average of 30% decline in peak numbers of male birds over 2 years vs. reference area." The purpose of this noise monitoring project was to determine the noise levels at leks during the male attendance period from late March to mid May.

The 2000 ROD (BLM, 2000) contains a noise analysis study defining the basis for choosing the threshold noise levels found in the 2000 and 2008 EIS documents (BLM, 1999). This study defines the baseline noise level of 39 dBA based on a similar setting to that of EPA's category of "Farm in Valley". The noise study also acknowledges that local conditions such as traffic, topography, and wind can alter background noise conditions. It is important to note that development of the 39 dBA background level did not include collection or analysis of any noise data from the project area. Therefore, the relevance of the 39 dBA value should be evaluated with respect to noise data from the project area.

2.0 Noise Monitoring Tasks

Noise monitoring in the PAPA required three tasks:

- Selection of noise monitoring equipment,
- Deployment and maintenance of noise monitoring equipment, and
- Analysis of data and reporting results.

2.1. Selection of Noise Monitoring Equipment

Meeting the noise monitoring criteria of the ROD required equipment capable of measuring noise levels over an extended period. The RFP for sage grouse monitoring for this project specified using four noise monitors for two 10-day intervals during the strutting period. WGFD is responsible for identifying the approximately 16 current lek locations requiring monitoring.

The noise monitoring equipment selected for this project included four Quest - SoundPRO-DL-2-1/3-10 Class/Type 2 sound level meters. These hand held meters were used with weatherproof outdoor kits that fully enclose the sound meters and provide extended power. This included an a weatherproof case, rechargeable 12-volt car batteries, cables, and adapters. This allowed

deployment of the meters in adverse conditions for five to seven day periods between battery changes.

2.2. Deployment and Maintenance of Noise Monitoring Equipment

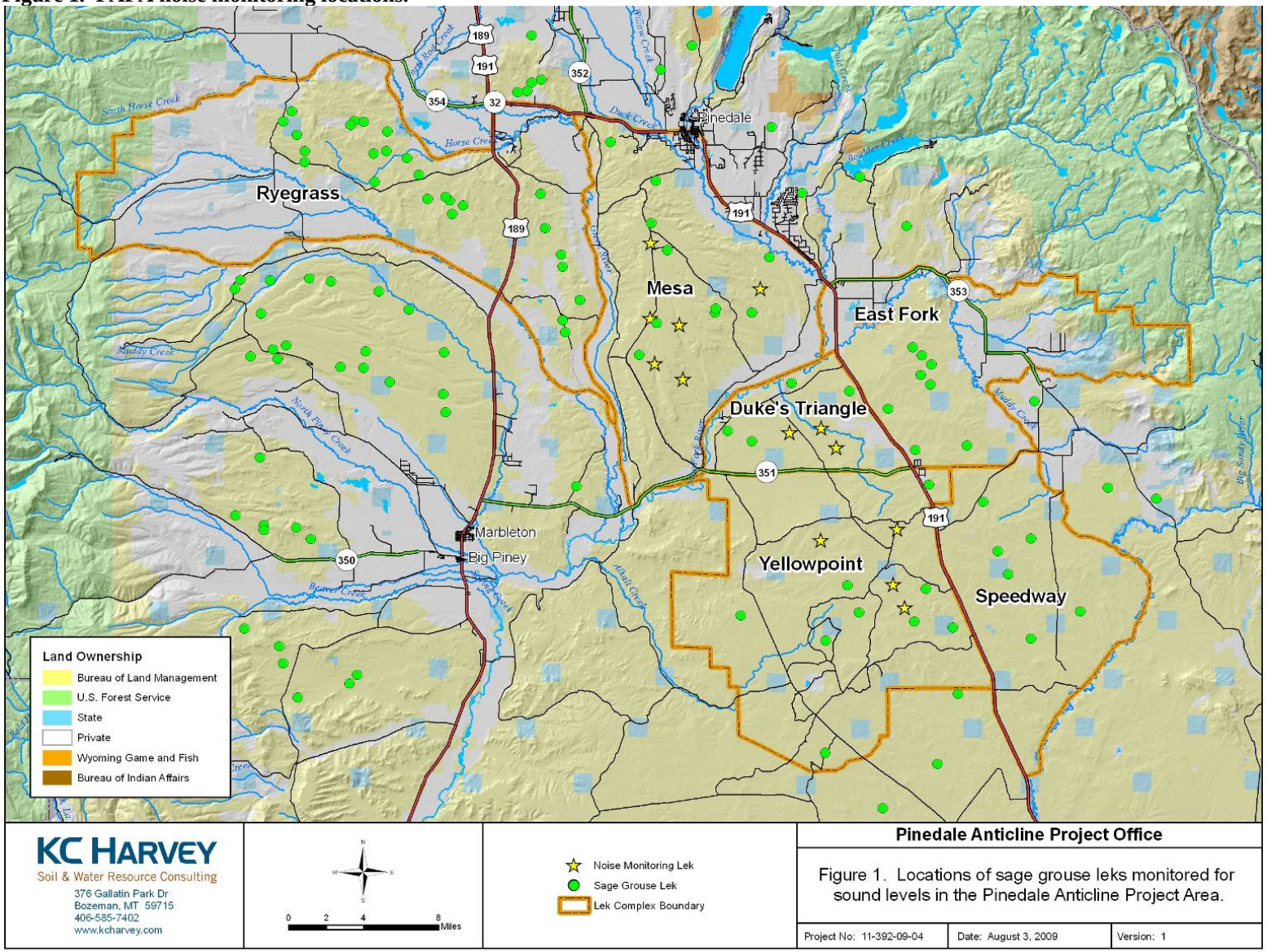
The noise monitoring took place between March 27 and May 17, 2009. Due to the late start of the project, it was not possible to monitor 16 locations for two 10-day periods each as requested in the RFP. Alternatively, WGFD approved a plan to monitor 11 leks for a 10-day and a 5-day monitoring period, and two leks for a single 10-day period.

Field crews that were concurrently tracking sage grouse nesting installed fully charged batteries at five to seven day intervals and moved the noise meters as required. Table 1 lists the leks and monitoring periods and Figure 1 displays their locations.

Table 1. Sage grouse leks monitored and monitoring period durations.

Complex	Lek	Duration
Mesa	Oil Fork Road	One 10-day and one 5-day period
	Mesa Road 3	One 10-day and one 5-day period
	Lovatt West	One 10-day and one 5-day period
	Two Buttes	One 10-day and one 5-day period
	Bloom Reservoir	One 10-day period
	Cat	One 10-day period
Duke's Triangle	Lower Sand Springs Draw	One 10-day and one 5-day period
	Little Fred	One 10-day and one 5-day period
	Big Fred	One 10-day and one 5-day period
Yellowpoint	South Rocks	One 10-day and one 5-day period
	The Rocks	One 10-day and one 5-day period
	Shelter Cabin Reservoir	One 10-day and one 5-day period
	Alkali Draw	One 10-day and one 5-day period

Figure 1. PAPA noise monitoring locations.



3.0 Results

Summary data analysis indicates that average measured noise levels are all below the 10 dBA above background threshold level of49 dBA (Table 2). Two locations had noise levels below baseline (Two Buttes and Mesa Road 3), and the highest level was 47.4 dBA at the Lovatt West lek. Median noise levels are also below 49 dBA level at all measured locations.

Field personnel maintaining the noise meters noticed that windy conditions increased noise levels significantly, sometimes to greater than 50 dBA. Since windy conditions are common in the area, wind noise may contribute significantly to the background noise levels. Figure 2 illustrates the distribution of noise levels at the Oil Fork Road lek. It shows that 24 dBA is the most common measurement recorded. Note that the mean noise level for this lek was approximately 43 dBA, and the median was 32 dBA. This suggests that noise levels are typically low, but punctuated by periods of increased noise, possibly from wind.

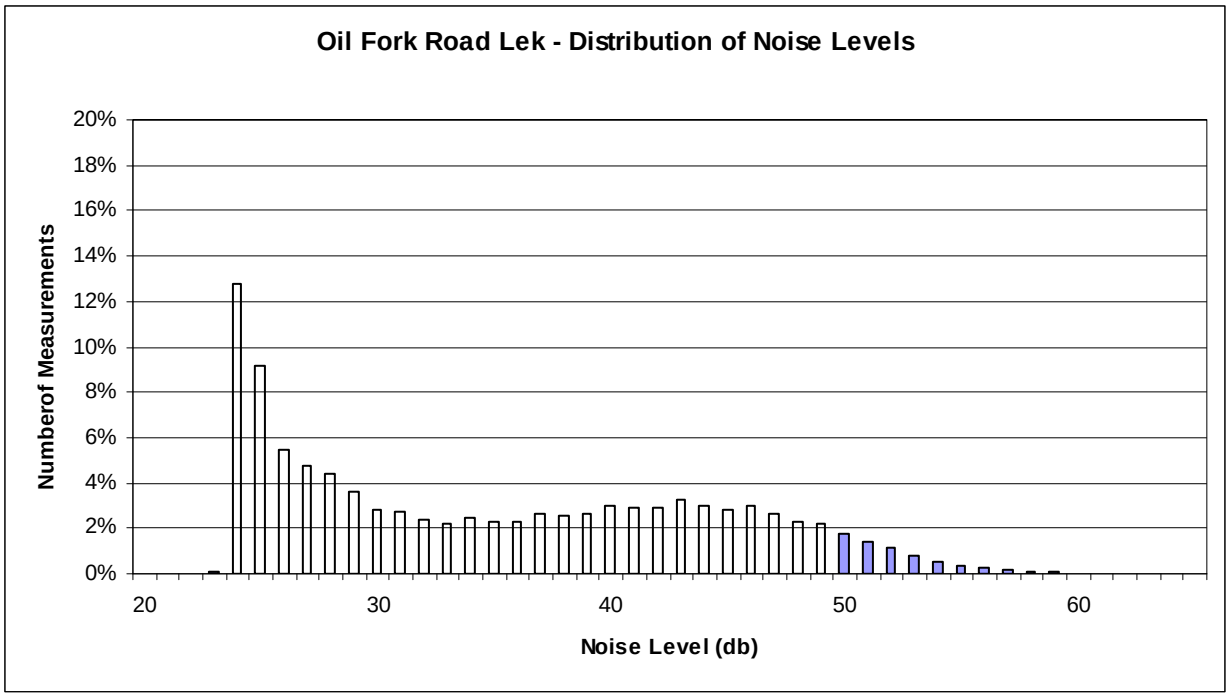


Figure 2. Distribution of noise level data collected at the Oil Fork Road lek, April 17-22, 2009.

Timing of noise levels is an important consideration. If variable noise levels during the course of a day are typical, threshold noise levels for monitoring should potentially be adjusted to compensate. To investigate noise level change with time of day, we took a closer look at data from four leks (Oil Fork Road, Little Fred, South Rocks, and the Rocks). Table 2 lists average noise levels for these leks during three time periods, early morning (12 AM-7 AM), daylight (7 AM-7 PM, and late evening (7 PM-12 AM). The time periods were selected based on natural breaks in the noise data.

Table 2. Summary noise monitoring results.

Complex	Lek	Average Noise Level (dBA)	Difference from 39 dBA Baseline	Median Noise Level (dBA)	Early AM (12AM- 7AM) Average Noise Level (dBA)	Daylight (7AM-7PM) Average Noise Level (dBA)	Late PM (7PM-12 AM) Average Noise Level (dBA)
Mesa	Oil Fork Road	42.8	3.8	33.0	34.5	53.1	51.4
	Mesa Road 3	32.5	-6.5	33.4			
	Lovatt West	47.4	8.4	33.2			
	Two Buttes	37.8	-1.2	35.6			
	Bloom Reservoir	41.9	2.9	29.2			
	Cat	44.3	5.3	28.1			
Duke's Triangle	Lower Sand Springs Draw	39.7	0.7	41.3			
	Little Fred	44.2	5.2	39.6	43.0	50.0	44.7
	Big Fred	42.4	3.4	33.5			
Yellowpoint	South Rocks	42.7	3.7	33.3	38.5	48.5	49.5
	The Rocks	44.4	5.4	33.1	43.3	50.2	42.6
	Shelter Cabin Reservoir	40.5	1.5	34.7			
	Alkali Draw	44.0	5.0	28.8			

In all cases, early morning hours (12AM-7AM) had the lowest measured average noise levels. Daylight hours (7 AM-7 PM) had the highest measured average noise levels at three of the four locations (Oil Fork Road, Little Fred, and the Rocks). At the South Rocks lek, measured average noise levels were high during the late evening period (7 PM-12 AM).

These results suggest that a single noise level threshold may not accurately reflect project area conditions. Background noise levels may be a function of:

- Time of day (and accompanying wind patterns),
- Weather,
- Local conditions such as topography, aspect, vegetation, and
- Development activity.

4.0 Recommendations

Noise monitoring results from 2009 indicate that threshold levels defined in the Record of Decision (ROD) documents from 2000 and 2008 for the Pinedale Anticline Project Area were not exceeded at monitored leks from late March to mid May. Observed variability in noise levels associated with windy conditions and at different times of day suggest that more data is required to develop local threshold noise levels.

Noise monitoring in 2010 should attempt to answer some of the unknowns in the noise conditions of the project area. This will determine if adjustment for the threshold noise levels defined in the ROD is warranted as part of adaptive management.

5.0 References Cited

BLM, 1999. Noise Analysis for the Pinedale Anticline Oil and Gas Exploration and Development Project, Sublette County, Wyoming. U.S. Bureau of Land Management, Pinedale Field Office, Pinedale, Wyoming. In cooperation with: U.S. Army Corps of Engineers, U.S. Forest Service, and the State of Wyoming.

BLM, 2000. Final Environmental Impact Statement for the Pinedale Anticline Oil and Gas Exploration and Development Project, Sublette County, Wyoming. U.S. Department of the Interior, Bureau of Land Management, Wyoming State Office. In cooperation with the U.S. Forest Service, U.S. Army Corps of Engineers, and the State of Wyoming.

BLM, 2008. Record of Decision for the Supplemental Environmental Impact Statement for the Pinedale Anticline Oil and Gas Exploration and Development Project Sublette County, Wyoming. U.S. Department of the Interior, Bureau of Land Management, Cheyenne, Wyoming.