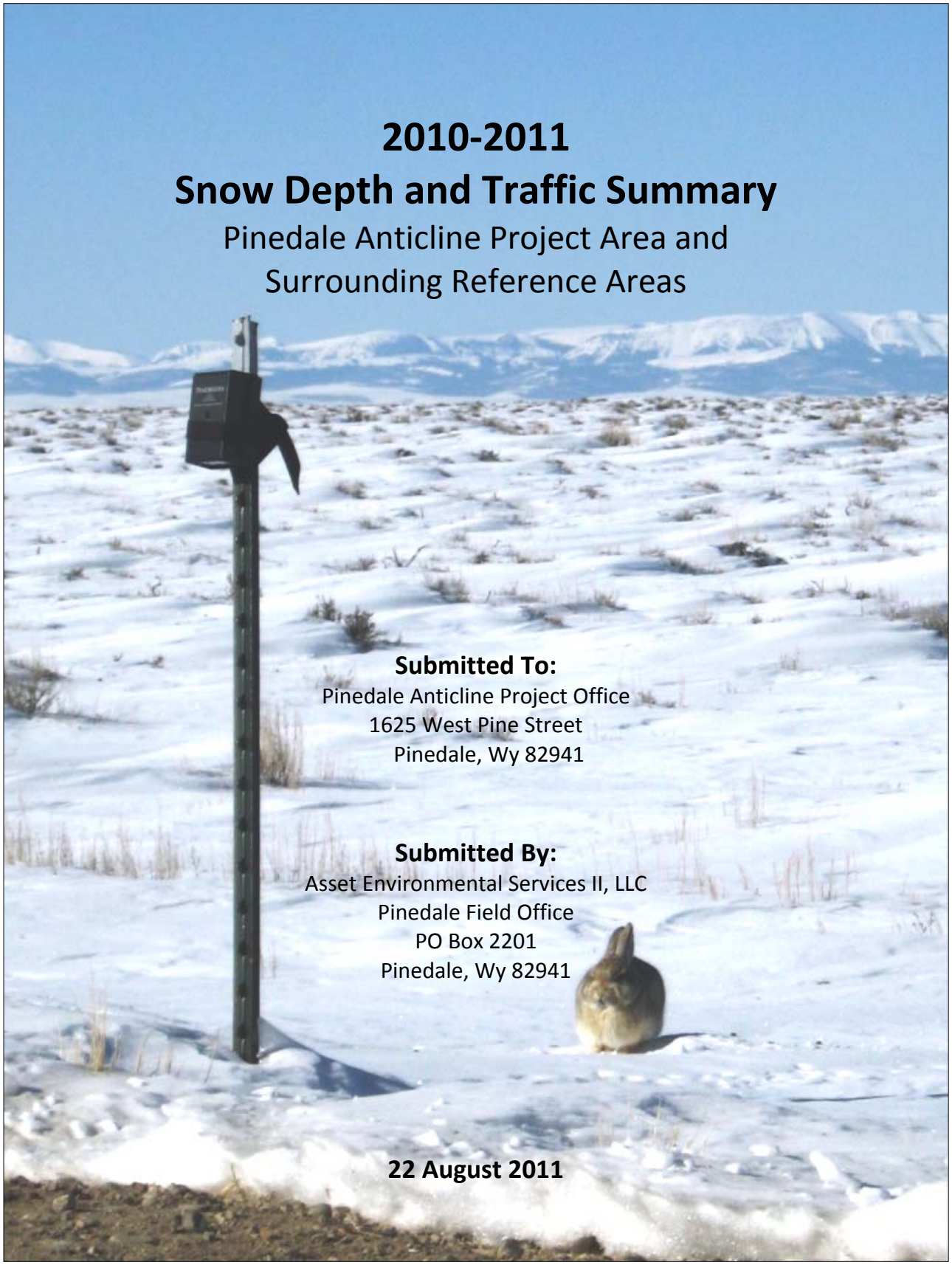

2010-2011
Snow Depth and Traffic Summary

Pinedale Anticline Project Area and Surrounding Reference Areas

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22 August 2011

Introduction

The 2008 Record of Decision for the Supplemental Environmental Impact Statement (SEIS) for the Pinedale Anticline Oil and Gas Exploration and Development Project Sublette County, Wyoming (ROD) requires monitoring of specific wildlife populations and habitat use following the Wildlife Monitoring and Mitigation Matrix (Matrix). The Pinedale Anticline Project Office (PAPO) selected qualified contractors to monitor wildlife in the Pinedale Anticline Project Area (PAPA) and adjacent reference areas. Evaluation of wildlife habitat use in the Pinedale Anticline Project Area (PAPA) was designed to include consideration for winter snow conditions and traffic volumes. Data collected for traffic volumes and snow depth may be included in analysis for all PAPA Matrix species being monitored and also provides the PAPO with an additional means to measure mitigation effectiveness. Analysis of mule deer and pronghorn habitat use includes a Resource Selection Function Model following that of Sawyer et al. (2006, 2007, 2009*a*, 2009*b*), where the animal is treated as the experimental unit and probability of use is estimated as a function of habitat variables with snow being one of those variables. The analysis for pronghorn habitat use incorporates winter severity (including snow depth), and response to selected development features that may vary depending on winter conditions. In October 2010, Asset Environmental Services II, L.L.C., (Asset) was contracted to quantitatively monitor and report traffic volumes within the PAPA and quantitatively monitor and report snow depth within the PAPA and associated reference areas (Attachment A). Asset performed monitoring from December 1, 2010 through May 2, 2011. Asset provided all monitoring data to the PAPO and Western EcoSystems, Inc. (contractor selected for pronghorn and mule deer monitoring in 2010) and coordinated with the PAPO in the selection of monitoring routes, specific monitoring locations and timing of data collection.

Traffic Monitoring Methods

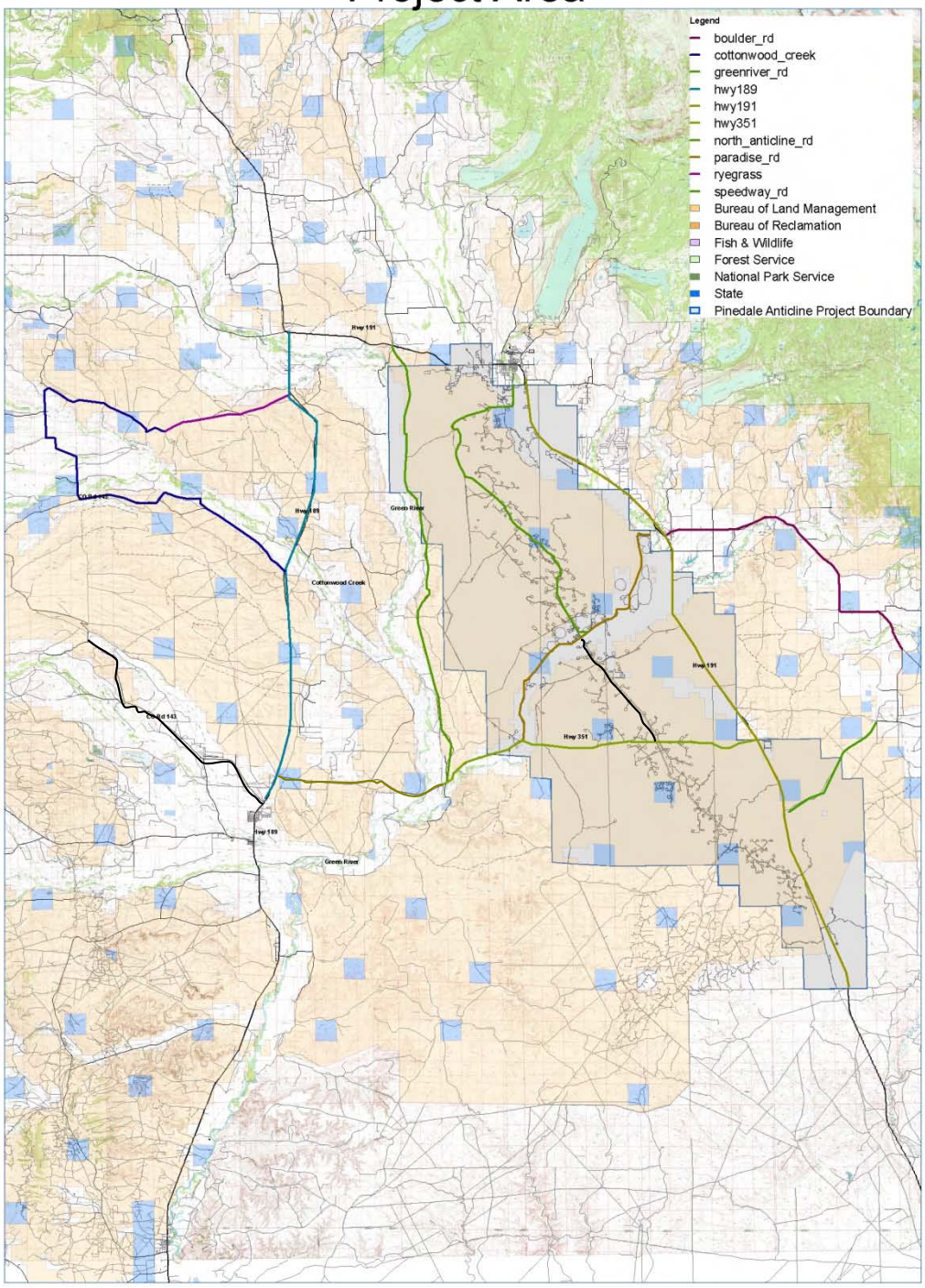
Asset installed Trailmaster® TM 1550 active infrared sensors similar to those utilized in previous monitoring efforts (for consistency with previous years' data). These sensors were installed in December 2010 to monitor traffic at 60 PAPO-selected locations within the PAPA. Traffic sensors remained active until May 2011 to monitor human activity levels throughout the field, recording hour and date for each event. Asset set each sensor at a sensitivity level which requires the infrared beam to be broken for at least 0.30 seconds before a hit would be recorded, and a delay between hits of approximately 6-8 seconds (Beckman et al., 2008). These settings reduce (but do not eliminate) the probability of recording multiple hits for trucks hauling trailers or hits caused by passing wildlife. Asset implemented a quality assurance/quality control (QA/QC) program to identify recorded events that may be caused by erroneous events such as snow plows, road graders, extreme weather, etc. which could cause numerous events (Nielson and Sawyer, 2006). Traffic monitoring equipment was downloaded every 7 -10 days and examined for QA/QC (sensor data was compared to visual occurrences to check for hit accuracy). A tabular summary of 2010-2011 traffic data can be reviewed in Attachment A. Traffic units with an abnormal number of events not related to increased industry activity may contain spurious events due to wildlife movement and/or increased snowplow activity. Some traffic units, due to the nature of their location could not be set at sensitivity levels high enough to counteract possible wildlife crossings. For example, higher speed limit areas require the sensitivity to be set low enough to capture passing vehicles. Additionally, data for days where certain sensors were temporarily incapacitated (due to damage, vandalism, theft, and/or snow cover) were estimated based on average counts per session.

Snow Monitoring Methods

Asset personnel installed fixed snow measuring devices in early December 2010 to monitor snow depth accumulations at 55 PAPO-approved locations within the PAPA and reference areas. Asset personnel monitored these devices every two (2) weeks, concurrently while downloading traffic counter data, from December 2010 through April 2011 (or until snow melt). Due to the amount of snow this winter, some devices measured snow through mid May 2011. Snow measuring devices were installed to include representations from the following aspects: North, South, East, West, Ridge, and Drainage. Asset personnel installed snow measurement sticks (secured via heavy anchoring devices) with large enough markings to be read through binoculars or a spotting scope from nearby access roads. Standard measurements were taken in a prescribed consistent manner. Measurements were recorded in tenths of feet and later converted to inches. Significant weather events and snow depth differences between visits were also recorded for each station. A summary of 2010-2011 snow data can be reviewed in Attachment A.

Attachment A

Snow Monitoring Routes and Traffic Monitoring Project Area



2010-2011 Monthly Traffic Summary

Stewart Point	Unit Number	January	February	March	April	May	season total per location
	40	19.7	28.3	41.1	52.5	13.1	154.7
	41	2.7	10.1	3.2	4.7	1.9	22.6
	50	14.4	43.3	44.6	32.2	65.0	199.5
	51	2.5	2.3	1.4	1.8	2.3	10.2
	52	1.5	1.7	10.8	8.3	10.6	32.9
	53	2.8	3.2	5.4	3.1	7.1	21.6
	54	0.0	0.0	0.0	0.4	2.6	2.9
	55	35.4	15.4	13.0	11.8	37.0	112.6
	56	3.1	4.6	7.7	2.3	2.1	19.8
	57	0.3	0.0	1.2	2.0	29.1	32.5
	58	1.8	3.1	3.3	1.9	2.2	12.4
	59	5.8	10.1	37.0	10.1	19.4	82.3
	60	34.0	17.2	21.2	20.2	23.6	116.2
TOTALS		124.0	139.3	189.9	151.3	215.8	
						Season Total	820.3

Development Area 1	Unit Number	January	February	March	April	May	season total per location
	20	40.9	48.8	45.5	47.6	58.6	241.5
	21	2.6	2.6	4.9	4.9	2.2	17.1
	22	11.7	12.1	2.7	62.3	12.8	101.6
	28	86.8	87.1	119.1	152.2	132.7	578.0
	29	1.7	2.6	1.9	3.3	3.3	12.8
	30	4.1	0.9	3.4	3.1	1.3	12.8
	31	3.3	2.1	4.1	2.6	2.8	14.8
	32	2.2	3.2	4.6	12.1	5.0	27.1
	33	3.0	2.6	2.9	2.7	1.5	12.7
	34	2.3	1.9	1.4	2.0	2.0	9.7
	35	4.5	3.8	4.7	3.9	1.1	18.1
	36	2.9	0.8	6.1	3.7	1.5	15.0
	37	2.9	4.0	3.9	13.1	46.0	70.0
	38	3.4	3.7	5.1	7.6	3.5	23.2
	39	6.9	8.1	10.7	8.1	10.3	44.1
TOTALS		179.0	184.5	221.0	329.1	284.5	
						Season Total per Development Area	1198.1

2010-2011 Monthly Traffic Summary

Development Area 2	Unit Number	January	February	March	April	May	season total per location
	1	10.1	5.3	5.4	7.8	3.6	32.1
	2	392.2	338.2	455.9	119.4	542.5	1848.3
	3	3.5	1.5	2.2	3.2	3.4	13.9
	4	7.3	26.6	66.5	89.3	32.5	222.1
	5	4.3	9.8	5.1	7.2	4.9	31.3
	6	6.2	5.1	7.2	6.3	4.1	28.9
	7	2.2	2.6	5.0	3.1	2.3	15.2
	8	50.6	56.5	144.7	100.5	152.4	504.7
	9	41.8	27.1	27.1	44.0	39.7	179.7
TOTALS		518.1	472.8	719.2	380.8	785.3	
						Season Total	2876.1

Development Area 3	Unit Number	January	February	March	April	May	season total per location
	10	65.8	44.7	62.8	41.7	53.6	268.6
	13	134.1	84.2	138.8	75.0	91.1	523.1
	14	91.1	131.1	139.9	142.9	116.5	621.4
	42	1.6	2.0	2.1	1.9	1.2	8.8
	43	1.9	2.1	2.0	1.8	1.0	8.8
TOTALS		294.4	264.1	345.6	263.2	263.4	
						Season Total	1430.7

Development Area 4	Unit Number	January	February	March	April	May	season total per location
	11	434.6	803.4	757.4	660.2	808.3	3463.9
	15	21.1	53.0	44.6	51.0	31.6	201.3
	16	74.2	84.3	83.7	87.1	226.9	556.2
	17	1.9	3.0	2.8	3.4	3.3	14.5
	18	4.0	3.9	3.9	2.5	1.8	16.2
	44	0.8	0.7	1.2	1.9	0.8	5.3
	45	13.6	31.0	26.1	16.4	6.6	93.7
	46	416.2	517.8	501.1	470.3	390.6	2295.9
	47	2.3	2.8	2.2	3.1	2.1	12.5
	48	4.6	4.8	4.0	3.4	2.4	19.1
	49	1.3	nul	nul	nul	nul	1.3
TOTALS		974.6	1504.7	1427.1	1299.3	1474.3	
						Season Total	6680.0

2010-2011 Monthly Traffic Summary

Development Area 5	Unit Number	January	February	March	April	May	season total per unit
	12	95.3	90.1	122.3	82.9	68.5	*459.2*
	19	1.6	1.9	1.5	1.4	0.9	*7.3*
	23	19.8	13.9	12.6	16.7	12.2	*75.1*
	24	3.5	3.0	0.3	0.4	2.3	*9.6*
	25	4.8	5.7	5.3	4.7	4.8	*25.2*
	26	8.4	8.7	11.1	5.5	6.6	*40.3*
	27	75.8	56.0	70.9	68.0	68.5	*339.3*
		209.3	179.2	224.0	179.7	163.7	
						Season Total	955.9

monthly total all locations		*4598.6*	*5489.0*	*6253.6*	*5206.9*	*6374.1*	*27922.2*

2010-2011 Monthly Snow Summary

(Measurements in inches)

	December	January	February	March	April	May
Boulder	6.56	10.65	12.04	15.65	2.85	0.00
Cottonwood Ryegrass	6.00	9.03	9.08	11.38	0.18	nul
Mesa Rd -Industrial Rd	6.13	7.96	11.12	13.97	3.92	0.00
East Green River Rd	5.01	7.62	7.92	10.40	0.00	nul
Hwy 189	5.85	9.75	10.24	14.23	0.00	nul
Hwy 191	8.49	11.36	13.01	16.74	2.40	0.00
Hwy 351	6.53	7.25	6.87	9.13	0.10	nul
Middle Crest Rd	5.94	10.40	14.10	18.12	0.00	nul
Paradise Rd	5.60	7.60	8.40	10.93	0.20	nul
Speedway	4.43	8.74	8.70	10.68	0.00	nul
Meadow Canyon Rd	5.74	9.71	9.34	12.70	0.00	nul