

APPENDIX A. SUMMARY OF AGENCY-PREScribed SAGE-GROUSE BUFFERS RELATIVE TO THE KEYSTONE XL PIPELINE PROJECT

NSOs (No Surface Occupancy), seasonal restrictions and buffers to protect sage-grouse have evolved rapidly in the last 10 years. This process has not been consistent among geographic areas, agencies, or even divisions within a single agency. However, there is growing recognition that sage-grouse should be managed at the landscape scale, regardless of socio-political boundaries (Knick and Connelly, In press). As a result, it appears that NSOs, seasonal restrictions and buffers for energy development are becoming standardized. The following discussions summarize sage-grouse NSOs, seasonal restrictions, and buffers specific to the Keystone XL Pipeline Project (Project).

BLM

The Project crosses land administered by three BLM Montana Field Offices (Malta, Glasgow, and Miles City). Land and wildlife management policies, including buffers for sage-grouse NSO and seasonal restrictions, are described in Resource Management Plans (RMP) written for each Field Office. The BLM is currently revising these RMPs, a process that occurs every 10 to 20 years. The next draft RMP for the Malta and Glasgow Field Offices (the HiLine RMP) is scheduled for release in fall 2010 while the next draft RMP for the Miles City Field Office (the Miles City RMP) was scheduled for release in spring 2010 but will probably be delayed until spring 2011 (BLM 2010d). The RMPs will be finalized approximately one year after release of the drafts. Until then, the policies, directives and constraints in the existing RMPs will remain in force, but may be modified through "RMP maintenance" actions or direction from the BLM state or national offices.

Existing sage-grouse NSO and seasonal restrictions, including buffers, for each BLM Field Office are:

- Miles City Field Office (Chapter 2, page 38, BLM 1995): "Surface disturbance (other than water developments and fences) will not be authorized within ¼ mile of sage grouse and sharp-tailed grouse leks. Disturbance will not be authorized within 2 miles of a lek from March 1 to June 15 each year to protect sage grouse and sharp-tailed grouse nesting habitat."
- Malta and Glasgow Field Offices (BLM 1992): The Wildlife and Right-of-Way discussions in the RMP do not specify NSO or seasonal restrictions for sage-grouse. However, constraints are listed on page 275 in Appendix B (Oil and Gas Leasing and Development) and include: "No Surface Occupancy for the lek (¼ acre) rather than No Surface Occupancy within ¼ mile of the lek; and seasonal restriction on exploration from March 15 to June 15 for a distance of ¼ mile from the lek rather than surface use prohibited from March 1 to June 15 within 2 miles of a lek."

More recently (March 5, 2010) the BLM issued Instruction Memorandum (IM) No. 2010-071 immediately after the USFWS declared sage-grouse an ESA candidate species. The BLM has used this IM to generally expand mitigation and avoidance measures for sage-grouse. The IM's "Actions Available for Protection of Sage-Grouse Populations" is oriented more toward wind and solar developments, electric transmission lines, and oil and gas wells than buried pipelines and includes:

- "In priority habitat and where supported by NEPA analysis, attach conditions to the approval of Applications for Permit to Drill (APD) that are more protective than the stipulations or restrictions identified in the applicable Resource Management Plan (RMP), as appropriate."

- “Screen new right-of-way applications to identify whether the wind or solar energy development or site testing and project area includes priority habitat. If so, alert the applicant as early as possible that the application may be denied or that terms and conditions may be imposed on the right-of-way grant to protect priority habitat as supported by NEPA analysis.”
- “Re-route proposed transmission projects to avoid priority habitat.”

MFWP

MFWP’s authority to establish conservation measures for sage-grouse is granted by Title 87, Chapter 5, Part 1 Montana Code Annotated (MCA):

“manage wildlife, fish, game, and nongame animals in a manner that prevents the need for listing under 87-5-107 or under the federal Endangered Species Act, 16 U.S.C. 1531, et seq.; and manage listed species, sensitive species, or a species that is a potential candidate for listing under 87-5-107 or under the federal Endangered Species Act, 16 U.S.C. 1531, et seq., in a manner that assists in the maintenance or recovery of those species” (87-1-201 (9)(a)(i), (ii)). The MFWP must also consider the following: “In maintaining or recovering a listed species, a sensitive species, or a species that is a potential candidate for listing, the department shall seek, to the fullest extent possible, to balance maintenance or recovery of those species with the social and economic impacts of species maintenance or recovery.” (87-1-201 (9)(b)).

MFWP is a signatory to the Management Plan and Conservation Strategies for Sage Grouse in Montana – Final (Montana Sage Grouse Work Group 2005). This document presents several NSO and seasonal restrictions as “conservation actions” to minimize impacts of energy development on sage-grouse:

- Allow no surface occupancy within 0.25 miles of an active lek. Use the best available information for siting structures near important breeding, brood-rearing, and winter habitat considering the following:
 - a) size of the structure(s),
 - b) life of the operation,
 - c) extent to which impacts would be minimized by topography, and
 - d) disturbance by noise and maintenance.
- Allow no surface use in nesting habitat within 2 miles of an active lek during a period of breeding and nesting—1 March –15 June.
- Restrict maintenance and related activities in sage grouse breeding/nesting complexes—1 March –15 June—between the hours of 4:00-8:00 am and 7:00-10:00 pm.
- Allow no surface use activities within crucial sage grouse wintering areas during 1 December-31 March.

However, since the publication of Montana Sage Grouse Work Group (2005) MFWP has expressed concern that NSO and seasonal restrictions presented in the plan are insufficient to effectively mitigate the effects of intensive energy development on sage-grouse (MFWP 2007; Colorado Department of Wildlife et al. 2008). These concerns are based on the results of several studies published between 2003 and 2006 that documented reductions in sage-grouse lek attendance, lek persistence, and nesting success as distances from energy development were reduced. MFWP’s (2007) recommendations for buffers were:

- Sage-grouse breeding activities: “utilize a minimum 1.6 km (1 mile) buffer and preferably a 3 km (1.8 mile) buffer of no surface occupancy around existing leks.”

- Sage-grouse nesting and brood rearing: “utilize a 6.9 km (4 mile) buffer around leks to protect nesting and brood rearing habitat for a minimum of 70% of the nesting hens associated with a lek from March 1 through June 30.”
- Sage-grouse winter habitat use: prior to field development, model potential winter habitat and once crucial areas are identified, prohibit development in those areas.”

It should be noted, however, that MFWP’s (2007) recommendations, like most of the studies on which they were based, were primarily oriented toward CBNG well drilling and field development, with its attendant system of closely spaced well pads, roads, small-diameter pipelines, transmission lines, comparatively high traffic volumes, etc. Also, MFWP’s 2007 NSO recommendations do not incorporate the considerations of topography, level of disturbance, or size and life of the operation discussed by Montana Sage Grouse Work Group (2005). While there have been studies of the effects of cross-country electric transmission lines on sage-grouse (e.g., Ellis 1984; Braun 1998; Braun et al. 2002) there apparently have been few or no studies of the effects of cross-country, solitary, large-diameter buried pipelines on sage-grouse; for example, cross-country large-diameter buried pipelines are not discussed in two recent summaries of energy development impacts to sage-grouse (USFWS 2010; Naugle et al. In press). While it is recognized that pipeline construction rights-of-way (ROW) may be a form of habitat fragmentation, the absence of roads/traffic and above-ground facilities over much of the ROW, and the select location of above-ground facilities such as pump stations with their attendant transmission lines along existing improved roads, present a different scenario than that of CBNG developments or cross-country transmission lines. ODFW (2009) recognized this difference to some degree when it recommended that “ground level structures (e.g., transfer stations, pipelines, buried power lines) should be sited >0.5 mile of the nearest occupied lek.” Similarly, Walker (2007) did not measure negative impacts to lek persistence from rarely used dirt roads. The Keystone XL Pipeline Project ROW would be less of an impact to sage-grouse leks than dirt roads since there will be no post-construction traffic along the majority of the ROW, and the ROW will be revegetated with species that are consistent with the surrounding environment and that can be used by sage-grouse.

USFWS


To date, the USFWS has not implemented regulatory buffers for sage-grouse, but has acknowledged buffers recommended by other agencies or programs (USFWS 2009, 2010). However, in its analysis of the impacts of the Bison Pipeline Project (which passes through southeast Montana) FERC (2009) stated: “The buffer zones, as recommended by FWS, include a 3-mile area of no disturbance around leks between March 1 through June 30 (and a 0.6-mile no surface occupancy year-round), and a 3-mile area of no disturbance around important winter habitat between November 15 and March 14.”

SDGFP

The SDGFP apparently has not recommended any NSO or seasonal restrictions, including buffers, to minimize impacts of energy development on sage-grouse (SDGFP 2008). However, South Dakota is part of sage-grouse Management Zone 1 and it is reasonable to assume that buffers recommended by Colorado Department of Wildlife et al. (2008) would be relevant to South Dakota leks. Further, the South Dakota Public Utilities Commission has conditioned their permit to require the Project to abide by buffers specified by the SDGFP and USFWS in South Dakota.

APPENDIX B. SAGEBRUSH CONSTRUCTION/RECLAMATION UNIT

**CONSTRUCTION/RECLAMATION UNIT SPECIFICATIONS: SAGE
KEYSTONE XL STEELE CITY**

UNIT NAME:	SAGEBRUSH	
UNIT CODE:	SAGE	
UNIT DESCRIPTION:	Sagebrush vegetation types on the Keystone XL Project are dominated by Wyoming big sagebrush (<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>) and/or silver sagebrush (<i>Artemisia cana</i>). Big sagebrush and/or silver sagebrush communities provide habitat for greater sage grouse and several other important wildlife species.	
UNIT LOCATION:	Sagebrush occurs in limited areas north of the Missouri River and is scattered south of the Missouri River throughout Montana and northwest South Dakota to the Moreau River in Spreads 1 to 5.	
UNIT GOALS:	<ul style="list-style-type: none"> • Re-establish vegetation with a substantial component of big or silver sagebrush, and native perennial grasses and forbs. • Maintain wildlife habitat, especially sage-grouse and livestock grazing production. • Complete all work to standards specified in the CMR Plan, contract documents and Details, applicable permits, easement descriptions, and Keystone’s satisfaction. 	
SPECIAL CONSIDERATIONS:	<ol style="list-style-type: none"> 1. Note that timing restrictions to avoid impacts to greater sage grouse occur throughout this Con/Rec Unit. See Alignment Sheets for timing restriction locations. 2. Mow vegetation rather than grade the soil where sagebrush occurs as practicable. Maintaining sagebrush root structures promotes sagebrush reestablishment. 3. Utilize trench and working side topsoil salvage to maintain sagebrush root structures on the spoil side where shown on Alignment Sheets or directed by Keystone. 4. Apply seed mix in two applications. Drill seed perennial grasses where slopes allow. Broadcast seed sagebrush and forbs. 	

CONSTRUCTION

ROW WIDTH:	Typically 110 feet.
CLEARING:	As specified in the CMR Plan. <u>ADDITIONAL REQUIREMENTS:</u> <ol style="list-style-type: none"> A. Mow or otherwise remove (e.g. hydroaxe) woody vegetation to ground level as directed by Keystone. B. Leave root crowns and root structures in place to the maximum extent practicable. C. Minimize clearing equipment on the ROW.
TOPSOIL SALVAGE:	As specified in the CMR Plan to maintain the topsoil resource and reclamation potential. <u>ADDITIONAL REQUIREMENTS:</u> <ol style="list-style-type: none"> A. Utilize trench and working salvage (Detail 54) on slopes less than 5% where shown on Alignment Sheets or as directed by Keystone. B. Where grading is necessary, salvage topsoil from entire area to be graded (Detail 53). C. Salvage topsoil horizon at depths as shown on Alignment Sheets or as directed by Keystone.
TRENCHING:	As specified in the CMR Plan. <u>ADDITIONAL REQUIREMENTS:</u> None unless otherwise directed by Keystone.
BACKFILL, DECOMPACTION AND REGRADING:	As specified in the CMR Plan to avoid slumping over the trench, relieve compaction, and match adjacent topography. <u>ADDITIONAL REQUIREMENTS:</u> <ol style="list-style-type: none"> A. Do not decompact areas where topsoil was not salvaged and sagebrush root structures remain in place unless directed by Keystone. B. Avoid scalping more than one inch of undisturbed topsoil on the spoil side when backfilling spoil and redistributing stockpiled topsoil.
TEMPORARY EROSION CONTROL:	As specified in the CMR Plan and authorized by Keystone to limit dust, prevent off-site sedimentation or erosion, and accelerated erosion on the ROW.

**CONSTRUCTION/RECLAMATION UNIT SPECIFICATIONS: SAGE
KEYSTONE XL STEELE CITY**

RECLAMATION

**SEEDBED
PREPARATION:**

As specified in the CMR Plan.

ADDITIONAL REQUIREMENTS:

- A. Dirt clods should typically be smaller than 4 inches diameter.
- B. Cultipack or roll ROW to firm topsoil prior to reseeding as authorized by Keystone.
- C. The seedbed should be firm enough so that the boot heel of an average adult penetrates the soil to a depth of approximately one-half inch.

**SEEDING METHOD,
SEED MIX AND RATE:**

As specified in the CMR Plan. See Detail 70 for a description of seeding procedures and approved equipment.

ADDITIONAL REQUIREMENTS:

- A. Seed will be provided by Keystone and managed by the Contractor. The Contractor will store seed a dry, secure location.
- B. The Contractor will store any unused seed in a dry, secure location and notify Keystone as to the seed's disposition. Keystone may elect to change the storage location.
- C. The seed mix will be broadcast-seeded in one application. Seeded areas will be dragged with a chain to lightly cover seed.
- D. Cover crop: If permanent seeding is delayed to the following growing season, QuickGuard will be seeded at a rate of 80 pounds per acre per Keystone direction.

**Sagebrush-1 Seed Mixture SAGE-1
(Spread 1)**

**BROADCAST
SEEDING RATE¹**

SCIENTIFIC NAME	COMMON NAME	VARIETY ²	Pounds	
			PLS/ Acre	PLS/ sq.ft.
GRASSES:				
Agropyron smithii*	Western wheatgrass	Rosana	5.00	- 12
Agropyron trachycaulum	Slender wheatgrass	Pryor	1.50	- 5
Koeleria cristata*	Prairie junegrass	VNS	0.10	- 5
Poa sandbergii*	Sandberg bluegrass	VNS, High Plains	0.40	- 8
Stipa comata	Needle-and-thread	VNS	2.50	- 6
Subtotal			9.50	- 36
FORBS:				
Achillea millefolium*	Yarrow	VNS, Great Northern	0.05	- 3
Dalea candida	White prairie clover	Antelope	0.25	- 2
Dalea purpurea	Purple prairie clover	Kaneb, Bismarck	0.25	- 1
Subtotal			0.10	- 8
SHRUBS:				
Artemisia cana*	Silver sagebrush	VNS	5.00	- 98
Ceratoides lanata*	Winterfat	Open Range	0.50	- 1
Subtotal			5.00	- 98
TOTAL			15.55	- 141

VNS: Variety not specified

¹Based on a broadcast seeding rate of 150 Pure Live Seed (PLS) per square foot.

²This may not be a complete list; other named varieties listed by USDA-NRCS in Montana and South Dakota are acceptable.

NOTE: Species or rates may be revised based on commercial availability or site-specific conditions.

*Identified as species associated with sage-grouse habitat in Bird and Schenk (2005).

**CONSTRUCTION/RECLAMATION UNIT SPECIFICATIONS: SAGE
KEYSTONE XL STEELE CITY**

Sagebrush-2 Seed Mixture SAGE-2 (Spreads 2, 3)			BROADCAST SEEDING RATE ¹	
SCIENTIFIC NAME	COMMON NAME	VARIETY ²	Pounds PLS/ Acre	PLS/ sq.ft.
GRASSES:				
Agropyron smithii*	Western wheatgrass	Rosana, Rodan	3.00	- 8
Agropyron spicatum	Bluebunch wheatgrass	Goldar	1.50	- 5
Agropyron trachycaulum	Slender wheatgrass	Pryor	1.00	- 3
Calamovilfa longifolia	Prairie sandreed	Goshen, Bowman	0.75	- 5
Koeleria cristata*	Prairie junegrass	VNS	0.10	- 5
Poa sandbergii*	Sandberg bluegrass	VNS, High Plains	0.25	- 5
Schizachyrium scoparium	Little bluestem	Badlands, Itasca	0.50	- 3
Stipa comata	Needle-and-thread	VNS	2.00	- 5
	Subtotal		9.40	- 39
FORBS:				
Achillea millefolium*	Yarrow	VNS, Great Northern	0.05	- 3
Dalea candida	White prairie clover	Antelope	0.25	- 2
Dalea purpurea	Purple prairie clover	Kaneb, Bismarck	0.25	- 1
	Subtotal		0.10	- 8
SHRUBS:				
Artemisia cana*	Silver sagebrush	VNS	2.00	- 39
Artemisia tridentata var. wyomingensis *	Wyoming big sagebrush	VNS	1.00	- 57
Ceratoides lanata*	Winterfat	Open Range	0.50	- 1
	Subtotal		3.00	- 96
	TOTAL		14.85	- 142

VNS: Variety not specified

¹Based on a broadcast seeding rate of 149 Pure Live Seed (PLS) per square foot.

²This may not be a complete list; other named varieties listed by USDA-NRCS in Montana and South Dakota are acceptable.

NOTE: Species or rates may be revised based on commercial availability or site-specific conditions.

*Identified as species associated with sage-grouse habitat in Bird and Schenk (2005).

Sagebrush-3 Seed Mixture SAGE-3 (Spreads 4, 5)			BROADCAST SEEDING RATE ¹	
SCIENTIFIC NAME	COMMON NAME	VARIETY ²	Pounds PLS/ Acre	PLS/ sq.ft.
GRASSES:				
Agropyron smithii*	Western wheatgrass	Rosana, Rodan, Walsh	2.50	- 6
Agropyron trachycaulum	Slender wheatgrass	Pryor	1.00	- 3
Buchloe dactyloides*	Buffalograss	Tatanka, Bismarck	3.00	- 4
Calamovilfa longifolia	Prairie sandreed	Goshen, Pronghorn	0.50	- 3
Distichlis spicata	Inland saltgrass	VNS	0.25	- 3
Koeleria cristata*	Prairie junegrass	VNS	0.10	- 5
Poa sandbergii*	Sandberg bluegrass	VNS	0.20	- 4
Schizachyrium scoparium	Little bluestem	Badlands, Itasca	0.50	- 3
Stipa comata	Needle-and-thread	VNS	2.00	- 5
Stipa viridula	Green needlegrass	Lodorm, AC Mallard Escovar	0.75	- 3
	Subtotal		10.90	- 39
FORBS:				
	Subtotal		0.10	- 8
SHRUBS:				
Artemisia cana*	Silver sagebrush	VNS	2.00	- 39
Artemisia tridentata var. wyomingensis *	Wyoming big sagebrush	VNS	1.00	- 57
	Subtotal		3.00	- 96
	TOTAL		15.00	- 147

**CONSTRUCTION/RECLAMATION UNIT SPECIFICATIONS: SAGE
KEYSTONE XL STEELE CITY**

	<p>VNS: Variety not specified ¹Based on a broadcast seeding rate of 149 Pure Live Seed (PLS) per square foot. ²This may not be a complete list; other named varieties listed by USDA-NRCS in Montana and South Dakota are acceptable. NOTE: Species or rates may be revised based on commercial availability or site-specific conditions. *Identified as species associated with Sage-grouse habitat in Bird and Schenk (2005).</p>
SEEDING DATE:	September 15 to May 15, depending on climatic conditions.
MULCHING AND MATTING:	All sagebrush will be mulched regardless of slope. Refer to Detail 52 for straw mulch. <u>ADDITIONAL REQUIREMENTS:</u> None unless otherwise directed by Keystone.
SLOPE AND TRENCH BREAKERS:	As specified in the CMR Plan at locations shown on Alignment Sheets or as directed by Keystone. Refer to Detail 3 for slope breakers and Detail 7 for trench breakers. <u>ADDITIONAL REQUIREMENTS:</u> None unless otherwise directed by Keystone.
MANAGEMENT PRACTICES	
<ol style="list-style-type: none"> 1. Provide for livestock and wildlife access across the trench at locations convenient to livestock and the landowner as practicable per the CMR Plan. 2. Construction and reclamation practices may be modified from those presented to suit site conditions or permit requirements with KXL approval. 3. Monitor revegetation and soil stability post construction. Areas of failed reclamation will be repaired. Sagebrush establishment in this Con/Rec Unit will be monitored on lands administered by the Bureau of Land Management (BLM). 4. Monitor and control noxious weeds as specified in the Montana and South Dakota Noxious Weed Management Plans. 	

APPENDIX C. PROPOSED REVEGETATION SUCCESS MONITORING PLAN FOR THE MONTANA PORTION OF THE KEYSTONE XL PIPELINE PROJECT.

1.0 INTRODUCTION

Post-construction reclamation monitoring is required on linear facilities that are regulated under the Major Facility Siting Act (MFSA). Reclamation monitoring standards are defined as follows:

“...in rangeland, coverage of desirable perennial plant species excluding, specifically, species recognized as noxious weeds, shall be 30% or more of that on adjacent rangeland of similar slope and topography the year following revegetation, and 90% or more of the coverage of adjacent rangeland of similar slope and topography within five years following revegetation; in forested land, revegetated land exclusive of the right-of-way or permanent roads, shall be planted with trees by the end of five years so that the approximate stand density of the adjacent forest will be attained at maturity” (Administrative Rules of Montana (ARM) 17.20.1902 (10)(a)(b)).

Different reclamation standards are allowed at landowner or land management agency request provided that it can be demonstrated to the Montana Department of Environmental Quality (MDEQ) that not reclaiming to the standards described above “...would not have adverse impacts on the public and other landowners” (ARM 17.20.1902 (10)(c)(d)).

In addition to the MFSA reclamation standard, the Keystone XL Oil Pipeline Project Draft Environmental Impact Statement (DEIS) requires monitoring sagebrush establishment on the ROW to insure that sagebrush “becomes established at densities similar to what occurs within adjacent sagebrush communities” (DOS 2010).

This post-construction reclamation monitoring plan describes monitoring procedures that will be utilized on the Keystone XL Pipeline Project (Project) in Montana to demonstrate achievement of the reclamation standards described in the Administrative Rules of Montana 17.20.1902 (10)(a) and (b), and the DEIS sagebrush monitoring requirement.

2.0 METHODS

Monitoring methods for the Project are designed to address MFSA reclamation standards and mitigation measures that have been specified in the DEIS. These methods have been used on several linear facilities in the West (Westech 1997, Westech 2001, Westech 2003, Westech 2010).

Qualified reclamation specialists will conduct semi-quantitative pedestrian surveys of the right-of-way and other project components in native rangeland and CRP pastures for five years following construction. Reclamation specialists will:

- assess general plant establishment and compare canopy cover to MFSA reclamation standards;
- monitor noxious weed populations;
- identify post-construction erosion;
- monitor sagebrush reestablishment within sagebrush stands; and
- determine the need for remedial revegetation, repair, or noxious weed treatment at specific sites.

Reclamation in all native rangeland and CRP pastures will be assessed within Reclamation Evaluation Areas (REA). Each REA is a section of right-of-way with relatively consistent vegetation, soils, and topography. There may be several REA within any given mile of right-of-way depending on the variety of topography or vegetation that is

crossed, although the minimum REA length is typically 0.25 mile. Stratifying the right-of-way into separate REA allows for a continuous comparison of reclamation within the right-of-way to the MFSA standard “of adjacent rangeland of similar slope and topography”, and is consistent with other semi-quantitative monitoring methods that are used to determine rangeland condition (Elzinga 1998; Pellant et al. 2005).

Vegetation data will be recorded as a range of values for each REA consistent with plotless methods that are used to evaluate vegetation development and condition (Mueller-Dombois and Ellenberg 1974). Paired monitoring plots will be used if necessary at specific locations. Soil stability will be assessed within each REA by looking for indicators of accelerated erosion such as rills, gullies, pedestaling, or other features on the right-of-way compared to adjacent areas. Particular attention will be paid to sensitive soils and other areas identified as having potential reclamation constraints.

The following specific vegetation and soil indicators will be assessed and were derived from interagency monitoring publications such as Measuring and Monitoring Plant Populations (Elzinga 1998), Interpreting Indicators of Rangeland Health (Pellant et al. 2005), and Rangeland Health (NRC 1994). These indicators provide a relatively rapid, repeatable system for assessing reclamation relative to the MFSA standard. Representative photos will also be taken.

- **Total Vegetation Cover:** Total plant canopy cover will be ocularly estimated as a range in cover on the ROW and adjacent area within each REA.

- **Vegetation Cover by Morphological Class:** Vegetation cover for each class will be ocularly estimated as a range in cover on the ROW and adjacent area within each REA. Morphological classes will include:
 - Native Perennial Grasses
 - Introduced Perennial Grasses
 - Introduced Annual Grasses
 - Native Perennial Forbs
 - Introduced Perennial Forbs
 - Native Annual/Biennial Forbs
 - Introduced Annual/Biennial Forbs
 - Subshrubs/Shrubs
 - Trees

- **Noxious Weeds:** Noxious weeds, if present, will be documented on separate noxious weed inventory forms within areas disturbed by the Project.

- **Sagebrush Density:** Keystone will implement the DEIS-required sagebrush density mitigation measure by monitoring sagebrush on the right-of-way and within adjacent sagebrush communities in areas that have been identified as a sagebrush Construction/Reclamation Unit. Silver sagebrush (*Artemisia cana*) and big sagebrush (*Artemisia tridentata* spp. *wyomingensis* or spp. *tridentata*) density will be recorded for all plants that are rooted within a 2-meter-wide belt transect. Transects will be established perpendicular to, and across the entire right-of-way, and will extend 55 feet into adjacent sagebrush stands on both side of the right-of-way. All shrubs that are rooted within the belt transect will be recorded by species and age class as follows: seedling (<1dm tall and not flowering), immature (>1 dm and not flowering), mature (flowering sagebrush plant). Transects will be located at representative locations within each sagebrush stand that is affected by the Project. A photo will be taken of each transect.

- **Accelerated Erosion:** Accelerated erosion within the right-of-way compared to adjacent areas will be monitored through the following indicators:
 - Rills
 - Water-flow patterns
 - Pedestals/terraces
 - Percent bare ground
 - Gullies
 - Wind-scoured blowouts or depressions
 - Litter movement;
 - Litter amount
 - Soil surface stability

3.0 REPORTING AND EVALUATING RECLAMATION SUCCESS

Keystone will submit an annual monitoring report to the MDEQ that details revegetation establishment and soil stability, and documents areas that meet the MFSA reclamation success standard. Monitoring will be discontinued when conditions within an REA achieve the reclamation success standard. This approach was used on the MFSA-regulated Express Pipeline between 1997 and 2001. For example, about 48 percent of native rangeland on the Express Pipeline right-of-way had achieved the reclamation success criteria within one to four years after construction (Westech 2001). Monitoring in these areas was discontinued the year after the success standard was achieved. An additional 46 percent of the Express Pipeline right-of-way had achieved the reclamation success standard five years after construction (Westech 2002). Consequently, reclamation monitoring and remediation in native rangeland were restricted to about 6 percent of the Express Pipeline right-of-way in Montana after 2001.

4.0 LITERATURE CITED

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APPENDIX D. FIGURES 1 TO 22

**APPENDIX E. GUIDE TO IMPLEMENTING CONSTRAINTS AND MITIGATION ON KNOWN SAGE-GROUSE LEKS,
KEYSTONE XL PIPELINE PROJECT.**

BASE GUIDE TO IMPLEMENTING SAGE-GROUSE CONSTRAINTS AND MITIGATION IS PRESENTED BELOW. GUIDES SPECIFIC TO EACH LEK FOLLOW.

- 1a. Is lek north of the Milk River^a? If YES go to 2; if NO go to 1b.
- 2a. Is lek “Confirmed Active^b” or “Unconfirmed^b” and active^c during spring surveys the year of pipeline construction? If YES go to 3; if NO go to 2b.
- 3a. Is lek ≤ 3 miles from Project? If YES go to 4; if NO go to 3b.
 - 4a. Are portions of Project within line-of-sight^d of lek? If YES implement CONSTRAINT I; if NO go to 4b.
 - 4b. Are portions of Project not within line-of-sight of lek? If YES go to 5.
 - 5a. Are portions of Project ≤ 1 mile from lek? If YES implement CONSTRAINT I; if NO go to 5b.
 - 5b. Are portions of Project > 1 mile from lek? If YES go to 6.
 6. Do portions of Project affect suitable nesting habitat^e? If YES implement CONSTRAINT I and MITIGATION I; if NO implement CONSTRAINT II and MITIGATION II.
NOTE: Recommend CONSTRAINT II rather than CONSTRAINT I since suitable nesting habitat quality is very marginal where crossed by the Project.
- 3b. Is lek > 3 miles from Project? If YES, PROCEED WITH CONSTRUCTION.
- 2b. Is lek “Confirmed Active” or “Unconfirmed” but not active during spring surveys the year of pipeline construction? If YES go to 7.
 7. Do portions of Project affect suitable nesting habitat^e within 3 miles of lek? If YES, PROCEED WITH CONSTRUCTION and implement MITIGATION I; if NO, PROCEED WITH CONSTRUCTION.
- 1b. Is lek south of the Milk River^a? If YES go to 8; if NO go to 1a.
 - 8a. Is lek “Confirmed Active^b” or “Unconfirmed^b” in Montana or “Priority^b” in South Dakota and active during spring surveys the year of pipeline construction? If YES go to 9; if NO go to 8b.
 - 9a. Is lek ≤ 3 miles from Project? If YES go to 10, if NO go to 9b.
 - 10a. Are portions of Project within line-of-sight^d of lek? If YES implement CONSTRAINT I; if NO go to 10b.
 - 10b. Are portions of Project not within line-of-sight of lek? If YES go to 11.
 - 11a. Are portions of Project ≤ 1 mile from lek? If YES implement CONSTRAINT I; if NO go to 11b.
 - 11b. Are portions of Project > 1 mile from lek? If YES go to 12.
 12. Do portions of Project affect suitable nesting habitat^f? If YES implement CONSTRAINT I and MITIGATION I; if NO implement CONSTRAINT II and MITIGATION II.
 - 9b. Is lek > 3 miles from Project? If YES, PROCEED WITH CONSTRUCTION.
 - 8b. Is lek “Confirmed Active” or “Unconfirmed” but not active during spring surveys the year of pipeline construction? If YES go to 13.
 13. Do portions of Project affect suitable nesting habitat^f within 3 miles of lek? If YES, PROCEED WITH CONSTRUCTION and implement MITIGATION I; if NO, PROCEED WITH CONSTRUCTION.

CONSTRAINT I. No construction from March 1 through June 15.

CONSTRAINT II. No construction from ½ hour before sunrise to 2 hours after sunrise from March 1 through June 15.

MITIGATION I. Mow suitable nesting habitat between September 1 and November 30 in the year prior to construction.
Implement sage-grouse nesting habitat Construction/Reclamation Unit.

MITIGATION II. Monitor lek when pipeline construction is within 3 miles. If displaying males that were present prior to construction are not present for 3 consecutive mornings after construction has commenced, confer with designated personnel.

^aSage-grouse habitat north of the Milk River (approximately MP 83 of the Keystone Pipeline Project route) differs from sage-grouse habitat described in Montana Sage Grouse Work Group (2005), primarily due to less total shrub cover and less sagebrush cover (Tack 2009). For the purposes of this key, all native rangeland along the pipeline route from MP 0 to MP 83 is potential sage-grouse habitat. South of the Milk River, sage-grouse habitats are defined by Montana Sage Grouse Work Group (2005).

^bConfirmed Active (MFWP): “data supports existence of lek. Supporting data is defined as: 1) minimum of 2 years with 2 or more males lekking on site (preferred); or b) 1 year with 2 or more males lekking on site followed with evidence of lekking (vegetation trampling, feathers and droppings) during the subsequent year;” Unconfirmed (MFWP): “single count with no subsequent survey or a reported lek without supporting survey data;” Priority (SD GFP): active in recent years.

^cFor the purposes of this key, “active” means that displaying males are observed on the lek on a minimum of one morning in the spring of pipeline construction.

^dFor the purposes of this key, the project is considered to be within a lek’s line-of-sight as determined through viewshed analysis using ESRI’s ArcGIS Spatial Analyst. Viewsheds were generated from the center of each lek based on a point 1 meter above the surface of USGS 1 arc-second NED.

^eNorth of the Milk River, sage-grouse nesting habitat is considered to be habitat with an overall shrub (not just sagebrush) cover of 15%. Sagebrush may comprise less than half the total overall shrub cover (Tack 2009). ^fSouth of the Milk River, sage-grouse nesting habitat is considered to be habitat with 15-31 percent sagebrush cover (Montana Sage Grouse Work Group 2005).

This is a guide to implementing constraints to minimize and mitigate the effects of the Keystone XL Pipeline Project on sage-grouse leks. **Highlighted** numbers indicate applicable conditions within 3 miles of this lek.

Lek ID: BLM

- 1a.** Is lek north of the Milk River^a? If YES go to 2; if NO go to 1b.
- 2a.** Is lek “Confirmed Active^b” or “Unconfirmed^b” and active^c during spring surveys the year of pipeline construction? If YES go to 3; if NO go to 2b.
- 3a.** Is lek ≤3 miles from Project? If YES go to 4; if NO go to 3b.
- 4a.** Are portions of Project within line-of-sight^d of lek? If YES implement CONSTRAINT I; if NO go to 4b.
- 4b.** Are portions of Project not within line-of-sight of lek? If YES go to 5.
- 5a.** Are portions of Project ≤1 mile from lek? If YES implement CONSTRAINT I; if NO go to 5b.
- 5b.** Are portions of Project >1 mile from lek? If YES go to 6.
- 6.** Do portions of Project affect suitable nesting habitat^e? If YES implement CONSTRAINT I and MITIGATION I; if NO implement CONSTRAINT II and MITIGATION II.
- 3b.** Is lek >3 miles from Project? If YES, PROCEED WITH CONSTRUCTION.
- 2b.** Is lek “Confirmed Active” or “Unconfirmed” but not active during spring surveys the year of pipeline construction? If YES go to 7.
- 7.** Do portions of Project affect suitable nesting habitat^e within 3 miles of lek? If YES, PROCEED WITH CONSTRUCTION and implement MITIGATION I; if NO, PROCEED WITH CONSTRUCTION.

- CONSTRAINT I. No construction from March 1 through June 15.
- CONSTRAINT II.** No construction from ½ hour before sunrise to 2 hours after sunrise from March 1 through June 15.
- MITIGATION I. Mow suitable nesting habitat between September 1 and November 30 in the year prior to construction. Implement sage-grouse nesting habitat Construction/Reclamation Unit.
- MITIGATION II.** Monitor lek when pipeline construction is within 3 miles. If displaying males that were present prior to construction are not present for 3 consecutive mornings after construction has commenced, confer with designated personnel.

^aSage-grouse habitat north of the Milk River (approximately MP 83 of the Keystone Pipeline Project route) differs from sage-grouse habitat described in Montana Sage Grouse Work Group (2005), primarily due to less total shrub cover and less sagebrush cover (Tack 2009). For the purposes of this key, all native rangeland along the pipeline route from MP 0 to MP 83 is potential sage-grouse habitat. South of the Milk River, sage-grouse habitats are defined by Montana Sage Grouse Work Group (2005).

^bConfirmed Active (MFWP): “data supports existence of lek. Supporting data is defined as: 1) minimum of 2 years with 2 or more males lekking on site (preferred); or b) 1 year with 2 or more males lekking on site followed with evidence of lekking (vegetation trampling, feathers and droppings) during the subsequent year;” Unconfirmed (MFWP): “single count with no subsequent survey or a reported lek without supporting survey data;” Priority (SD GFP): active in recent years.

^cFor the purposes of this key, “active” means that displaying males are observed on the lek on a minimum of one morning in the spring of pipeline construction.

^dFor the purposes of this key, the project is considered to be within a lek’s line-of-sight as determined through viewshed analysis using ESRI’s ArcGIS Spatial Analyst. Viewsheds were generated from the center of each lek based on a point 1 meter above the surface of USGS 1 arc-second NED.

^eNorth of the Milk River, sage-grouse nesting habitat is considered to be habitat with an overall shrub (not just sagebrush) cover of 15%. Sagebrush may comprise less than half the total overall shrub cover (Tack 2009).

^fSouth of the Milk River, sage-grouse nesting habitat is considered to be habitat with 15-31 percent sagebrush cover (Montana Sage Grouse Work Group 2005).

This is a guide to implementing constraints to minimize and mitigate the effects of the Keystone XL Pipeline Project on sage-grouse leks. **Highlighted** numbers indicate applicable conditions within 3 miles of this lek.

Lek ID: 744

- 1a. Is lek north of the Milk River^a? If YES go to 2; if NO go to 1b.
- 2a. Is lek “Confirmed Active^b” or “Unconfirmed^b” and active^c during spring surveys the year of pipeline construction? If YES go to 3; if NO go to 2b.
- 3a. Is lek ≤3 miles from Project? If YES go to 4; if NO go to 3b.
- 4a. Are portions of Project within line-of-sight^d of lek? If YES implement CONSTRAINT I; if NO go to 4b.
- 4b. Are portions of Project not within line-of-sight of lek? If YES go to 5.
- 5a. Are portions of Project ≤1 mile from lek? If YES implement CONSTRAINT I; if NO go to 5b.
- 5b. Are portions of Project >1 mile from lek? If YES go to 6.
- 6. Do portions of Project affect suitable nesting habitat^e? If YES implement CONSTRAINT I and MITIGATION I; if NO implement CONSTRAINT II and MITIGATION II.
- 3b. Is lek >3 miles from Project? If YES, PROCEED WITH CONSTRUCTION.
- 2b. Is lek “Confirmed Active” or “Unconfirmed” but not active during spring surveys the year of pipeline construction? If YES go to 7.
- 7. Do portions of Project affect suitable nesting habitat^e within 3 miles of lek? If YES, PROCEED WITH CONSTRUCTION and implement MITIGATION I; if NO, PROCEED WITH CONSTRUCTION.

- CONSTRAINT I.** No construction from March 1 through June 15.
- CONSTRAINT II.** No construction from ½ hour before sunrise to 2 hours after sunrise from March 1 through June 15.
- MITIGATION I.** Mow suitable nesting habitat between September 1 and November 30 in the year prior to construction. Implement sage-grouse nesting habitat Construction/Reclamation Unit.
- MITIGATION II.** Monitor lek when pipeline construction is within 3 miles. If displaying males that were present prior to construction are not present for 3 consecutive mornings after construction has commenced, confer with designated personnel.

^aSage-grouse habitat north of the Milk River (approximately MP 83 of the Keystone Pipeline Project route) differs from sage-grouse habitat described in Montana Sage Grouse Work Group (2005), primarily due to less total shrub cover and less sagebrush cover (Tack 2009). For the purposes of this key, all native rangeland along the pipeline route from MP 0 to MP 83 is potential sage-grouse habitat. South of the Milk River, sage-grouse habitats are defined by Montana Sage Grouse Work Group (2005).

^bConfirmed Active (MFWP): “data supports existence of lek. Supporting data is defined as: 1) minimum of 2 years with 2 or more males lekking on site (preferred); or b) 1 year with 2 or more males lekking on site followed with evidence of lekking (vegetation trampling, feathers and droppings) during the subsequent year;” Unconfirmed (MFWP): “single count with no subsequent survey or a reported lek without supporting survey data;” Priority (SD GFP): active in recent years.

^cFor the purposes of this key, “active” means that displaying males are observed on the lek on a minimum of one morning in the spring of pipeline construction.

^dFor the purposes of this key, the project is considered to be within a lek’s line-of-sight as determined through viewshed analysis using ESRI’s ArcGIS Spatial Analyst. Viewsheds were generated from the center of each lek based on a point 1 meter above the surface of USGS 1 arc-second NED.

^eNorth of the Milk River, sage-grouse nesting habitat is considered to be habitat with an overall shrub (not just sagebrush) cover of 15%. Sagebrush may comprise less than half the total overall shrub cover (Tack 2009).

^fSouth of the Milk River, sage-grouse nesting habitat is considered to be habitat with 15-31 percent sagebrush cover (Montana Sage Grouse Work Group 2005).

This is a guide to implementing constraints to minimize and mitigate the effects of the Keystone XL Pipeline Project on sage-grouse leks. **Highlighted** numbers indicate applicable conditions within 3 miles of this lek.

Lek ID: 746

- 1a. Is lek north of the Milk River^a? If YES go to 2; if NO go to 1b.
- 2a. Is lek “Confirmed Active^b” or “Unconfirmed^b” and active^c during spring surveys the year of pipeline construction? If YES go to 3; if NO go to 2b.
- 3a. Is lek ≤3 miles from Project? If YES go to 4; if NO go to 3b.
- 4a. Are portions of Project within line-of-sight^d of lek? If YES implement CONSTRAINT I; if NO go to 4b.
- 4b. Are portions of Project not within line-of-sight of lek? If YES go to 5.
- 5a. Are portions of Project ≤1 mile from lek? If YES implement CONSTRAINT I; if NO go to 5b.
- 5b. Are portions of Project >1 mile from lek? If YES go to 6.
- 6. Do portions of Project affect suitable nesting habitat^e? If YES implement CONSTRAINT I and MITIGATION I; if NO implement CONSTRAINT II and MITIGATION II.
- 3b. Is lek >3 miles from Project? If YES, PROCEED WITH CONSTRUCTION.
- 2b. Is lek “Confirmed Active” or “Unconfirmed” but not active during spring surveys the year of pipeline construction? If YES go to 7.
- 7. Do portions of Project affect suitable nesting habitat^e within 3 miles of lek? If YES, PROCEED WITH CONSTRUCTION and implement MITIGATION I; if NO, PROCEED WITH CONSTRUCTION.

- CONSTRAINT I. No construction from March 1 through June 15.
- CONSTRAINT II.** No construction from ½ hour before sunrise to 2 hours after sunrise from March 1 through June 15.
- MITIGATION I. Mow suitable nesting habitat between September 1 and November 30 in the year prior to construction. Implement sage-grouse nesting habitat Construction/Reclamation Unit.
- MITIGATION II.** Monitor lek when pipeline construction is within 3 miles. If displaying males that were present prior to construction are not present for 3 consecutive mornings after construction has commenced, confer with designated personnel.

^aSage-grouse habitat north of the Milk River (approximately MP 83 of the Keystone Pipeline Project route) differs from sage-grouse habitat described in Montana Sage Grouse Work Group (2005), primarily due to less total shrub cover and less sagebrush cover (Tack 2009). For the purposes of this key, all native rangeland along the pipeline route from MP 0 to MP 83 is potential sage-grouse habitat. South of the Milk River, sage-grouse habitats are defined by Montana Sage Grouse Work Group (2005).

^bConfirmed Active (MFWP): “data supports existence of lek. Supporting data is defined as: 1) minimum of 2 years with 2 or more males lekking on site (preferred); or b) 1 year with 2 or more males lekking on site followed with evidence of lekking (vegetation trampling, feathers and droppings) during the subsequent year;” Unconfirmed (MFWP): “single count with no subsequent survey or a reported lek without supporting survey data;” Priority (SD GFP): active in recent years.

^cFor the purposes of this key, “active” means that displaying males are observed on the lek on a minimum of one morning in the spring of pipeline construction.

^dFor the purposes of this key, the project is considered to be within a lek’s line-of-sight as determined through viewshed analysis using ESRI’s ArcGIS Spatial Analyst. Viewsheds were generated from the center of each lek based on a point 1 meter above the surface of USGS 1 arc-second NED.

^eNorth of the Milk River, sage-grouse nesting habitat is considered to be habitat with an overall shrub (not just sagebrush) cover of 15%. Sagebrush may comprise less than half the total overall shrub cover (Tack 2009).

^fSouth of the Milk River, sage-grouse nesting habitat is considered to be habitat with 15-31 percent sagebrush cover (Montana Sage Grouse Work Group 2005).

This is a guide to implementing constraints to minimize and mitigate the effects of the Keystone XL Pipeline Project on sage-grouse leks. **Highlighted** numbers indicate applicable conditions within 3 miles of this lek.

Lek ID: 753

- 1a. Is lek north of the Milk River^a? If YES go to 2; if NO go to 1b.
- 2a. Is lek “Confirmed Active^b” or “Unconfirmed^b” and active^c during spring surveys the year of pipeline construction? If YES go to 3; if NO go to 2b.
- 3a. Is lek ≤3 miles from Project? If YES go to 4; if NO go to 3b.
- 4a. Are portions of Project within line-of-sight^d of lek? If YES implement CONSTRAINT I; if NO go to 4b.
NOTE: Recommend CONSTRAINT II rather than CONSTRAINT I since the Project is on the edge of the 3-mile buffer and adjacent to an active gravel pit (Figure 4).
- 4b. Are portions of Project not within line-of-sight of lek? If YES go to 5.
 - 5a. Are portions of Project ≤1 mile from lek? If YES implement CONSTRAINT I; if NO go to 5b.
 - 5b. Are portions of Project >1 mile from lek? If YES go to 6.
 - 6. Do portions of Project affect suitable nesting habitat^e? If YES implement CONSTRAINT I and MITIGATION I; if NO implement CONSTRAINT II and MITIGATION II.
- 3b. Is lek >3 miles from Project? If YES, PROCEED WITH CONSTRUCTION.
- 2b. Is lek “Confirmed Active” or “Unconfirmed” but not active during spring surveys the year of pipeline construction? If YES go to 7.
- 7. Do portions of Project affect suitable nesting habitat^e within 3 miles of lek? If YES, PROCEED WITH CONSTRUCTION and implement MITIGATION I; if NO, PROCEED WITH CONSTRUCTION.

- CONSTRAINT I. No construction from March 1 through June 15.
- CONSTRAINT II.** No construction from ½ hour before sunrise to 2 hours after sunrise from March 1 through June 15.
- MITIGATION I. Mow suitable nesting habitat between September 1 and November 30 in the year prior to construction. Implement sage-grouse nesting habitat Construction/Reclamation Unit.
- MITIGATION II.** Monitor lek when pipeline construction is within 3 miles. If displaying males that were present prior to construction are not present for 3 consecutive mornings after construction has commenced, confer with designated personnel.

^aSage-grouse habitat north of the Milk River (approximately MP 83 of the Keystone Pipeline Project route) differs from sage-grouse habitat described in Montana Sage Grouse Work Group (2005), primarily due to less total shrub cover and less sagebrush cover (Tack 2009). For the purposes of this key, all native rangeland along the pipeline route from MP 0 to MP 83 is potential sage-grouse habitat. South of the Milk River, sage-grouse habitats are defined by Montana Sage Grouse Work Group (2005).

^bConfirmed Active (MFWP): “data supports existence of lek. Supporting data is defined as: 1) minimum of 2 years with 2 or more males lekking on site (preferred); or b) 1 year with 2 or more males lekking on site followed with evidence of lekking (vegetation trampling, feathers and droppings) during the subsequent year;” Unconfirmed (MFWP): “single count with no subsequent survey or a reported lek without supporting survey data;” Priority (SD GFP): active in recent years.

^cFor the purposes of this key, “active” means that displaying males are observed on the lek on a minimum of one morning in the spring of pipeline construction.

^dFor the purposes of this key, the project is considered to be within a lek’s line-of-sight as determined through viewshed analysis using ESRI’s ArcGIS Spatial Analyst. Viewsheds were generated from the center of each lek based on a point 1 meter above the surface of USGS 1 arc-second NED.

^eNorth of the Milk River, sage-grouse nesting habitat is considered to be habitat with an overall shrub (not just sagebrush) cover of 15%. Sagebrush may comprise less than half the total overall shrub cover (Tack 2009).

^fSouth of the Milk River, sage-grouse nesting habitat is considered to be habitat with 15-31 percent sagebrush cover (Montana Sage Grouse Work Group 2005).

This is a guide to implementing constraints to minimize and mitigate the effects of the Keystone XL Pipeline Project on sage-grouse leks. **Highlighted** numbers indicate applicable conditions within 3 miles of this lek.

Lek ID: 619

- 1b.** Is lek south of the Milk River^a? If YES go to 8; if NO go to 1a.
- 8a.** Is lek “Confirmed Active^b” or “Unconfirmed^b” in Montana or “Priority^b” in South Dakota and active during spring surveys the year of pipeline construction? If YES go to 9; if NO go to 8b.
- 9a.** Is lek ≤3 miles from Project? If YES go to 10, if NO go to 9b.
 - 10a. Are portions of Project within line-of-sight^d of lek? If YES implement CONSTRAINT I; if NO go to 10b.
 - 10b.** Are portions of Project not within line-of-sight of lek? If YES go to 11.
 - 11a. Are portions of Project ≤1 mile from lek? If YES implement CONSTRAINT I; if NO go to 11b.
 - 11b.** Are portions of Project >1 mile from lek? If YES go to 12.
 - 12.** Do portions of Project affect suitable nesting habitat^f? If YES implement CONSTRAINT I and MITIGATION I; if NO
 - implement CONSTRAINT II and MITIGATION II.
- 9b. Is lek >3 miles from Project? If YES, PROCEED WITH CONSTRUCTION.
- 8b. Is lek “Confirmed Active” or “Unconfirmed” but not active during spring surveys the year of pipeline construction? If YES go to 13.
- 13. Do portions of Project affect suitable nesting habitat^f within 3 miles of lek? If YES, PROCEED WITH CONSTRUCTION and implement MITIGATION I; if NO, PROCEED WITH CONSTRUCTION.

- CONSTRAINT I. No construction from March 1 through June 15.
- CONSTRAINT II.** No construction from ½ hour before sunrise to 2 hours after sunrise from March 1 through June 15.
- MITIGATION I. Mow suitable nesting habitat between September 1 and November 30 in the year prior to construction. Implement sage-grouse nesting habitat Construction/Reclamation Unit.
- MITIGATION II.** Monitor lek when pipeline construction is within 3 miles. If displaying males that were present prior to construction are not present for 3 consecutive mornings after construction has commenced, confer with designated personnel.

^aSage-grouse habitat north of the Milk River (approximately MP 83 of the Keystone Pipeline Project route) differs from sage-grouse habitat described in Montana Sage Grouse Work Group (2005), primarily due to less total shrub cover and less sagebrush cover (Tack 2009). For the purposes of this key, all native rangeland along the pipeline route from MP 0 to MP 83 is potential sage-grouse habitat. South of the Milk River, sage-grouse habitats are defined by Montana Sage Grouse Work Group (2005).

^bConfirmed Active (MFWP): “data supports existence of lek. Supporting data is defined as: 1) minimum of 2 years with 2 or more males lekking on site (preferred); or b) 1 year with 2 or more males lekking on site followed with evidence of lekking (vegetation trampling, feathers and droppings) during the subsequent year;” Unconfirmed (MFWP): “single count with no subsequent survey or a reported lek without supporting survey data;” Priority (SD GFP): active in recent years.

^cFor the purposes of this key, “active” means that displaying males are observed on the lek on a minimum of one morning in the spring of pipeline construction.

^dFor the purposes of this key, the project is considered to be within a lek’s line-of-sight as determined through viewshed analysis using ESRI’s ArcGIS Spatial Analyst. Viewsheds were generated from the center of each lek based on a point 1 meter above the surface of USGS 1 arc-second NED.

^eNorth of the Milk River, sage-grouse nesting habitat is considered to be habitat with an overall shrub (not just sagebrush) cover of 15%. Sagebrush may comprise less than half the total overall shrub cover (Tack 2009).

^fSouth of the Milk River, sage-grouse nesting habitat is considered to be habitat with 15-31 percent sagebrush cover (Montana Sage Grouse Work Group 2005).

This is a guide to implementing constraints to minimize and mitigate the effects of the Keystone XL Pipeline Project on sage-grouse leks. **Highlighted** numbers indicate applicable conditions within 3 miles of this lek.

Lek ID: 1739

- 1b.** Is lek south of the Milk River^a? If YES go to 8; if NO go to 1a.
- 8a.** Is lek “Confirmed Active^b” or “Unconfirmed^b” in Montana or “Priority^b” in South Dakota and active during spring surveys the year of pipeline construction? If YES go to 9; if NO go to 8b.
- 9a.** Is lek ≤3 miles from Project? If YES go to 10, if NO go to 9b.
 - 10a.** Are portions of Project within line-of-sight^d of lek? If YES implement CONSTRAINT I; if NO go to 10b.
 - 10b.** Are portions of Project not within line-of-sight of lek? If YES go to 11.
 - 11a.** Are portions of Project ≤1 mile from lek? If YES implement CONSTRAINT I; if NO go to 11b.
 - 11b.** Are portions of Project >1 mile from lek? If YES go to 12.
 - 12.** Do portions of Project affect suitable nesting habitat^f? If YES implement CONSTRAINT I and MITIGATION I; if NO
 - implement CONSTRAINT II and MITIGATION II.
- 9b.** Is lek >3 miles from Project? If YES, PROCEED WITH CONSTRUCTION.
- 8b.** Is lek “Confirmed Active” or “Unconfirmed” but not active during spring surveys the year of pipeline construction? If YES go to 13.
- 13.** Do portions of Project affect suitable nesting habitat^f within 3 miles of lek? If YES, PROCEED WITH CONSTRUCTION and implement MITIGATION I; if NO, PROCEED WITH CONSTRUCTION.

- CONSTRAINT I.** No construction from March 1 through June 15.
- CONSTRAINT II.** No construction from ½ hour before sunrise to 2 hours after sunrise from March 1 through June 15.
- MITIGATION I.** Mow suitable nesting habitat between September 1 and November 30 in the year prior to construction. Implement sage-grouse nesting habitat Construction/Reclamation Unit.
- MITIGATION II.** Monitor lek when pipeline construction is within 3 miles. If displaying males that were present prior to construction are not present for 3 consecutive mornings after construction has commenced, confer with designated personnel.

^aSage-grouse habitat north of the Milk River (approximately MP 83 of the Keystone Pipeline Project route) differs from sage-grouse habitat described in Montana Sage Grouse Work Group (2005), primarily due to less total shrub cover and less sagebrush cover (Tack 2009). For the purposes of this key, all native rangeland along the pipeline route from MP 0 to MP 83 is potential sage-grouse habitat. South of the Milk River, sage-grouse habitats are defined by Montana Sage Grouse Work Group (2005).

^bConfirmed Active (MFWP): “data supports existence of lek. Supporting data is defined as: 1) minimum of 2 years with 2 or more males lekking on site (preferred); or b) 1 year with 2 or more males lekking on site followed with evidence of lekking (vegetation trampling, feathers and droppings) during the subsequent year;” Unconfirmed (MFWP): “single count with no subsequent survey or a reported lek without supporting survey data;” Priority (SD GFP): active in recent years.

^cFor the purposes of this key, “active” means that displaying males are observed on the lek on a minimum of one morning in the spring of pipeline construction.

^dFor the purposes of this key, the project is considered to be within a lek’s line-of-sight as determined through viewshed analysis using ESRI’s ArcGIS Spatial Analyst. Viewsheds were generated from the center of each lek based on a point 1 meter above the surface of USGS 1 arc-second NED.

^eNorth of the Milk River, sage-grouse nesting habitat is considered to be habitat with an overall shrub (not just sagebrush) cover of 15%. Sagebrush may comprise less than half the total overall shrub cover (Tack 2009).

^fSouth of the Milk River, sage-grouse nesting habitat is considered to be habitat with 15-31 percent sagebrush cover (Montana Sage Grouse Work Group 2005).

This is a guide to implementing constraints to minimize and mitigate the effects of the Keystone XL Pipeline Project on sage-grouse leks. **Highlighted** numbers indicate applicable conditions within 3 miles of this lek.

Lek ID: 1894

- 1b.** Is lek south of the Milk River^a? If YES go to 8; if NO go to 1a.
- 8a.** Is lek “Confirmed Active^b” or “Unconfirmed^b” in Montana or “Priority^b” in South Dakota and active during spring surveys the year of pipeline construction? If YES go to 9; if NO go to 8b.
- 9a.** Is lek ≤3 miles from Project? If YES go to 10, if NO go to 9b.
- 10a.** Are portions of Project within line-of-sight^d of lek? If YES implement CONSTRAINT I; if NO go to 10b.
- 10b.** Are portions of Project not within line-of-sight of lek? If YES go to 11.
 - 11a.** Are portions of Project ≤1 mile from lek? If YES implement CONSTRAINT I; if NO go to 11b.
 - 11b.** Are portions of Project >1 mile from lek? If YES go to 12.
 - 12.** Do portions of Project affect suitable nesting habitat^f? If YES implement CONSTRAINT I and MITIGATION I; if NO
 - implement CONSTRAINT II and MITIGATION II.
- 9b.** Is lek >3 miles from Project? If YES, PROCEED WITH CONSTRUCTION.
- 8b.** Is lek “Confirmed Active” or “Unconfirmed” but not active during spring surveys the year of pipeline construction? If YES go to 13.
- 13.** Do portions of Project affect suitable nesting habitat^f within 3 miles of lek? If YES, PROCEED WITH CONSTRUCTION and implement MITIGATION I; if NO, PROCEED WITH CONSTRUCTION.

- CONSTRAINT I.** No construction from March 1 through June 15.
- CONSTRAINT II.** No construction from ½ hour before sunrise to 2 hours after sunrise from March 1 through June 15.
- MITIGATION I.** Mow suitable nesting habitat between September 1 and November 30 in the year prior to construction. Implement sage-grouse nesting habitat Construction/Reclamation Unit.
- MITIGATION II.** Monitor lek when pipeline construction is within 3 miles. If displaying males that were present prior to construction are not present for 3 consecutive mornings after construction has commenced, confer with designated personnel.

^aSage-grouse habitat north of the Milk River (approximately MP 83 of the Keystone Pipeline Project route) differs from sage-grouse habitat described in Montana Sage Grouse Work Group (2005), primarily due to less total shrub cover and less sagebrush cover (Tack 2009). For the purposes of this key, all native rangeland along the pipeline route from MP 0 to MP 83 is potential sage-grouse habitat. South of the Milk River, sage-grouse habitats are defined by Montana Sage Grouse Work Group (2005).

^bConfirmed Active (MFWP): “data supports existence of lek. Supporting data is defined as: 1) minimum of 2 years with 2 or more males lekking on site (preferred); or b) 1 year with 2 or more males lekking on site followed with evidence of lekking (vegetation trampling, feathers and droppings) during the subsequent year;” Unconfirmed (MFWP): “single count with no subsequent survey or a reported lek without supporting survey data;” Priority (SD GFP): active in recent years.

^cFor the purposes of this key, “active” means that displaying males are observed on the lek on a minimum of one morning in the spring of pipeline construction.

^dFor the purposes of this key, the project is considered to be within a lek’s line-of-sight as determined through viewshed analysis using ESRI’s ArcGIS Spatial Analyst. Viewsheds were generated from the center of each lek based on a point 1 meter above the surface of USGS 1 arc-second NED.

^eNorth of the Milk River, sage-grouse nesting habitat is considered to be habitat with an overall shrub (not just sagebrush) cover of 15%. Sagebrush may comprise less than half the total overall shrub cover (Tack 2009).

^fSouth of the Milk River, sage-grouse nesting habitat is considered to be habitat with 15-31 percent sagebrush cover (Montana Sage Grouse Work Group 2005).

This is a guide to implementing constraints to minimize and mitigate the effects of the Keystone XL Pipeline Project on sage-grouse leks. **Highlighted** numbers indicate applicable conditions within 3 miles of this lek.

Lek ID: 656

- 1b.** Is lek south of the Milk River^a? If YES go to 8; if NO go to 1a.
- 8a.** Is lek “Confirmed Active^b” or “Unconfirmed^b” in Montana or “Priority^b” in South Dakota and active during spring surveys the year of pipeline construction? If YES go to 9; if NO go to 8b.
- 9a.** Is lek ≤3 miles from Project? If YES go to 10, if NO go to 9b.
- 10a.** Are portions of Project within line-of-sight^d of lek? If YES implement CONSTRAINT I; if NO go to 10b.
- 10b.** Are portions of Project not within line-of-sight of lek? If YES go to 11.
- 11a.** Are portions of Project ≤1 mile from lek? If YES implement CONSTRAINT I; if NO go to 11b.
- 11b.** Are portions of Project >1 mile from lek? If YES go to 12.
- 12.** Do portions of Project affect suitable nesting habitat^f? If YES implement CONSTRAINT I and MITIGATION I; if NO
 implement CONSTRAINT II and MITIGATION II.
- 9b.** Is lek >3 miles from Project? If YES, PROCEED WITH CONSTRUCTION.
- 8b.** Is lek “Confirmed Active” or “Unconfirmed” but not active during spring surveys the year of pipeline construction? If YES go to 13.
- 13.** Do portions of Project affect suitable nesting habitat^f within 3 miles of lek? If YES, PROCEED WITH CONSTRUCTION and implement MITIGATION I; if NO, PROCEED WITH CONSTRUCTION.

- CONSTRAINT I.** No construction from March 1 through June 15.
- CONSTRAINT II.** No construction from ½ hour before sunrise to 2 hours after sunrise from March 1 through June 15.
- MITIGATION I.** Mow suitable nesting habitat between September 1 and November 30 in the year prior to construction. Implement sage-grouse nesting habitat Construction/Reclamation Unit.
- MITIGATION II.** Monitor lek when pipeline construction is within 3 miles. If displaying males that were present prior to construction are not present for 3 consecutive mornings after construction has commenced, confer with designated personnel.

^aSage-grouse habitat north of the Milk River (approximately MP 83 of the Keystone Pipeline Project route) differs from sage-grouse habitat described in Montana Sage Grouse Work Group (2005), primarily due to less total shrub cover and less sagebrush cover (Tack 2009). For the purposes of this key, all native rangeland along the pipeline route from MP 0 to MP 83 is potential sage-grouse habitat. South of the Milk River, sage-grouse habitats are defined by Montana Sage Grouse Work Group (2005).

^bConfirmed Active (MFWP): “data supports existence of lek. Supporting data is defined as: 1) minimum of 2 years with 2 or more males lekking on site (preferred); or b) 1 year with 2 or more males lekking on site followed with evidence of lekking (vegetation trampling, feathers and droppings) during the subsequent year;” Unconfirmed (MFWP): “single count with no subsequent survey or a reported lek without supporting survey data;” Priority (SD GFP): active in recent years.

^cFor the purposes of this key, “active” means that displaying males are observed on the lek on a minimum of one morning in the spring of pipeline construction.

^dFor the purposes of this key, the project is considered to be within a lek’s line-of-sight as determined through viewshed analysis using ESRI’s ArcGIS Spatial Analyst. Viewsheds were generated from the center of each lek based on a point 1 meter above the surface of USGS 1 arc-second NED.

^eNorth of the Milk River, sage-grouse nesting habitat is considered to be habitat with an overall shrub (not just sagebrush) cover of 15%. Sagebrush may comprise less than half the total overall shrub cover (Tack 2009).

^fSouth of the Milk River, sage-grouse nesting habitat is considered to be habitat with 15-31 percent sagebrush cover (Montana Sage Grouse Work Group 2005).

This is a guide to implementing constraints to minimize and mitigate the effects of the Keystone XL Pipeline Project on sage-grouse leks. **Highlighted** numbers indicate applicable conditions within 3 miles of this lek.

Lek ID: 1298

- 1b.** Is lek south of the Milk River^a? If YES go to 8; if NO go to 1a.
- 8a.** Is lek “Confirmed Active^b” or “Unconfirmed^b” in Montana or “Priority^b” in South Dakota and active during spring surveys the year of pipeline construction? If YES go to 9; if NO go to 8b.
- 9a.** Is lek ≤3 miles from Project? If YES go to 10, if NO go to 9b.
- 10a.** Are portions of Project within line-of-sight^d of lek? If YES implement CONSTRAINT I; if NO go to 10b.
- 10b.** Are portions of Project not within line-of-sight of lek? If YES go to 11.
- 11a.** Are portions of Project ≤1 mile from lek? If YES implement CONSTRAINT I; if NO go to 11b.
- 11b.** Are portions of Project >1 mile from lek? If YES go to 12.
- 12.** Do portions of Project affect suitable nesting habitat^f? If YES implement CONSTRAINT I and MITIGATION I; if NO
 - implement CONSTRAINT II and MITIGATION II.
- 9b.** Is lek >3 miles from Project? If YES, PROCEED WITH CONSTRUCTION.
- 8b.** Is lek “Confirmed Active” or “Unconfirmed” but not active during spring surveys the year of pipeline construction? If YES go to 13.
- 13.** Do portions of Project affect suitable nesting habitat^f within 3 miles of lek? If YES, PROCEED WITH CONSTRUCTION and implement MITIGATION I; if NO, PROCEED WITH CONSTRUCTION.

- CONSTRAINT I.** No construction from March 1 through June 15.
- CONSTRAINT II.** No construction from ½ hour before sunrise to 2 hours after sunrise from March 1 through June 15.
- MITIGATION I.** Mow suitable nesting habitat between September 1 and November 30 in the year prior to construction. Implement sage-grouse nesting habitat Construction/Reclamation Unit.
- MITIGATION II.** Monitor lek when pipeline construction is within 3 miles. If displaying males that were present prior to construction are not present for 3 consecutive mornings after construction has commenced, confer with designated personnel.

^aSage-grouse habitat north of the Milk River (approximately MP 83 of the Keystone Pipeline Project route) differs from sage-grouse habitat described in Montana Sage Grouse Work Group (2005), primarily due to less total shrub cover and less sagebrush cover (Tack 2009). For the purposes of this key, all native rangeland along the pipeline route from MP 0 to MP 83 is potential sage-grouse habitat. South of the Milk River, sage-grouse habitats are defined by Montana Sage Grouse Work Group (2005).

^bConfirmed Active (MFWP): “data supports existence of lek. Supporting data is defined as: 1) minimum of 2 years with 2 or more males lekking on site (preferred); or b) 1 year with 2 or more males lekking on site followed with evidence of lekking (vegetation trampling, feathers and droppings) during the subsequent year;” Unconfirmed (MFWP): “single count with no subsequent survey or a reported lek without supporting survey data;” Priority (SD GFP): active in recent years.

^cFor the purposes of this key, “active” means that displaying males are observed on the lek on a minimum of one morning in the spring of pipeline construction.

^dFor the purposes of this key, the project is considered to be within a lek’s line-of-sight as determined through viewshed analysis using ESRI’s ArcGIS Spatial Analyst. Viewsheds were generated from the center of each lek based on a point 1 meter above the surface of USGS 1 arc-second NED.

^eNorth of the Milk River, sage-grouse nesting habitat is considered to be habitat with an overall shrub (not just sagebrush) cover of 15%. Sagebrush may comprise less than half the total overall shrub cover (Tack 2009).

^fSouth of the Milk River, sage-grouse nesting habitat is considered to be habitat with 15-31 percent sagebrush cover (Montana Sage Grouse Work Group 2005).

This is a guide to implementing constraints to minimize and mitigate the effects of the Keystone XL Pipeline Project on sage-grouse leks. **Highlighted** numbers indicate applicable conditions within 3 miles of this lek.

Lek ID: 658

- 1b.** Is lek south of the Milk River^a? If YES go to 8; if NO go to 1a.
- 8a.** Is lek “Confirmed Active^b” or “Unconfirmed^b” in Montana or “Priority^b” in South Dakota and active during spring surveys the year of pipeline construction? If YES go to 9; if NO go to 8b.
- 9a.** Is lek ≤3 miles from Project? If YES go to 10, if NO go to 9b.
 - 10a. Are portions of Project within line-of-sight^d of lek? If YES implement CONSTRAINT I; if NO go to 10b.
 - 10b.** Are portions of Project not within line-of-sight of lek? If YES go to 11.
 - 11a. Are portions of Project ≤1 mile from lek? If YES implement CONSTRAINT I; if NO go to 11b.
 - 11b.** Are portions of Project >1 mile from lek? If YES go to 12.
 - 12.** Do portions of Project affect suitable nesting habitat^f? If YES implement CONSTRAINT I and MITIGATION I; if NO
 - implement CONSTRAINT II and MITIGATION II.
- 9b. Is lek >3 miles from Project? If YES, PROCEED WITH CONSTRUCTION.
- 8b. Is lek “Confirmed Active” or “Unconfirmed” but not active during spring surveys the year of pipeline construction? If YES go to 13.
- 13. Do portions of Project affect suitable nesting habitat^f within 3 miles of lek? If YES, PROCEED WITH CONSTRUCTION and implement MITIGATION I; if NO, PROCEED WITH CONSTRUCTION.

- CONSTRAINT I.** No construction from March 1 through June 15.
- CONSTRAINT II.** No construction from ½ hour before sunrise to 2 hours after sunrise from March 1 through June 15.
- MITIGATION I.** Mow suitable nesting habitat between September 1 and November 30 in the year prior to construction. Implement sage-grouse nesting habitat Construction/Reclamation Unit.
- MITIGATION II.** Monitor lek when pipeline construction is within 3 miles. If displaying males that were present prior to construction are not present for 3 consecutive mornings after construction has commenced, confer with designated personnel.

^aSage-grouse habitat north of the Milk River (approximately MP 83 of the Keystone Pipeline Project route) differs from sage-grouse habitat described in Montana Sage Grouse Work Group (2005), primarily due to less total shrub cover and less sagebrush cover (Tack 2009). For the purposes of this key, all native rangeland along the pipeline route from MP 0 to MP 83 is potential sage-grouse habitat. South of the Milk River, sage-grouse habitats are defined by Montana Sage Grouse Work Group (2005).

^bConfirmed Active (MFWP): “data supports existence of lek. Supporting data is defined as: 1) minimum of 2 years with 2 or more males lekking on site (preferred); or b) 1 year with 2 or more males lekking on site followed with evidence of lekking (vegetation trampling, feathers and droppings) during the subsequent year;” Unconfirmed (MFWP): “single count with no subsequent survey or a reported lek without supporting survey data;” Priority (SD GFP): active in recent years.

^cFor the purposes of this key, “active” means that displaying males are observed on the lek on a minimum of one morning in the spring of pipeline construction.

^dFor the purposes of this key, the project is considered to be within a lek’s line-of-sight as determined through viewshed analysis using ESRI’s ArcGIS Spatial Analyst. Viewsheds were generated from the center of each lek based on a point 1 meter above the surface of USGS 1 arc-second NED.

^eNorth of the Milk River, sage-grouse nesting habitat is considered to be habitat with an overall shrub (not just sagebrush) cover of 15%. Sagebrush may comprise less than half the total overall shrub cover (Tack 2009).

^fSouth of the Milk River, sage-grouse nesting habitat is considered to be habitat with 15-31 percent sagebrush cover (Montana Sage Grouse Work Group 2005).

This is a guide to implementing constraints to minimize and mitigate the effects of the Keystone XL Pipeline Project on sage-grouse leks. **Highlighted** numbers indicate applicable conditions within 3 miles of this lek.

Lek ID: 1781

- 1b.** Is lek south of the Milk River^a? If YES go to 8; if NO go to 1a.
- 8a.** Is lek “Confirmed Active^b” or “Unconfirmed^b” in Montana or “Priority^b” in South Dakota and active during spring surveys the year of pipeline construction? If YES go to 9; if NO go to 8b.
- 9a.** Is lek ≤3 miles from Project? If YES go to 10, if NO go to 9b.
- 10a.** Are portions of Project within line-of-sight^d of lek? If YES implement CONSTRAINT I; if NO go to 10b.
- 10b.** Are portions of Project not within line-of-sight of lek? If YES go to 11.
 - 11a.** Are portions of Project ≤1 mile from lek? If YES implement CONSTRAINT I; if NO go to 11b.
 - 11b.** Are portions of Project >1 mile from lek? If YES go to 12.
 - 12.** Do portions of Project affect suitable nesting habitat^f? If YES implement CONSTRAINT I and MITIGATION I; if NO
 - implement CONSTRAINT II and MITIGATION II.
- 9b.** Is lek >3 miles from Project? If YES, PROCEED WITH CONSTRUCTION.
- 8b.** Is lek “Confirmed Active” or “Unconfirmed” but not active during spring surveys the year of pipeline construction? If YES go to 13.
- 13.** Do portions of Project affect suitable nesting habitat^f within 3 miles of lek? If YES, PROCEED WITH CONSTRUCTION and implement MITIGATION I; if NO, PROCEED WITH CONSTRUCTION.

- CONSTRAINT I.** No construction from March 1 through June 15.
- CONSTRAINT II.** No construction from ½ hour before sunrise to 2 hours after sunrise from March 1 through June 15.
- MITIGATION I.** Mow suitable nesting habitat between September 1 and November 30 in the year prior to construction. Implement sage-grouse nesting habitat Construction/Reclamation Unit.
- MITIGATION II.** Monitor lek when pipeline construction is within 3 miles. If displaying males that were present prior to construction are not present for 3 consecutive mornings after construction has commenced, confer with designated personnel.

^aSage-grouse habitat north of the Milk River (approximately MP 83 of the Keystone Pipeline Project route) differs from sage-grouse habitat described in Montana Sage Grouse Work Group (2005), primarily due to less total shrub cover and less sagebrush cover (Tack 2009). For the purposes of this key, all native rangeland along the pipeline route from MP 0 to MP 83 is potential sage-grouse habitat. South of the Milk River, sage-grouse habitats are defined by Montana Sage Grouse Work Group (2005).

^bConfirmed Active (MFWP): “data supports existence of lek. Supporting data is defined as: 1) minimum of 2 years with 2 or more males lekking on site (preferred); or b) 1 year with 2 or more males lekking on site followed with evidence of lekking (vegetation trampling, feathers and droppings) during the subsequent year;” Unconfirmed (MFWP): “single count with no subsequent survey or a reported lek without supporting survey data;” Priority (SD GFP): active in recent years.

^cFor the purposes of this key, “active” means that displaying males are observed on the lek on a minimum of one morning in the spring of pipeline construction.

^dFor the purposes of this key, the project is considered to be within a lek’s line-of-sight as determined through viewshed analysis using ESRI’s ArcGIS Spatial Analyst. Viewsheds were generated from the center of each lek based on a point 1 meter above the surface of USGS 1 arc-second NED.

^eNorth of the Milk River, sage-grouse nesting habitat is considered to be habitat with an overall shrub (not just sagebrush) cover of 15%. Sagebrush may comprise less than half the total overall shrub cover (Tack 2009).

^fSouth of the Milk River, sage-grouse nesting habitat is considered to be habitat with 15-31 percent sagebrush cover (Montana Sage Grouse Work Group 2005).

This is a guide to implementing constraints to minimize and mitigate the effects of the Keystone XL Pipeline Project on sage-grouse leks. **Highlighted** numbers indicate applicable conditions within 3 miles of this lek.

Lek ID: 662

- 1b.** Is lek south of the Milk River^a? If YES go to 8; if NO go to 1a.
- 8a.** Is lek “Confirmed Active^b” or “Unconfirmed^b” in Montana or “Priority^b” in South Dakota and active during spring surveys the year of pipeline construction? If YES go to 9; if NO go to 8b.
- 9a.** Is lek ≤3 miles from Project? If YES go to 10, if NO go to 9b.
- 10a.** Are portions of Project within line-of-sight^d of lek? If YES implement CONSTRAINT I; if NO go to 10b.
- 10b.** Are portions of Project not within line-of-sight of lek? If YES go to 11.
- 11a.** Are portions of Project ≤1 mile from lek? If YES implement CONSTRAINT I; if NO go to 11b.
- 11b.** Are portions of Project >1 mile from lek? If YES go to 12.
- 12.** Do portions of Project affect suitable nesting habitat^f? If YES implement CONSTRAINT I and MITIGATION I; if NO
 implement CONSTRAINT II and MITIGATION II.
- 9b.** Is lek >3 miles from Project? If YES, PROCEED WITH CONSTRUCTION.
- 8b.** Is lek “Confirmed Active” or “Unconfirmed” but not active during spring surveys the year of pipeline construction? If YES go to 13.
- 13.** Do portions of Project affect suitable nesting habitat^f within 3 miles of lek? If YES, PROCEED WITH CONSTRUCTION and implement MITIGATION I; if NO, PROCEED WITH CONSTRUCTION.

- CONSTRAINT I.** No construction from March 1 through June 15.
- CONSTRAINT II.** No construction from ½ hour before sunrise to 2 hours after sunrise from March 1 through June 15.
- MITIGATION I.** Mow suitable nesting habitat between September 1 and November 30 in the year prior to construction. Implement sage-grouse nesting habitat Construction/Reclamation Unit.
- MITIGATION II.** Monitor lek when pipeline construction is within 3 miles. If displaying males that were present prior to construction are not present for 3 consecutive mornings after construction has commenced, confer with designated personnel.

^aSage-grouse habitat north of the Milk River (approximately MP 83 of the Keystone Pipeline Project route) differs from sage-grouse habitat described in Montana Sage Grouse Work Group (2005), primarily due to less total shrub cover and less sagebrush cover (Tack 2009). For the purposes of this key, all native rangeland along the pipeline route from MP 0 to MP 83 is potential sage-grouse habitat. South of the Milk River, sage-grouse habitats are defined by Montana Sage Grouse Work Group (2005).

^bConfirmed Active (MFWP): “data supports existence of lek. Supporting data is defined as: 1) minimum of 2 years with 2 or more males lekking on site (preferred); or b) 1 year with 2 or more males lekking on site followed with evidence of lekking (vegetation trampling, feathers and droppings) during the subsequent year;” Unconfirmed (MFWP): “single count with no subsequent survey or a reported lek without supporting survey data;” Priority (SD GFP): active in recent years.

^cFor the purposes of this key, “active” means that displaying males are observed on the lek on a minimum of one morning in the spring of pipeline construction.

^dFor the purposes of this key, the project is considered to be within a lek’s line-of-sight as determined through viewshed analysis using ESRI’s ArcGIS Spatial Analyst. Viewsheds were generated from the center of each lek based on a point 1 meter above the surface of USGS 1 arc-second NED.

^eNorth of the Milk River, sage-grouse nesting habitat is considered to be habitat with an overall shrub (not just sagebrush) cover of 15%. Sagebrush may comprise less than half the total overall shrub cover (Tack 2009).

^fSouth of the Milk River, sage-grouse nesting habitat is considered to be habitat with 15-31 percent sagebrush cover (Montana Sage Grouse Work Group 2005).

This is a guide to implementing constraints to minimize and mitigate the effects of the Keystone XL Pipeline Project on sage-grouse leks. **Highlighted** numbers indicate applicable conditions within 3 miles of this lek.

Lek ID: 795

- 1b.** Is lek south of the Milk River^a? If YES go to 8; if NO go to 1a.
- 8a.** Is lek “Confirmed Active^b” or “Unconfirmed^b” in Montana or “Priority^b” in South Dakota and active during spring surveys the year of pipeline construction? If YES go to 9; if NO go to 8b.
- 9a.** Is lek ≤3 miles from Project? If YES go to 10, if NO go to 9b.
 - 10a. Are portions of Project within line-of-sight^d of lek? If YES implement CONSTRAINT I; if NO go to 10b.
 - 10b.** Are portions of Project not within line-of-sight of lek? If YES go to 11.
 - 11a. Are portions of Project ≤1 mile from lek? If YES implement CONSTRAINT I; if NO go to 11b.
 - 11b.** Are portions of Project >1 mile from lek? If YES go to 12.
 - 12.** Do portions of Project affect suitable nesting habitat^f? If YES implement CONSTRAINT I and MITIGATION I; if NO
 - implement CONSTRAINT II and MITIGATION II.
- 9b. Is lek >3 miles from Project? If YES, PROCEED WITH CONSTRUCTION.
- 8b. Is lek “Confirmed Active” or “Unconfirmed” but not active during spring surveys the year of pipeline construction? If YES go to 13.
- 13. Do portions of Project affect suitable nesting habitat^f within 3 miles of lek? If YES, PROCEED WITH CONSTRUCTION and implement MITIGATION I; if NO, PROCEED WITH CONSTRUCTION.

- CONSTRAINT I.** No construction from March 1 through June 15.
- CONSTRAINT II.** No construction from ½ hour before sunrise to 2 hours after sunrise from March 1 through June 15.
- MITIGATION I.** Mow suitable nesting habitat between September 1 and November 30 in the year prior to construction. Implement sage-grouse nesting habitat Construction/Reclamation Unit.
- MITIGATION II.** Monitor lek when pipeline construction is within 3 miles. If displaying males that were present prior to construction are not present for 3 consecutive mornings after construction has commenced, confer with designated personnel.

^aSage-grouse habitat north of the Milk River (approximately MP 83 of the Keystone Pipeline Project route) differs from sage-grouse habitat described in Montana Sage Grouse Work Group (2005), primarily due to less total shrub cover and less sagebrush cover (Tack 2009). For the purposes of this key, all native rangeland along the pipeline route from MP 0 to MP 83 is potential sage-grouse habitat. South of the Milk River, sage-grouse habitats are defined by Montana Sage Grouse Work Group (2005).

^bConfirmed Active (MFWP): “data supports existence of lek. Supporting data is defined as: 1) minimum of 2 years with 2 or more males lekking on site (preferred); or b) 1 year with 2 or more males lekking on site followed with evidence of lekking (vegetation trampling, feathers and droppings) during the subsequent year;” Unconfirmed (MFWP): “single count with no subsequent survey or a reported lek without supporting survey data;” Priority (SD GFP): active in recent years.

^cFor the purposes of this key, “active” means that displaying males are observed on the lek on a minimum of one morning in the spring of pipeline construction.

^dFor the purposes of this key, the project is considered to be within a lek’s line-of-sight as determined through viewshed analysis using ESRI’s ArcGIS Spatial Analyst. Viewsheds were generated from the center of each lek based on a point 1 meter above the surface of USGS 1 arc-second NED.

^eNorth of the Milk River, sage-grouse nesting habitat is considered to be habitat with an overall shrub (not just sagebrush) cover of 15%. Sagebrush may comprise less than half the total overall shrub cover (Tack 2009).

^fSouth of the Milk River, sage-grouse nesting habitat is considered to be habitat with 15-31 percent sagebrush cover (Montana Sage Grouse Work Group 2005).

This is a guide to implementing constraints to minimize and mitigate the effects of the Keystone XL Pipeline Project on sage-grouse leks. **Highlighted** numbers indicate applicable conditions within 3 miles of this lek.

Lek ID: 799

- 1b.** Is lek south of the Milk River^a? If YES go to 8; if NO go to 1a.
- 8a.** Is lek “Confirmed Active^b” or “Unconfirmed^b” in Montana or “Priority^b” in South Dakota and active during spring surveys the year of pipeline construction? If YES go to 9; if NO go to 8b.
- 9a.** Is lek ≤3 miles from Project? If YES go to 10, if NO go to 9b.
- 10a.** Are portions of Project within line-of-sight^d of lek? If YES implement CONSTRAINT I; if NO go to 10b.
- 10b.** Are portions of Project not within line-of-sight of lek? If YES go to 11.
- 11a.** Are portions of Project ≤1 mile from lek? If YES implement CONSTRAINT I; if NO go to 11b.
- 11b.** Are portions of Project >1 mile from lek? If YES go to 12.
- 12.** Do portions of Project affect suitable nesting habitat^f? If YES implement CONSTRAINT I and MITIGATION I; if NO
 implement CONSTRAINT II and MITIGATION II.
- 9b.** Is lek >3 miles from Project? If YES, PROCEED WITH CONSTRUCTION.
- 8b.** Is lek “Confirmed Active” or “Unconfirmed” but not active during spring surveys the year of pipeline construction? If YES go to 13.
- 13.** Do portions of Project affect suitable nesting habitat^f within 3 miles of lek? If YES, PROCEED WITH CONSTRUCTION and implement MITIGATION I; if NO, PROCEED WITH CONSTRUCTION.

- CONSTRAINT I.** No construction from March 1 through June 15.
- CONSTRAINT II.** No construction from ½ hour before sunrise to 2 hours after sunrise from March 1 through June 15.
- MITIGATION I.** Mow suitable nesting habitat between September 1 and November 30 in the year prior to construction. Implement sage-grouse nesting habitat Construction/Reclamation Unit.
- MITIGATION II.** Monitor lek when pipeline construction is within 3 miles. If displaying males that were present prior to construction are not present for 3 consecutive mornings after construction has commenced, confer with designated personnel.

^aSage-grouse habitat north of the Milk River (approximately MP 83 of the Keystone Pipeline Project route) differs from sage-grouse habitat described in Montana Sage Grouse Work Group (2005), primarily due to less total shrub cover and less sagebrush cover (Tack 2009). For the purposes of this key, all native rangeland along the pipeline route from MP 0 to MP 83 is potential sage-grouse habitat. South of the Milk River, sage-grouse habitats are defined by Montana Sage Grouse Work Group (2005).

^bConfirmed Active (MFWP): “data supports existence of lek. Supporting data is defined as: 1) minimum of 2 years with 2 or more males lekking on site (preferred); or b) 1 year with 2 or more males lekking on site followed with evidence of lekking (vegetation trampling, feathers and droppings) during the subsequent year;” Unconfirmed (MFWP): “single count with no subsequent survey or a reported lek without supporting survey data;” Priority (SD GFP): active in recent years.

^cFor the purposes of this key, “active” means that displaying males are observed on the lek on a minimum of one morning in the spring of pipeline construction.

^dFor the purposes of this key, the project is considered to be within a lek’s line-of-sight as determined through viewshed analysis using ESRI’s ArcGIS Spatial Analyst. Viewsheds were generated from the center of each lek based on a point 1 meter above the surface of USGS 1 arc-second NED.

^eNorth of the Milk River, sage-grouse nesting habitat is considered to be habitat with an overall shrub (not just sagebrush) cover of 15%. Sagebrush may comprise less than half the total overall shrub cover (Tack 2009).

^fSouth of the Milk River, sage-grouse nesting habitat is considered to be habitat with 15-31 percent sagebrush cover (Montana Sage Grouse Work Group 2005).

This is a guide to implementing constraints to minimize and mitigate the effects of the Keystone XL Pipeline Project on sage-grouse leks. **Highlighted** numbers indicate applicable conditions within 3 miles of this lek.

Lek ID: 1805 and 1430

- 1b.** Is lek south of the Milk River^a? If YES go to 8; if NO go to 1a.
- 8a.** Is lek “Confirmed Active^b” or “Unconfirmed^b” in Montana or “Priority^b” in South Dakota and active during spring surveys the year of pipeline construction? If YES go to 9; if NO go to 8b.
- 9a.** Is lek ≤3 miles from Project? If YES go to 10, if NO go to 9b.
 - 10a.** Are portions of Project within line-of-sight^d of lek? If YES implement CONSTRAINT I; if NO go to 10b.
 - 10b.** Are portions of Project not within line-of-sight of lek? If YES go to 11.
 - 11a.** Are portions of Project ≤1 mile from lek? If YES implement CONSTRAINT I; if NO go to 11b.
 - 11b.** Are portions of Project >1 mile from lek? If YES go to 12.
 - 12.** Do portions of Project affect suitable nesting habitat^f? If YES implement CONSTRAINT I and MITIGATION I; if NO
 - implement CONSTRAINT II and MITIGATION II.
- 9b.** Is lek >3 miles from Project? If YES, PROCEED WITH CONSTRUCTION.
- 8b.** Is lek “Confirmed Active” or “Unconfirmed” but not active during spring surveys the year of pipeline construction? If YES go to 13.
- 13.** Do portions of Project affect suitable nesting habitat^f within 3 miles of lek? If YES, PROCEED WITH CONSTRUCTION and implement MITIGATION I; if NO, PROCEED WITH CONSTRUCTION.

- CONSTRAINT I.** No construction from March 1 through June 15.
- CONSTRAINT II.** No construction from ½ hour before sunrise to 2 hours after sunrise from March 1 through June 15.
- MITIGATION I.** Mow suitable nesting habitat between September 1 and November 30 in the year prior to construction. Implement sage-grouse nesting habitat Construction/Reclamation Unit.
- MITIGATION II.** Monitor lek when pipeline construction is within 3 miles. If displaying males that were present prior to construction are not present for 3 consecutive mornings after construction has commenced, confer with designated personnel.

^aSage-grouse habitat north of the Milk River (approximately MP 83 of the Keystone Pipeline Project route) differs from sage-grouse habitat described in Montana Sage Grouse Work Group (2005), primarily due to less total shrub cover and less sagebrush cover (Tack 2009). For the purposes of this key, all native rangeland along the pipeline route from MP 0 to MP 83 is potential sage-grouse habitat. South of the Milk River, sage-grouse habitats are defined by Montana Sage Grouse Work Group (2005).

^bConfirmed Active (MFWP): “data supports existence of lek. Supporting data is defined as: 1) minimum of 2 years with 2 or more males lekking on site (preferred); or b) 1 year with 2 or more males lekking on site followed with evidence of lekking (vegetation trampling, feathers and droppings) during the subsequent year;” Unconfirmed (MFWP): “single count with no subsequent survey or a reported lek without supporting survey data;” Priority (SD GFP): active in recent years.

^cFor the purposes of this key, “active” means that displaying males are observed on the lek on a minimum of one morning in the spring of pipeline construction.

^dFor the purposes of this key, the project is considered to be within a lek’s line-of-sight as determined through viewshed analysis using ESRI’s ArcGIS Spatial Analyst. Viewsheds were generated from the center of each lek based on a point 1 meter above the surface of USGS 1 arc-second NED.

^eNorth of the Milk River, sage-grouse nesting habitat is considered to be habitat with an overall shrub (not just sagebrush) cover of 15%. Sagebrush may comprise less than half the total overall shrub cover (Tack 2009).

^fSouth of the Milk River, sage-grouse nesting habitat is considered to be habitat with 15-31 percent sagebrush cover (Montana Sage Grouse Work Group 2005).

This is a guide to implementing constraints to minimize and mitigate the effects of the Keystone XL Pipeline Project on sage-grouse leks. **Highlighted** numbers indicate applicable conditions within 3 miles of this lek.

Lek ID: 1428 and 1725

- 1b.** Is lek south of the Milk River^a? If YES go to 8; if NO go to 1a.
- 8a.** Is lek “Confirmed Active^b” or “Unconfirmed^b” in Montana or “Priority^b” in South Dakota and active during spring surveys the year of pipeline construction? If YES go to 9; if NO go to 8b.
- 9a.** Is lek ≤3 miles from Project? If YES go to 10, if NO go to 9b.
- 10a.** Are portions of Project within line-of-sight^d of lek? If YES implement CONSTRAINT I; if NO go to 10b.
NOTE: Recommend CONSTRAINT II rather than CONSTRAINT I at this site since visible area is very restricted.
- 10b.** Are portions of Project not within line-of-sight of lek? If YES go to 11.
- 11a.** Are portions of Project ≤1 mile from lek? If YES implement CONSTRAINT I; if NO go to 11b.
- 11b.** Are portions of Project >1 mile from lek? If YES go to 12.
- 12.** Do portions of Project affect suitable nesting habitat^f? If YES implement CONSTRAINT I and MITIGATION I; if NO
 - implement CONSTRAINT II and MITIGATION II.
- 9b.** Is lek >3 miles from Project? If YES, PROCEED WITH CONSTRUCTION.
- 8b.** Is lek “Confirmed Active” or “Unconfirmed” but not active during spring surveys the year of pipeline construction? If YES go to 13.
- 13.** Do portions of Project affect suitable nesting habitat^f within 3 miles of lek? If YES, PROCEED WITH CONSTRUCTION and implement MITIGATION I; if NO, PROCEED WITH CONSTRUCTION.

- CONSTRAINT I. No construction from March 1 through June 15.
- CONSTRAINT II. No construction from ½ hour before sunrise to 2 hours after sunrise from March 1 through June 15.
- MITIGATION I. Mow suitable nesting habitat between September 1 and November 30 in the year prior to construction. Implement sage-grouse nesting habitat Construction/Reclamation Unit.
- MITIGATION II. Monitor lek when pipeline construction is within 3 miles. If displaying males that were present prior to construction are not present for 3 consecutive mornings after construction has commenced, confer with designated personnel.

^aSage-grouse habitat north of the Milk River (approximately MP 83 of the Keystone Pipeline Project route) differs from sage-grouse habitat described in Montana Sage Grouse Work Group (2005), primarily due to less total shrub cover and less sagebrush cover (Tack 2009). For the purposes of this key, all native rangeland along the pipeline route from MP 0 to MP 83 is potential sage-grouse habitat. South of the Milk River, sage-grouse habitats are defined by Montana Sage Grouse Work Group (2005).

^bConfirmed Active (MFWP): “data supports existence of lek. Supporting data is defined as: 1) minimum of 2 years with 2 or more males lekking on site (preferred); or b) 1 year with 2 or more males lekking on site followed with evidence of lekking (vegetation trampling, feathers and droppings) during the subsequent year;” Unconfirmed (MFWP): “single count with no subsequent survey or a reported lek without supporting survey data;” Priority (SD GFP): active in recent years.

^cFor the purposes of this key, “active” means that displaying males are observed on the lek on a minimum of one morning in the spring of pipeline construction.

^dFor the purposes of this key, the project is considered to be within a lek’s line-of-sight as determined through viewshed analysis using ESRI’s ArcGIS Spatial Analyst. Viewsheds were generated from the center of each lek based on a point 1 meter above the surface of USGS 1 arc-second NED.

^eNorth of the Milk River, sage-grouse nesting habitat is considered to be habitat with an overall shrub (not just sagebrush) cover of 15%. Sagebrush may comprise less than half the total overall shrub cover (Tack 2009).

^fSouth of the Milk River, sage-grouse nesting habitat is considered to be habitat with 15-31 percent sagebrush cover (Montana Sage Grouse Work Group 2005).

This is a guide to implementing constraints to minimize and mitigate the effects of the Keystone XL Pipeline Project on sage-grouse leks. **Highlighted** numbers indicate applicable conditions within 3 miles of this lek.

Lek ID: 1801

- 1b.** Is lek south of the Milk River^a? If YES go to 8; if NO go to 1a.
- 8a.** Is lek “Confirmed Active^b” or “Unconfirmed^b” in Montana or “Priority^b” in South Dakota and active during spring surveys the year of pipeline construction? If YES go to 9; if NO go to 8b.
- 9a.** Is lek ≤3 miles from Project? If YES go to 10, if NO go to 9b.
- 10a.** Are portions of Project within line-of-sight^d of lek? If YES implement CONSTRAINT I; if NO go to 10b.
- 10b.** Are portions of Project not within line-of-sight of lek? If YES go to 11.
- 11a.** Are portions of Project ≤1 mile from lek? If YES implement CONSTRAINT I; if NO go to 11b.
- 11b.** Are portions of Project >1 mile from lek? If YES go to 12.
- 12.** Do portions of Project affect suitable nesting habitat^f? If YES implement CONSTRAINT I and MITIGATION I; if NO
 - implement CONSTRAINT II and MITIGATION II.
 - NOTE: Recommend CONSTRAINT II rather than CONSTRAINT I at this site since suitable habitat is on the margin of the 3-mile buffer and very limited.
- 9b.** Is lek >3 miles from Project? If YES, PROCEED WITH CONSTRUCTION.
- 8b.** Is lek “Confirmed Active” or “Unconfirmed” but not active during spring surveys the year of pipeline construction? If YES go to 13.
- 13.** Do portions of Project affect suitable nesting habitat^f within 3 miles of lek? If YES, PROCEED WITH CONSTRUCTION and implement MITIGATION I; if NO, PROCEED WITH CONSTRUCTION.

- CONSTRAINT I.** No construction from March 1 through June 15.
- CONSTRAINT II.** No construction from ½ hour before sunrise to 2 hours after sunrise from March 1 through June 15.
- MITIGATION I.** Mow suitable nesting habitat between September 1 and November 30 in the year prior to construction. Implement sage-grouse nesting habitat Construction/Reclamation Unit.
- MITIGATION II.** Monitor lek when pipeline construction is within 3 miles. If displaying males that were present prior to construction are not present for 3 consecutive mornings after construction has commenced, confer with designated personnel.

^aSage-grouse habitat north of the Milk River (approximately MP 83 of the Keystone Pipeline Project route) differs from sage-grouse habitat described in Montana Sage Grouse Work Group (2005), primarily due to less total shrub cover and less sagebrush cover (Tack 2009). For the purposes of this key, all native rangeland along the pipeline route from MP 0 to MP 83 is potential sage-grouse habitat. South of the Milk River, sage-grouse habitats are defined by Montana Sage Grouse Work Group (2005).

^bConfirmed Active (MFWP): “data supports existence of lek. Supporting data is defined as: 1) minimum of 2 years with 2 or more males lekking on site (preferred); or b) 1 year with 2 or more males lekking on site followed with evidence of lekking (vegetation trampling, feathers and droppings) during the subsequent year;” Unconfirmed (MFWP): “single count with no subsequent survey or a reported lek without supporting survey data;” Priority (SD GFP): active in recent years.

^cFor the purposes of this key, “active” means that displaying males are observed on the lek on a minimum of one morning in the spring of pipeline construction.

^dFor the purposes of this key, the project is considered to be within a lek’s line-of-sight as determined through viewshed analysis using ESRI’s ArcGIS Spatial Analyst. Viewsheds were generated from the center of each lek based on a point 1 meter above the surface of USGS 1 arc-second NED.

^eNorth of the Milk River, sage-grouse nesting habitat is considered to be habitat with an overall shrub (not just sagebrush) cover of 15%. Sagebrush may comprise less than half the total overall shrub cover (Tack 2009).

^fSouth of the Milk River, sage-grouse nesting habitat is considered to be habitat with 15-31 percent sagebrush cover (Montana Sage Grouse Work Group 2005).

This is a guide to implementing constraints to minimize and mitigate the effects of the Keystone XL Pipeline Project on sage-grouse leks. **Highlighted** numbers indicate applicable conditions within 3 miles of this lek.

Lek ID: 1837

- 1b.** Is lek south of the Milk River^a? If YES go to 8; if NO go to 1a.
- 8a.** Is lek “Confirmed Active^b” or “Unconfirmed^b” in Montana or “Priority^b” in South Dakota and active during spring surveys the year of pipeline construction? If YES go to 9; if NO go to 8b.
- 9a.** Is lek ≤3 miles from Project? If YES go to 10, if NO go to 9b.
- 10a.** Are portions of Project within line-of-sight^d of lek? If YES implement CONSTRAINT I; if NO go to 10b.
- 10b.** Are portions of Project not within line-of-sight of lek? If YES go to 11.
- 11a.** Are portions of Project ≤1 mile from lek? If YES implement CONSTRAINT I; if NO go to 11b.
- 11b.** Are portions of Project >1 mile from lek? If YES go to 12.
- 12.** Do portions of Project affect suitable nesting habitat^f? If YES implement CONSTRAINT I and MITIGATION I; if NO
 implement CONSTRAINT II and MITIGATION II.
 NOTE: Recommend CONSTRAINT II rather than CONSTRAINT I at this site since suitable habitat is very limited.
- 9b.** Is lek >3 miles from Project? If YES, PROCEED WITH CONSTRUCTION.
- 8b.** Is lek “Confirmed Active” or “Unconfirmed” but not active during spring surveys the year of pipeline construction? If YES go to 13.
- 13.** Do portions of Project affect suitable nesting habitat^f within 3 miles of lek? If YES, PROCEED WITH CONSTRUCTION and implement MITIGATION I; if NO, PROCEED WITH CONSTRUCTION.

- CONSTRAINT I.** No construction from March 1 through June 15.
- CONSTRAINT II.** No construction from ½ hour before sunrise to 2 hours after sunrise from March 1 through June 15.
- MITIGATION I.** Mow suitable nesting habitat between September 1 and November 30 in the year prior to construction. Implement sage-grouse nesting habitat Construction/Reclamation Unit.
- MITIGATION II.** Monitor lek when pipeline construction is within 3 miles. If displaying males that were present prior to construction are not present for 3 consecutive mornings after construction has commenced, confer with designated personnel.

^aSage-grouse habitat north of the Milk River (approximately MP 83 of the Keystone Pipeline Project route) differs from sage-grouse habitat described in Montana Sage Grouse Work Group (2005), primarily due to less total shrub cover and less sagebrush cover (Tack 2009). For the purposes of this key, all native rangeland along the pipeline route from MP 0 to MP 83 is potential sage-grouse habitat. South of the Milk River, sage-grouse habitats are defined by Montana Sage Grouse Work Group (2005).

^bConfirmed Active (MFWP): “data supports existence of lek. Supporting data is defined as: 1) minimum of 2 years with 2 or more males lekking on site (preferred); or b) 1 year with 2 or more males lekking on site followed with evidence of lekking (vegetation trampling, feathers and droppings) during the subsequent year;” Unconfirmed (MFWP): “single count with no subsequent survey or a reported lek without supporting survey data;” Priority (SD GFP): active in recent years.

^cFor the purposes of this key, “active” means that displaying males are observed on the lek on a minimum of one morning in the spring of pipeline construction.

^dFor the purposes of this key, the project is considered to be within a lek’s line-of-sight as determined through viewshed analysis using ESRI’s ArcGIS Spatial Analyst. Viewsheds were generated from the center of each lek based on a point 1 meter above the surface of USGS 1 arc-second NED.

^eNorth of the Milk River, sage-grouse nesting habitat is considered to be habitat with an overall shrub (not just sagebrush) cover of 15%. Sagebrush may comprise less than half the total overall shrub cover (Tack 2009).

^fSouth of the Milk River, sage-grouse nesting habitat is considered to be habitat with 15-31 percent sagebrush cover (Montana Sage Grouse Work Group 2005).

This is a guide to implementing constraints to minimize and mitigate the effects of the Keystone XL Pipeline Project on sage-grouse leks. **Highlighted** numbers indicate applicable conditions within 3 miles of this lek.

Lek ID: 1838

- 1b.** Is lek south of the Milk River^a? If YES go to 8; if NO go to 1a.
- 8a.** Is lek “Confirmed Active^b” or “Unconfirmed^b” in Montana or “Priority^b” in South Dakota and active during spring surveys the year of pipeline construction? If YES go to 9; if NO go to 8b.
- 9a.** Is lek ≤3 miles from Project? If YES go to 10, if NO go to 9b.
- 10a.** Are portions of Project within line-of-sight^d of lek? If YES implement CONSTRAINT I; if NO go to 10b.
- 10b.** Are portions of Project not within line-of-sight of lek? If YES go to 11.
 - 11a.** Are portions of Project ≤1 mile from lek? If YES implement CONSTRAINT I; if NO go to 11b.
 - 11b.** Are portions of Project >1 mile from lek? If YES go to 12.
 - 12.** Do portions of Project affect suitable nesting habitat^f? If YES implement CONSTRAINT I and MITIGATION I; if NO
 - implement CONSTRAINT II and MITIGATION II.
- 9b.** Is lek >3 miles from Project? If YES, PROCEED WITH CONSTRUCTION.
- 8b.** Is lek “Confirmed Active” or “Unconfirmed” but not active during spring surveys the year of pipeline construction? If YES go to 13.
- 13.** Do portions of Project affect suitable nesting habitat^f within 3 miles of lek? If YES, PROCEED WITH CONSTRUCTION and implement MITIGATION I; if NO, PROCEED WITH CONSTRUCTION.

- CONSTRAINT I.** No construction from March 1 through June 15.
- CONSTRAINT II.** No construction from ½ hour before sunrise to 2 hours after sunrise from March 1 through June 15.
- MITIGATION I.** Mow suitable nesting habitat between September 1 and November 30 in the year prior to construction. Implement sage-grouse nesting habitat Construction/Reclamation Unit.
- MITIGATION II.** Monitor lek when pipeline construction is within 3 miles. If displaying males that were present prior to construction are not present for 3 consecutive mornings after construction has commenced, confer with designated personnel.

^aSage-grouse habitat north of the Milk River (approximately MP 83 of the Keystone Pipeline Project route) differs from sage-grouse habitat described in Montana Sage Grouse Work Group (2005), primarily due to less total shrub cover and less sagebrush cover (Tack 2009). For the purposes of this key, all native rangeland along the pipeline route from MP 0 to MP 83 is potential sage-grouse habitat. South of the Milk River, sage-grouse habitats are defined by Montana Sage Grouse Work Group (2005).

^bConfirmed Active (MFWP): “data supports existence of lek. Supporting data is defined as: 1) minimum of 2 years with 2 or more males lekking on site (preferred); or b) 1 year with 2 or more males lekking on site followed with evidence of lekking (vegetation trampling, feathers and droppings) during the subsequent year;” Unconfirmed (MFWP): “single count with no subsequent survey or a reported lek without supporting survey data;” Priority (SD GFP): active in recent years.

^cFor the purposes of this key, “active” means that displaying males are observed on the lek on a minimum of one morning in the spring of pipeline construction.

^dFor the purposes of this key, the project is considered to be within a lek’s line-of-sight as determined through viewshed analysis using ESRI’s ArcGIS Spatial Analyst. Viewsheds were generated from the center of each lek based on a point 1 meter above the surface of USGS 1 arc-second NED.

^eNorth of the Milk River, sage-grouse nesting habitat is considered to be habitat with an overall shrub (not just sagebrush) cover of 15%. Sagebrush may comprise less than half the total overall shrub cover (Tack 2009).

^fSouth of the Milk River, sage-grouse nesting habitat is considered to be habitat with 15-31 percent sagebrush cover (Montana Sage Grouse Work Group 2005).

This is a guide to implementing constraints to minimize and mitigate the effects of the Keystone XL Pipeline Project on sage-grouse leks. **Highlighted** numbers indicate applicable conditions within 3 miles of this lek.

Lek ID: 1840

- 1b.** Is lek south of the Milk River^a? If YES go to 8; if NO go to 1a.
- 8a.** Is lek “Confirmed Active^b” or “Unconfirmed^b” in Montana or “Priority^b” in South Dakota and active during spring surveys the year of pipeline construction? If YES go to 9; if NO go to 8b.
- 9a.** Is lek ≤3 miles from Project? If YES go to 10, if NO go to 9b.
- 10a.** Are portions of Project within line-of-sight^d of lek? If YES implement CONSTRAINT I; if NO go to 10b.
- 10b.** Are portions of Project not within line-of-sight of lek? If YES go to 11.
 - 11a.** Are portions of Project ≤1 mile from lek? If YES implement CONSTRAINT I; if NO go to 11b.
 - 11b.** Are portions of Project >1 mile from lek? If YES go to 12.
 - 12.** Do portions of Project affect suitable nesting habitat^f? If YES implement CONSTRAINT I and MITIGATION I; if NO
 - implement CONSTRAINT II and MITIGATION II.
- 9b.** Is lek >3 miles from Project? If YES, PROCEED WITH CONSTRUCTION.
- 8b.** Is lek “Confirmed Active” or “Unconfirmed” but not active during spring surveys the year of pipeline construction? If YES go to 13.
- 13.** Do portions of Project affect suitable nesting habitat^f within 3 miles of lek? If YES, PROCEED WITH CONSTRUCTION and implement MITIGATION I; if NO, PROCEED WITH CONSTRUCTION.

- CONSTRAINT I.** No construction from March 1 through June 15.
- CONSTRAINT II.** No construction from ½ hour before sunrise to 2 hours after sunrise from March 1 through June 15.
- MITIGATION I.** Mow suitable nesting habitat between September 1 and November 30 in the year prior to construction. Implement sage-grouse nesting habitat Construction/Reclamation Unit.
- MITIGATION II.** Monitor lek when pipeline construction is within 3 miles. If displaying males that were present prior to construction are not present for 3 consecutive mornings after construction has commenced, confer with designated personnel.

^aSage-grouse habitat north of the Milk River (approximately MP 83 of the Keystone Pipeline Project route) differs from sage-grouse habitat described in Montana Sage Grouse Work Group (2005), primarily due to less total shrub cover and less sagebrush cover (Tack 2009). For the purposes of this key, all native rangeland along the pipeline route from MP 0 to MP 83 is potential sage-grouse habitat. South of the Milk River, sage-grouse habitats are defined by Montana Sage Grouse Work Group (2005).

^bConfirmed Active (MFWP): “data supports existence of lek. Supporting data is defined as: 1) minimum of 2 years with 2 or more males lekking on site (preferred); or b) 1 year with 2 or more males lekking on site followed with evidence of lekking (vegetation trampling, feathers and droppings) during the subsequent year;” Unconfirmed (MFWP): “single count with no subsequent survey or a reported lek without supporting survey data;” Priority (SD GFP): active in recent years.

^cFor the purposes of this key, “active” means that displaying males are observed on the lek on a minimum of one morning in the spring of pipeline construction.

^dFor the purposes of this key, the project is considered to be within a lek’s line-of-sight as determined through viewshed analysis using ESRI’s ArcGIS Spatial Analyst. Viewsheds were generated from the center of each lek based on a point 1 meter above the surface of USGS 1 arc-second NED.

^eNorth of the Milk River, sage-grouse nesting habitat is considered to be habitat with an overall shrub (not just sagebrush) cover of 15%. Sagebrush may comprise less than half the total overall shrub cover (Tack 2009).

^fSouth of the Milk River, sage-grouse nesting habitat is considered to be habitat with 15-31 percent sagebrush cover (Montana Sage Grouse Work Group 2005).

This is a guide to implementing constraints to minimize and mitigate the effects of the Keystone XL Pipeline Project on sage-grouse leks. **Highlighted** numbers indicate applicable conditions within 3 miles of this lek.

Lek ID: 1292

- 1b.** Is lek south of the Milk River^a? If YES go to 8; if NO go to 1a.
- 8a.** Is lek “Confirmed Active^b” or “Unconfirmed^b” in Montana or “Priority^b” in South Dakota and active during spring surveys the year of pipeline construction? If YES go to 9; if NO go to 8b.
- 9a.** Is lek ≤3 miles from Project? If YES go to 10, if NO go to 9b.
 - 10a. Are portions of Project within line-of-sight^d of lek? If YES implement CONSTRAINT I; if NO go to 10b.
 - 10b.** Are portions of Project not within line-of-sight of lek? If YES go to 11.
 - 11a. Are portions of Project ≤1 mile from lek? If YES implement CONSTRAINT I; if NO go to 11b.
 - 11b.** Are portions of Project >1 mile from lek? If YES go to 12.
 - 12.** Do portions of Project affect suitable nesting habitat^f? If YES implement CONSTRAINT I and MITIGATION I; if NO
 - implement CONSTRAINT II and MITIGATION II.
- 9b. Is lek >3 miles from Project? If YES, PROCEED WITH CONSTRUCTION.
- 8b. Is lek “Confirmed Active” or “Unconfirmed” but not active during spring surveys the year of pipeline construction? If YES go to 13.
- 13. Do portions of Project affect suitable nesting habitat^f within 3 miles of lek? If YES, PROCEED WITH CONSTRUCTION and implement MITIGATION I; if NO, PROCEED WITH CONSTRUCTION.

- CONSTRAINT I.** No construction from March 1 through June 15.
- CONSTRAINT II.** No construction from ½ hour before sunrise to 2 hours after sunrise from March 1 through June 15.
- MITIGATION I.** Mow suitable nesting habitat between September 1 and November 30 in the year prior to construction. Implement sage-grouse nesting habitat Construction/Reclamation Unit.
- MITIGATION II.** Monitor lek when pipeline construction is within 3 miles. If displaying males that were present prior to construction are not present for 3 consecutive mornings after construction has commenced, confer with designated personnel.

^aSage-grouse habitat north of the Milk River (approximately MP 83 of the Keystone Pipeline Project route) differs from sage-grouse habitat described in Montana Sage Grouse Work Group (2005), primarily due to less total shrub cover and less sagebrush cover (Tack 2009). For the purposes of this key, all native rangeland along the pipeline route from MP 0 to MP 83 is potential sage-grouse habitat. South of the Milk River, sage-grouse habitats are defined by Montana Sage Grouse Work Group (2005).

^bConfirmed Active (MFWP): “data supports existence of lek. Supporting data is defined as: 1) minimum of 2 years with 2 or more males lekking on site (preferred); or b) 1 year with 2 or more males lekking on site followed with evidence of lekking (vegetation trampling, feathers and droppings) during the subsequent year;” Unconfirmed (MFWP): “single count with no subsequent survey or a reported lek without supporting survey data;” Priority (SD GFP): active in recent years.

^cFor the purposes of this key, “active” means that displaying males are observed on the lek on a minimum of one morning in the spring of pipeline construction.

^dFor the purposes of this key, the project is considered to be within a lek’s line-of-sight as determined through viewshed analysis using ESRI’s ArcGIS Spatial Analyst. Viewsheds were generated from the center of each lek based on a point 1 meter above the surface of USGS 1 arc-second NED.

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^fSouth of the Milk River, sage-grouse nesting habitat is considered to be habitat with 15-31 percent sagebrush cover (Montana Sage Grouse Work Group 2005).

This is a guide to implementing constraints to minimize and mitigate the effects of the Keystone XL Pipeline Project on sage-grouse leks. **Highlighted** numbers indicate applicable conditions within 3 miles of this lek.

Lek ID: 1437

- 1b.** Is lek south of the Milk River^a? If YES go to 8; if NO go to 1a.
- 8a.** Is lek “Confirmed Active^b” or “Unconfirmed^b” in Montana or “Priority^b” in South Dakota and active during spring surveys the year of pipeline construction? If YES go to 9; if NO go to 8b.
- 9a.** Is lek ≤3 miles from Project? If YES go to 10, if NO go to 9b.
 - 10a. Are portions of Project within line-of-sight^d of lek? If YES implement CONSTRAINT I; if NO go to 10b.
 - 10b.** Are portions of Project not within line-of-sight of lek? If YES go to 11.
 - 11a. Are portions of Project ≤1 mile from lek? If YES implement CONSTRAINT I; if NO go to 11b.
 - 11b.** Are portions of Project >1 mile from lek? If YES go to 12.
 - 12.** Do portions of Project affect suitable nesting habitat^f? If YES implement CONSTRAINT I and MITIGATION I; if NO
 - implement CONSTRAINT II and MITIGATION II.
- 9b. Is lek >3 miles from Project? If YES, PROCEED WITH CONSTRUCTION.
- 8b. Is lek “Confirmed Active” or “Unconfirmed” but not active during spring surveys the year of pipeline construction? If YES go to 13.
- 13. Do portions of Project affect suitable nesting habitat^f within 3 miles of lek? If YES, PROCEED WITH CONSTRUCTION and implement MITIGATION I; if NO, PROCEED WITH CONSTRUCTION.

- CONSTRAINT I. No construction from March 1 through June 15.
- CONSTRAINT II.** No construction from ½ hour before sunrise to 2 hours after sunrise from March 1 through June 15.
- MITIGATION I. Mow suitable nesting habitat between September 1 and November 30 in the year prior to construction. Implement sage-grouse nesting habitat Construction/Reclamation Unit.
- MITIGATION II.** Monitor lek when pipeline construction is within 3 miles. If displaying males that were present prior to construction are not present for 3 consecutive mornings after construction has commenced, confer with designated personnel.

^aSage-grouse habitat north of the Milk River (approximately MP 83 of the Keystone Pipeline Project route) differs from sage-grouse habitat described in Montana Sage Grouse Work Group (2005), primarily due to less total shrub cover and less sagebrush cover (Tack 2009). For the purposes of this key, all native rangeland along the pipeline route from MP 0 to MP 83 is potential sage-grouse habitat. South of the Milk River, sage-grouse habitats are defined by Montana Sage Grouse Work Group (2005).

^bConfirmed Active (MFWP): “data supports existence of lek. Supporting data is defined as: 1) minimum of 2 years with 2 or more males lekking on site (preferred); or b) 1 year with 2 or more males lekking on site followed with evidence of lekking (vegetation trampling, feathers and droppings) during the subsequent year;” Unconfirmed (MFWP): “single count with no subsequent survey or a reported lek without supporting survey data;” Priority (SD GFP): active in recent years.

^cFor the purposes of this key, “active” means that displaying males are observed on the lek on a minimum of one morning in the spring of pipeline construction.

^dFor the purposes of this key, the project is considered to be within a lek’s line-of-sight as determined through viewshed analysis using ESRI’s ArcGIS Spatial Analyst. Viewsheds were generated from the center of each lek based on a point 1 meter above the surface of USGS 1 arc-second NED.

^eNorth of the Milk River, sage-grouse nesting habitat is considered to be habitat with an overall shrub (not just sagebrush) cover of 15%. Sagebrush may comprise less than half the total overall shrub cover (Tack 2009).

^fSouth of the Milk River, sage-grouse nesting habitat is considered to be habitat with 15-31 percent sagebrush cover (Montana Sage Grouse Work Group 2005).