

## **Appendix J**

### **Sage-Grouse Impact Analysis**

- Appendix J-1: Framework for Sage-grouse Impacts Analysis for Interstate Transmission Lines
- Appendix J-2: Habitat Equivalency Analysis for Mitigation of the Gateway West Transmission Line

**Appendix J-1**  
**Framework for Sage-Grouse Impacts Analysis for**  
**Interstate Transmission Lines**

## **Framework for Sage-grouse Impacts Analysis for Interstate Transmission Lines 10-22-2011**

**(1) Evaluation of Direct and Indirect Impacts-** This portion of the overall SG Impacts Assessment Framework addresses project-related habitat impacts that bear directly on listing factors considered by the U.S. Fish and Wildlife Service (FWS) when evaluating the need to provide full listing protection under the Endangered Species Act (ESA).

A starting point for this analysis is a thorough review of the threats assessment/five factor analysis that FWS conducted as part of the March 23, 2010 (75 FR 13910), listing of the SG as a Candidate under ESA. An evaluation of all potential threats to SG and SG habitat from the transmission line should be conducted incorporating the latest available scientific information—most of which is referenced in the FR notice itself.

Of particular importance is the synthesis evaluation of all potential threats of the project that operate cumulatively to impact SG populations and habitat in a way that is not adequately evaluated by examining threats independently. The project proponent should look to the FR cumulative threats assessment summary as an example of how to fully analyze impacts associated with the proposed project. Reference to additional scientific information published since the issuance of the FR is available on the FWS website and should be incorporated into the analysis.

An analysis of sage-grouse populations that attend leks within 18km of the project is a critical component of an indirect impacts analysis for the species. Sage-grouse that attend leks up to 18km from the project may be indirectly affected by the loss of habitat functionality during other seasons of the year (Connelly et.al. 2000). The construction of a transmission project or other linear facility may pose additional hindrance of seasonal migration patterns or avoidance of important seasonal habitats once used extensively by local sage-grouse populations. Qualitative and quantitative measures of habitat change must be considered in describing the potential impacts of the project. In the context of managing a species that requires such a large landscape of habitats to meet their life-cycle needs, and the nature of the proposed disturbance, it is reasonable to make some assumptive predictions about the relative impacts within 18km.

**(2) Addressing Direct Loss of Birds-** While the currency of HEA is in terms of habitat acreage and/or dollars associated with what is essentially an economic analysis, a fundamental concern of all agency biologists is the need to address the impact (i.e., “take” including mortality, harm, etc.) to SG populations and the issue of their replacement. This piece of the overall SG Impacts Assessment Framework is an important contribution to the rangewide jeopardy analysis conducted as part of the informal conferencing process for this Candidate species. Additionally, addressing impacts to populations provides key information needed for completing any potential future formal Section 7 consultation that would be required if the SG is ultimately listed under ESA during project development, thereby significantly streamlining this process.

FWS is actively working on this issue as it relates to rangewide SG conservation. There are two ways that the project proponent is expected to help resolve this concern:

- a) Work closely with FWS and State Agency Biologists to develop an approach to address loss of birds from project-related impacts and their replacement;
- b) Contribute financially to research projects that have been designed specifically to address this issue.

**(3) Mitigation-** Until an impacts analysis has been conducted in coordination with agency biologists—leading to an adequate understanding of impacts to SG populations and habitat—the issue of mitigation will not be addressed. However, when discussion and evaluation of mitigation does begin, it is with the understanding that mitigation ratios across state lines will remain the same. That is, a bird in Wyoming is equivalent to one in Idaho; an acre of nesting habitat in WY is worth as much in Idaho; etc.

The Habitat Equivalency Analysis, described below, provides a standardized basis to determine a one-to-one ratio for habitat services lost to habitat services mitigated. However, biological factors may provide a valid basis for adjusting the minimal mitigation ratio beyond one-to-one. Three such factors include: (a) the best available scientific information regarding the relative value of sage-grouse populations contributing to long-term species viability across the species' range points to the relative importance of central and southwestern ID, central and northwestern NV, eastern OR, and the state of WY; (b) regarding individual birds, hens have a much higher biological value, in terms of contribution to populations, than males; and (c) localized habitats of high ecological value including (but not limited to) those serving key functions in demographic, genetic, or seasonal connectivity, important wintering areas, or leks.

**Habitat Equivalency Analysis (HEA)-** HEA is a method of quantifying the permanent or interim loss of habitat services from project related impacts. HEA provides a scientific-based, peer-reviewed method of scaling compensatory mitigation requirements, and has been used by federal regulatory agencies including the FWS and National Oceanic and Atmospheric Administration. The HEA is not meant to be an impacts analysis in and of itself; rather, it is a way to objectively determine quantity of project-related habitat impacts and provides the quantity and type of mitigation necessary to offset loss of habitat services as a form of output.

HEA is a process that requires close collaboration among the project proponent and State Agencies in states sustaining most of the impacts to populations and habitat (like Wyoming and Idaho) as well as FWS and BLM biologists to ensure adequacy of analysis and a corresponding final product. Other impacted states are expected to play an “advisory” role reviewing the HEA and ensuring consistency with their respective states as well (e.g., UT, NV, CO, and others depending upon the project). Building models associated with the HEA process must be done in close coordination with agency biologists in order to address concerns, questions, assumptions, and issues as they arise.

Agency biologists recognize the need for the incorporation of data and information the HEA models that the project proponent may not currently have. Agency biologists will work with project proponents to obtain such information to the extent they can (e.g., habitat maps; adequate

vegetation data)—again, reiterating the need for an interactive approach between the project proponent and agency biologists in order to ensure adequate completion of the HEA.

The initial starting point for evaluating direct and indirect impacts to SG habitat will be 18km either side of the proposed transmission line, addressing impacts to roughly 98% of nesting hens according the best available scientific information. Any deviation from this starting point must be supported by scientific literature: agency biologists can direct the project proponent to recently published literature on this topic which the project proponent is encouraged to use.

## Calculating Density of Disturbance within Key<sup>1</sup> Habitat

Once the Alternatives Analysis is complete and a preferred alternative has been selected, an additional site-specific evaluation of density of disturbance within Key Habitats/Core Areas may be conducted. The purpose of this evaluation is to evaluate opportunities to: minimize density of disturbance within Key Habitats/Core Areas that are outside the designated disturbance corridor identified in the Wyoming Governor's Executive Order 2011-5; and restore and/or enhance important sage-grouse habitat as a part of project-related mitigation. These site-specific habitat evaluations also will enable BLM to: (a) demonstrate compliance with the *Greater Sage-Grouse Habitat Management Policy on Wyoming BLM Administered Public Lands including Federal Mineral Estate* (IM WY-2010-012); and (b) demonstrate consistency with the *Greater Sage-Grouse Core Area Protection*, Wyoming Governor's Executive Order 2011-5.

The overall goal of a Sage-Grouse Key Habitat/Core Area Strategy within both Wyoming and Idaho is to limit the density and duration of disturbances and restrict activities within Key/Core Areas sufficient to ensure the long-term conservation and management of sage-grouse within each state. To this end, the Density Disturbance Calculation (DDC) is a tool designed to measure habitat loss within the Key Habitat/Core Area. In particular, it is used to determine—in terms of management actions—how the project related disturbance can be limited to no more than 5% loss of habitat and result in no more than an average of one disturbance per 640 acres.

The DDC calculates habitat loss in Key Habitat/Core Areas beyond which scientific research has shown negative population level effects will occur. To accomplish this, the following evaluation will be conducted.

### **Step 1: Determination of leks that will be used in the site-specific evaluation:**

Place a four-mile boundary around the outer project boundary (as defined by the proposed area of disturbance related to the project, i.e., 150ft Right of Way, or similar). All occupied and undetermined sage-grouse leks located within four miles of the outer boundary of the project, and within Key Habitat/Core Areas, the will be considered in the DDC.

### **Step 2: Determine the DDC area size and configuration:**

A four-mile boundary placed around the perimeter of each lek identified in Step 1 and the area within the boundary of the leks, plus the four-mile project boundary, creates the DDC area for the project.

### **Step 3: Density of disturbance habitat evaluation:**

Disturbance will be evaluated for the DDC area as a whole, as well as for individual leks within the DDC area. Any portion of the DDC that falls outside Key Habitat/Core Area will be removed from this portion of the evaluation for Wyoming.

Disturbance Calculation: Total acres of “disturbance” within the DDC area will be determined through an evaluation of:

- a. Existing and Proposed disturbance—sage-grouse habitat that is disturbed by existing anthropogenic features or activities (e.g., transmission lines, distribution lines, wind development, oil/gas wells/facilities, geothermal, communication towers, pipelines, paved roads, and others)— and wildfire, including the full 150ft ROW of the proposed action;

- ❖ Additional guidance and information regarding how to “count” the number and acres of existing disturbances is available. Please request additional information regarding this issue from Idaho Fish and Game biologists the Habitat Protection Section (HPS) of the Wyoming Game and Fish Department.

- b. Approved permits (i.e., any state or Federal permits providing approval for on the ground actions) for projects not yet implemented or constructed.

Habitat Disturbance Evaluation: For projects that will result in disturbance of more than 5% of the DDC area, it may be advantageous for the project proponent to map the full extent of sage-grouse habitat within the DDC area in order to reduce this percentage. If this is done, it will be conducted to identify:

- a. “Suitable Habitat” and “Marginal Habitat” using BLM’s Habitat Assessment Framework (HAF) and unsuitable habitats within the DDC area.
- b. Sage-grouse evidence of use of suitable habitats (seasonal use, densities based on best available information)
- c. Priority restoration areas (which could reduce the existing disturbances to below the 5% threshold) for example:
  - i) Areas where plug and abandon activities on retired oil and gas wells will eliminate disturbance
  - ii) Areas where old reclamation has not produced suitable habitat
- d. Areas of invasive species
- e. Lands where other conservation assurances are in place (e.g., CCAA, easements, habitat contract, etc.)

**Step 4: Determination of existing and allowable suitable habitat disturbance:**

Acres of disturbance within suitable habitat divided by the total suitable habitat within the DDC area, multiplied by 100, equals the percent of disturbed suitable habitat within the DDC area. Subtracting the percentage of existing disturbed suitable habitat from 5% equals new allowable suitable habitat disturbance until plant regeneration or reclamation reduces acres of disturbed habitat within the DDC area.

<sup>1</sup> **Key Habitat Definitions.** For purposes of the Density of Disturbance Analysis for Gateway West, “Key Habitat” areas in Wyoming will correspond to the State of Wyoming’s identified Core Population Areas (version 3), and in Idaho the definition will encompass all of the following habitat types identified on the Idaho Sage-grouse Habitat Planning Map:

Key Habitat: Areas of generally intact sagebrush that provide sage-grouse habitat during some portion of the year.

Potential Restoration Area Type I (Also referred to as R1). Perennial Grasslands: Sagebrush-limited areas characterized by perennial grass species composition and/or structure that should provide suitable potential nesting habitat in the future, once sufficient sagebrush cover is re-established.

Potential Restoration Area Type II (Also referred to as R2). Annual Grasslands: Areas dominated or strongly influenced by invasive annuals such as cheatgrass (*Bromus tectorum*), medusahead rye (*Taeniatherum caputmedusae*) or similar species.

Potential Restoration Area Type III (Also referred to as R3). Conifer Encroachment: Areas where junipers and/or other conifer species are encroaching into sage-grouse habitat areas.

**Appendix J-2**  
**Habitat Equivalency Analysis for Mitigation of the Gateway West  
Transmission Line**

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# **Habitat Equivalency Analysis for Mitigation of the Gateway West Transmission Line**

Prepared as a component of the Framework for  
Sage-grouse Impacts Analysis developed by

**Bureau of Land Management  
U.S. Fish and Wildlife Service  
Wyoming Game and Fish Department  
Idaho Fish and Game Department  
Rocky Mountain Power  
Idaho Power Company**

Prepared by

**SWCA Environmental Consultants**

August 2012

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## APPENDICES

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## 1.0 INTRODUCTION

Bureau of Land Management (BLM) biology staff provided a Framework for Sage-grouse Impacts Analysis for Interstate Transmission Lines (Framework; November 22, 2010, last revised October 22, 2011) to Rocky Mountain Power and Idaho Power Company as guidance for the analysis of impacts to greater sage-grouse (*Centrocercus urophasianus*; henceforth, sage-grouse) for the Gateway West Transmission Line Project (Project). Activities proposed for the Project include building and operating approximately 1,000 miles of new high-voltage (230- and 500-kilovolt) transmission lines across southern Idaho and southern Wyoming. The Framework was developed by an interagency group consisting of the BLM, U.S. Fish and Wildlife Service (USFWS), Idaho Department of Fish and Game (IDFG), and Wyoming Game and Fish Department (WGFD). It is intended to produce an impacts analysis that is compliant with the Greater Sage-Grouse Habitat Management Policy on Wyoming BLM Administered Public Lands including Federal Mineral Estate (IM WY-2010-012), and consistent with the Greater Sage-Grouse Core Area Protection, Wyoming Governor's Executive Order 2011-5.

The Framework specified the Project Proponent's use of the Habitat Equivalency Analysis (HEA) technique as a decision-support tool to scale mitigation for the loss of sage-grouse habitat services associated with vegetation loss, noise, and human presence anticipated with Project development. The HEA for Gateway West is not the NEPA-mandated impacts analysis for the Project, which is separate and found in the draft environmental impact statement (DEIS; BLM 2011).

HEA is a science-based, peer-reviewed method of scaling compensatory mitigation requirements to potential Project-related effects, measured as a loss of habitat services from pre-disturbance conditions (Allen et al. 2005; Dunford et al. 2004; King 1997; Kohler and Dodge 2006; National Oceanic and Atmospheric Administration 2006, 2009). Habitat services include those ecosystem features (i.e., physical site-specific characteristics of an ecosystem) and ecosystem functions (i.e., biophysical processes that occur within an ecosystem) that support wildlife and human populations (King 1997).

An HEA defines which habitat services will be affected, quantifies the permanent or interim loss of those services over time, and quantifies scaled compensation for that loss. When wildlife habitat is the primary service of interest, habitat services (e.g., nest sites, forage, cover from predators, etc.) are generally quantified using a metric that represents the functionality or quality of habitat (i.e., the ability of that habitat to provide those services, such as vegetation composition and structure, patch size, proximity to breeding areas, etc.). Areas with the highest habitat service levels are those areas with the highest habitat quality. Permanent habitat injuries are those habitat injuries remaining after construction is finished and vegetation recovery is complete (e.g., substations, permanent footprint of the transmission structures, etc.). Interim habitat injuries are those habitat services that are absent during the construction phase and during vegetation restoration that would have been available if that disturbance had not occurred.

The Framework states, "The HEA is not meant to be an impacts analysis in and of itself; rather, it is one part of an overall wildlife impacts analysis that objectively determines quantity of project-related habitat impacts and provides the quantity and type of mitigation necessary to offset loss of habitat services as a form of output." This HEA is not an impacts analysis for the

Project. Rather, it is a decision-support tool intended to be used in conjunction with the rest of the Framework to develop an appropriate mitigation package. The HEA modeled loss of habitat services associated with vegetation loss (direct effect), noise (indirect effect), and human presence (indirect effect). Additional Project effects (e.g., introduction and spread of invasive species; decreased lek attendance; habitat loss caused by behavioral avoidance of transmission corridors; increased public access and associated impacts [e.g., noise, trash]; and increased predation and nesting by raptors and corvids due to the presence of transmission structures) are evaluated separately by the DEIS because the magnitude of these effects could not be defensibly quantified for the HEA model (BLM 2011).

A multiple-agency and stakeholder group (HEA Technical Advisory Team) was convened to guide the development of the HEA model for the Project. The HEA Technical Advisory Team includes representatives from Wyoming BLM, Idaho BLM, WGFD, IDFG, Idaho USFWS, Wyoming USFWS, Rocky Mountain Power, and Idaho Power Company. Consulting companies—Tetra Tech (preparers of the environmental impact statement for the Project), SWCA Environmental Consultants (SWCA; preparers of the HEA model), and EnviroIssues—provide support to the HEA Technical Advisory Team. Decisions made by the HEA Technical Advisory Team are documented in meeting notes, which are provided in Appendix F of this document.

The draft environmental impact statement (BLM 2011) evaluates several alternatives for each of the 10 Project segments. It was not feasible to model all alternatives for the HEA and the BLM had not selected a preferred route at the time of the analysis, so the Proponent's preferred route was modeled and analyzed (refer to Appendix F, discussion on dates 07/29/11, 12/08/11, and 03/20/12). Additionally, the Framework specifies that the HEA is to be used as a mitigation scaling tool, not an impacts analysis tool, so the HEA Technical Advisory Team felt it was inappropriate to model all alternatives for the purpose of comparison.

## 2.0 METHODS

The following sections describe the general methods used to develop the HEA models that were applied to assess the loss of habitat services associated with Project development and the benefits of various conservation measures that may be used for mitigation.

The HEA methods specific to this Project are described in Appendices A through D and include:

- Appendix A: Development of Habitat Service Metrics. Development of the sage-grouse habitat metric for the Project.
- Appendix B: Quantification of Baseline Habitat Service Level. Geographic information system (GIS) methods used to map Baseline habitat quality and calculate the Baseline habitat service level for each modeled segment.
- Appendix C: Quantification of Habitat Service Losses. Description of Project effects, Project schedule, GIS methods to model Project effects and recovery, and HEA for habitat service losses.

- Appendix D: Quantification of Mitigation Project Habitat Service Gains. Description of mitigation projects selected for modeling, GIS methods to quantify habitat service gain associated with mitigation projects, and HEA for mitigation service gains.

For this HEA, a habitat service metric was developed. Using this approach, lost habitat services (decreases in habitat quality) must be replaced with like services. The HEA does not assume a one-to-one trade-off in resources (e.g., number of acres of sage-grouse habitat effected), but instead determines compensation based on the habitat services those acres provide (e.g., development in high-quality sage-grouse habitat would have higher compensation levels than development in lower-quality habitat that provides fewer services).

## 2.1 DEVELOPMENT OF HABITAT SERVICE METRIC

To quantify the habitat services (e.g., sage-grouse habitat functionality) provided by an ecosystem, a habitat service metric is developed that scores key habitat elements for the species. Scoring habitat services is a critical step in the HEA process because it provides a way to quantitatively measure the quality of specific habitat functions in a specific area. The habitat metrics used in the HEA must be able to capture the relative differences in the quantity of services provided before and after construction and conservation-focused activities. Habitat services often have three components—land area, service level, and time—and are commonly expressed in service-acres (one year) or service-acre-years (service-acres summed over multiple years).

The sage-grouse habitat services metric for the project was developed collaboratively by the HEA Technical Advisory Team and their consultants. The focus of the metric was to capture changes in sage-grouse habitat services over time with vegetation removal and recovery. Decisions by the Team regarding inclusion and exclusion of environmental variables in the metric are documented in the meeting notes collected by EnviroIssues (see Appendix F, dates 01/19/11, 05/12/11, 06/21/11, 07/29/11, 08/31/11, 10/31/11, and 12/07/11). Many variables were considered for inclusion in the metric that were later excluded because they were not adequately supported by the literature or data were not available for the Project area. Variables required available quantitative data of comparable quality for the Project area in both Idaho and Wyoming in order to be included in the metric. Maps of baseline condition (i.e., maps of metric scores at pre-construction condition) were produced at a localized scale for review by resource experts with the BLM, USFWS, WGFD, and IDFG. Discrepancies between the map of baseline conditions and agency-observed patterns in sage-grouse habitat quality were addressed by adjusting the metric until the HEA Technical Advisory Team reached consensus that the metric scores were a useful surrogate for habitat quality and appropriate for use in the HEA.

The habitat service metric developed for the Project included variables identified by the peer-reviewed literature as having influence on the quality of sage-grouse habitat, including dominant vegetative components and anthropogenic influences (Table 2). The variables included were limited to those for which data were available across the Project area.<sup>1</sup> For each of the variables,

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<sup>1</sup> Discussion regarding the metric variables considered is documented in the HEA Technical Advisory Team notes dated 05/12/11 and 06/21/11. Additional variables considered but excluded due to lack of data were grass and forb height, forb richness, and monocot cover and height.

a habitat service score ranging from 0 to 3 (zero to high services) was assigned for categories like those defined in the Sage-Grouse Habitat Assessment Framework Multi-scale Habitat Assessment Tool (Stiver et al. 2010). Categorical variables were more appropriate than continuous variables due to the resolution of the remotely sensed vegetation data available for the length of the Project. The breaks between scores were primarily based on information contained in the literature regarding sage-grouse habitat use and selection. When literature did not allow for direct quantification of the HEA scores, professional judgments of the HEA Technical Advisory Team informed by the available peer-reviewed literature were used. Professional judgments were correlated with specific literature references when possible and/or confirmed with academic and agency biologists. When a particular variable matched literature-based optimal conditions, that variable was given a service score of 3. When a particular variable was absent in a vegetated area (e.g., sage-brush vegetation was absent for the sage-brush cover variable [see VAR08 in Table 2, below]), the assigned score was 1. However, if no vegetation was present (e.g., vegetation was cleared from any part of the scored grid cell during Project construction) or the vegetation present was considered unsuitable for sage-grouse (as defined by VAR04 in Table 2), the total possible score was 0.

The HEA Technical Advisory Team considered weighting some variables higher than others, but ultimately decided to weight all variables evenly. Weights were not applied because there was not adequate information in the literature to support the use of one specific weight over another. The importance of sagebrush was already intrinsically weighted higher than other vegetation types due to the number of variables that measured an aspect of sagebrush vegetation (for which non-sagebrush vegetation types would score low). Agency reviews of the final baseline maps were conducted to assure the quality of the metric. These reviews indicated that the metric performed well to distinguish between high-quality and low-quality sage-grouse habitat across the length of the Project without adjusting the variable weights.

Sage-grouse habitat suitability publications vary in their baseline environmental conditions affecting a particular study site. Even studies within a single state may describe different suitable habitat conditions depending on elevation, precipitation zone, and other geographic or climatic factors affecting each study site. The habitat metric relied on generalizations presented in BLM et al. (2000), Cagney et al. (2009), Connelly et al. (2011), Connelly et al. (2000), Stiver et al. (2010), and other summary publications. Specific citations are given to support these generalizations when applicable.

The HEA metric was used to score habitat service level for all areas on and within 9 kilometers (km) of the Project (Assessment Area). The Assessment Area for the HEA was smaller than the 18-km assessment area used in the draft environmental impact statement (DEIS; BLM 2011) because it decreased model processing times (by GIS software) and because none of the service losses modeled (vegetation loss, noise, and human presence) extended beyond 9 km of the transmission line (refer to Appendix F, attachments to notes dated 6/21/2011). The Project segments modeled were selected from the Project alternatives presented in the DEIS (BLM 2011) by the HEA Technical Advisory Team, because a preferred route had not been selected at the time of the analysis. The Project segment alternatives modeled for the HEA included 01Wa, 01Wc, 02c, 03p, 04a, 05p, 07p, 08p, 09d, and 10p (Table 1).

**Table 1.** Project Segments Modeled in the HEA and the Corresponding Project Routes in the DEIS (BLM 2011).

HEA Project Segment	Corresponding Project Routes in Project DEIS	Reference Points in Project DEIS maps
01Wa	Proposed 01Wa	1, 1Wa, 1Wb, 1Wc, 1Wd, 2
01Wc	Proposed 01Wc	1x, 1x.1, 1x.2, 2
02c	Segment 02—Alternative C	2, 2a, 2a.1, 2d.1, 2e.4, 2e.1, 2e.2, 2e.3, 2f, 2h, 2i, 3
03p	Segment 03—Proposed	3, 3a, 4
04a	Segment 04—Alternative A	4, 4a, 4b, 4f, 4e, 4f.1, 4f.2, 4g.1, 4g, 4f.4, 4j, 4k, 4m, 4n, 4o, 4p, 5
05p	Segment 05—Proposed	5, 5a, 5a.1, 5g, 5b, 5i, 5j, 5l, 6
07p	Segment 07—Proposed	5, 7a.0, 7b.0, 7c, 7d, 7e, 7v, 7g, 7h, 7j, 7j.1, 7k, 7l, 7y, 7m.1, 7t, 7s, 7s.3, 7s.1, 7z, 9
08p	Segment 08—Proposed	8, 8a, 8b, 8c, 8c.1, 8c.2, 8q, 8r, 8r.1, 8r.3, 8r.4, 8r.5, 9t, 9v, 11
09d	Segment 09—Alternative D	9, 9a, 9a.2, 9a.3, 9a.4, 9a.5, 9c.1, 9e.1, 9e.2, 9h, 9i, 9n, 9n.1, 9r, 9r.1, 9r.4, 9r.5, 9p, 9w, 11
10p	Segment 10—Proposed	8, 10a, 10c, 9

**Table 2.** Anthropogenic and Habitat Variables Used as a Metric of Greater Sage-grouse Habitat Services

Variable Number	Variables	Service Score				Primary Citations
		3	2	1	0	
VAR01	Distance to interstate highway or federal highway (meters [m])	>5,000	700–5,000	100–700	<100	Craighead Beringia South (2008); Johnson et al. (2011); Pruett et al. (2009)
VAR02	Distance to county/state highway or heavily travelled gravel road, well pads, or mine footprints (m)	>200	50–200	25–50	<25	Connelly et al. (2004); Craighead Beringia South (2008); Johnson et al. (2011); Pruett et al. (2009); Rogers (1964)
VAR03	Distance to fence (km)*	>2.0	0.4–2.0	<0.4	N/A	Christiansen (2009); Stevens (2011)
VAR04	Vegetation class	N/A	N/A	All vegetation types except those identified as scoring 0	Forested, urban, open water, roads, well pads, and mine footprints	Multiple sources per USFWS listing decision in <i>Federal Register</i> ; Johnson et al. (2011)
VAR05	Percent slope	<10	10–30	30–40	>40	Beck (1977); Lincoln County Sage Grouse Technical Review Team (2004)
VAR06	Distance to occupied lek (km)	0–5.0	5.0–8.5	>8.5	N/A	Cagney et al. (2009); Connelly et al. (2000); Connelly et al. (2011); Holloran and Anderson (2005)
VAR07	Sagebrush patch size (hectares)	>130	10–130	<10	N/A	Connelly et al. (2011); Wallestad (1971)
VAR08	Percent sagebrush cover	15–25	5–15 or >25	<5	N/A	Cagney et al. (2009); Connelly et al. (2000); Stiver et al. (2010)
VAR09	Sagebrush canopy height (centimeters)	30–80	20 to <30 or >80	<20	N/A	Connelly et al. (2000); Crawford et al. (2004); Stiver et al. (2010)
VAR10	Percent bunchgrass cover	5–15	2–5 or >15	<2	N/A	BLM et al. (2000); Connelly et al. (2000); Gregg et al. (1994); Stiver et al. (2010)
VAR11	Distance of habitat to sage or shrub dominant (m)	<90	90–275	>275	N/A	BLM et al. (2000); Connelly et al. (2000); Lincoln County Sage Grouse Technical Review Team (2004)

Note: The metric is a simple additive model. Each cell in the analysis area is scored separately by multiplying the sum of Variables 01 through 03 and 05 through 11 by the vegetation exclusion Variable 04.

\* Allotment boundaries are being used as a surrogate for fences in this variable.

## 2.2 QUANTIFICATION OF HABITAT SERVICE LOSSES

The following sections describe the losses of habitat services that would likely occur as a result of constructing the Project. These habitat models were simulated in a GIS platform to produce data inputs for the HEA.

The HEA model calculates the present value of future changes to the baseline habitat service level with time caused by losses of habitat services with Project development and gains of habitat services with mitigation projects. Economists call this process *discounting* and it is a standard part of the HEA model. Discounting converts services being provided in different time periods into current time period equivalents (Allen et al. 2005). Discounting results in a gradual increase in the service-acres provided by injured habitats over time, and the same rate of decrease in service-acres gained by habitat conservation over time. Consequently, credit for mitigation in the form of habitat conservation (increase in service-acres) is greater when implemented early in the lifetime of the Project than when implemented late in the lifetime of the Project. This encourages early mitigation to offset habitat service losses, to ensure that long-term adverse effects to the resource are minimal. Likewise, the injury (i.e., loss of habitat services) due to construction and operation of the Project (decrease in service-acres) is greater when it occurs early in the project lifetime than when it occurs later in the project lifetime.

Ideally, the baseline habitat service level would account for all habitat service losses associated with existing environmental disturbances. This was done to the extent possible with the existing data for the Assessment Area. In some cases, existing habitat disturbances were not mapped in the baseline service level because they were not detected by the chosen habitat services metric, or because the data were unavailable for use in the baseline analysis. Omission of these disturbances is a conservative approach to the analysis of Project-related habitat service losses. When baseline disturbances are omitted, the analysis assumes that the habitats affected by the Project are of higher-quality than they actually are, and thus require a greater amount of mitigation to offset Project-related habitat service losses.

### 2.2.1 Description of Changing Habitat Service Level by Project Milestone

The habitat services provided by the Assessment Area were calculated at Project milestones that reflected varying levels of disturbance. The Project milestones modeled with GIS data for the HEA are listed below.

1. **Baseline**—the baseline milestone quantifies habitat services available to sage-grouse before disturbance. The calculation of Baseline is described above.
2. **Construction**—the substation and transmission line construction milestone quantifies habitat services available to sage-grouse during the construction or operation of the substations proposed as part of this Project and the construction of the transmission line. Magnitude of the loss of habitat services during construction is dependent on proximity to the Project and the amount of new surface disturbance.
3. **Restoration**—the restoration milestone quantifies habitat services available to sage-grouse after substation and transmission line construction is complete and some services return with the reduction in noise and human presence.

4. **Recovery**—the recovery milestone quantifies habitat services available to sage-grouse after a vegetation type has recovered to the greatest extent expected after Project restoration is complete. Habitat services return to baseline conditions in restored areas with the time to recovery being dependent on the vegetation type. There were four vegetation-based recovery endpoints: 1) agriculture and introduced vegetation including cheatgrass (1 year after Restoration); 2) grassland, wetland, and riparian (5 years after Restoration), 3) shrubs other than sagebrush (20 years after restoration); and 4) sagebrush (100 years after Restoration; see Recovery Milestone description in Appendix C for vegetation recovery rates associated with these endpoints).

## **2.2.2 Quantifying Habitat Service Losses during Construction**

Snapshots of the changing habitat services over time are modeled using GIS-based tools for each of the milestones identified above for incorporation into the HEA. The HEA calculates the total interim and permanent habitat injuries associated with the Project. Specifics of the GIS and HEA methods are provided in Appendix C.

### **2.2.2.1 Timing**

A conceptual substation, transmission structure, and infrastructure layout was provided in the Project DEIS (BLM 2011) from which all habitat service losses were calculated. The timing of the different phases of construction was provided by Rocky Mountain Power and Idaho Power for each Project segment (Table 3). Each segment was constructed over a period of 3 years. A separate HEA was conducted for each Project segment, so the timing of the Project milestones is independent among segments.

### **2.2.2.2 Direct Disturbance**

The footprint of the Project segments and alternatives presented in the DEIS were provided electronically to SWCA by Tetra Tech. The footprint files specified the locations of and direct disturbance associated with substations, regeneration stations, roads, transmission structures, and other project infrastructure.

During the three Construction years, direct disturbance was defined as the loss of all habitat services within the entire construction footprint for the segment modeled (Table 4). The model did not capture temporal restrictions on Project construction required by the BLM, resulting in high estimates of service losses in the three Construction years. In the Restoration year following construction, direct disturbance was still defined as the loss of all habitat services in the construction footprint, because the vegetation had not regrown sufficiently to provide habitat. In the Recovery years, direct disturbance was defined as the loss of all habitat services in the footprint of permanent facilities (i.e., substations, regeneration stations, and transmission structure pads). The direct disturbance in restored areas was returned at different rates depending on baseline vegetation type.

**Table 3. Project Milestone Years by Segment**

Project Year	Project Milestone by Modeled Segment								
	01Wa + 01Wc	02c	03p	04a	05p	07p	08p	09d	10p
0	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
1	Construct	Construct	Construct	Construct	Baseline	Baseline	Baseline	Baseline	Baseline
2	Construct	Construct	Construct	Construct	Baseline	Baseline	Baseline	Baseline	Baseline
3	Construct	Construct	Construct	Construct	Baseline	Baseline	Baseline	Baseline	Baseline
4	Restoration	Restoration	Restoration	Restoration	Construct	Construct	Construct	Construct	Construct
5	Recovery 1	Recovery 1	Recovery 1	Recovery 1	Construct	Construct	Construct	Construct	Construct
6	--	--	--	--	Construct	Construct	Construct	Construct	Construct
7	--	--	--	--	Restoration	Restoration	Restoration	Restoration	Restoration
8	--	--	--	--	Recovery 1				
9	Recovery 2	Recovery 2	Recovery 2	Recovery 2	--	--	--	--	--
10	--	--	--	--	--	--	--	--	--
11	--	--	--	--	--	--	--	--	--
12	--	--	--	--	Recovery 2				
13–23	--	--	--	--	--	--	--	--	--
24	Recovery 3	Recovery 3	Recovery 3	Recovery 3	--	--	--	--	--
25	--	--	--	--	--	--	--	--	--
26	--	--	--	--	--	--	--	--	--
27	--	--	--	--	Recovery 3				
28–103	--	--	--	--	--	--	--	--	--
104	Recovery 4	Recovery 4	Recovery 4	Recovery 4	--	--	--	--	--
105	End of Analysis	End of Analysis	End of Analysis	End of Analysis	--	--	--	--	--
106									
107					Recovery 4				
108					End of Analysis				

Note: Recovery Endpoints: 1) Recovery of agriculture/pasture and introduced vegetation is complete; 2) Recovery of grassland, wetland, and riparian is complete; 3) Recovery of shrub is complete (excluding sagebrush); and 4) Recovery of sagebrush complete. Years marked by shaded cells were not included in the HEA.  
 -- = linear change in habitat service level between recovery endpoints

**Table 4.** Direct Disturbance Levels Modeled by Project Year and Disturbance Type

Project Milestones	Project Year Applied*	Percent Baseline Services Present by Direct Disturbance Type		
		Substations and Regeneration Stations	Transmission Towers	Access Roads, Transmission Lines, and Temporary Infrastructure
Baseline	0	100%	100%	100%
Construction	1, 2, 3	0%	0%	0%
Restoration	4	0%	0%	0%
Progressive Vegetation Recovery	5 (endpoint 1)	0%	<ul style="list-style-type: none"> <li>• 0% in tower pad<sup>†</sup> (0.06 acre)</li> <li>Elsewhere<sup>‡</sup>: <ul style="list-style-type: none"> <li>• 100% of agricultural baseline services</li> <li>• 20% of grassland, wetland, and riparian baseline services</li> <li>• 5% shrub baseline services</li> <li>• 1% of sagebrush baseline services</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• 100% of agricultural baseline services</li> <li>• 20% of grassland, wetland, and riparian baseline services</li> <li>• 5% shrub baseline services</li> <li>• 1% of sagebrush baseline services</li> </ul>
	9 (endpoint 2)	0%	<ul style="list-style-type: none"> <li>• 0% in tower pad (0.06 acre)</li> <li>Elsewhere: <ul style="list-style-type: none"> <li>• 100% of agricultural, grassland, wetland, and riparian baseline services</li> <li>• 25% shrub baseline services</li> <li>• 5% of sagebrush baseline services</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• 100% of agricultural, grassland, wetland, and riparian baseline services</li> <li>• 25% shrub baseline services</li> <li>• 5% of sagebrush baseline services</li> </ul>
	24 (endpoint 3)	0%	<ul style="list-style-type: none"> <li>• 0% in tower pad (0.06 acre)</li> <li>Elsewhere: <ul style="list-style-type: none"> <li>• 100% of agricultural, grassland, wetland, riparian, and shrub baseline services</li> <li>• 20% of sagebrush baseline services</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• 100% of agricultural, grassland, wetland, riparian, and shrub baseline services</li> <li>• 20% of sagebrush baseline services</li> </ul>
	104 (endpoint 4)	0%	<ul style="list-style-type: none"> <li>• 0% in tower pad (0.06 acre)</li> <li>Elsewhere: <ul style="list-style-type: none"> <li>• 100% of agricultural, grassland, wetland, riparian, shrub, and sagebrush baseline services</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• 100% of agricultural, grassland, wetland, riparian, shrub, and sagebrush baseline services</li> </ul>

\* There is a 3-year delay for segments 5, 7, 8, 9, and 10 per schedule in Table 3.

<sup>†</sup> Tower pad in this table refers to the permanent tower footprint.

<sup>‡</sup> Elsewhere refers to construction roads that were reduced to two-track roads, or any areas where vegetation was cleared for Project construction that were subsequently revegetated during Restoration (e.g., staging areas).

### 2.2.2.3 Indirect Disturbance

In addition to the actual surface disturbance, indirect disturbance buffers were applied to reduce habitat services around substations and around transmission lines during periods of active construction (Table 5). Within these buffers (>200 meters [m], 50–200 m, 25–50 m, or <25 m), the habitat services were scored by the metric as if they were in the same proximity to a secondary road (county/state highway or heavily travelled gravel road) to account for the disturbance associated with noise and human presence (see Appendix C, Quantifying Loss of Habitat Services Due to Indirect Disturbances During Construction for additional detail).

After construction, the indirect disturbance buffers were dropped from everything except substations and regeneration stations. The noise associated with the operation of the substations and regeneration stations was characterized as a permanent indirect disturbance in the model. Little information has been published on sage-grouse habitat use near transmission lines. The

HEA Technical Advisory Team decided not to model disturbance due to transmission lines after construction is complete, because insufficient information was available to characterize and quantify these effects. Potential indirect impacts associated with transmission lines are discussed in detail in the Project DEIS (BLM 2011).

**Table 5.** Indirect Disturbance Levels Modeled by Project Year and Disturbance Type

Project Milestones	Project Year Applied <sup>†</sup>	Indirect Disturbance Buffers* Applied by Disturbance Type		
		Substations and Regeneration Stations	Transmission Towers	Access Roads, Transmission Lines, and Temporary Infrastructure
Baseline	0	None	None	None
Construction	1, 2, 3	Secondary Road	Secondary Road	Secondary Road
Restoration	4	Secondary Road	None	None
Progressive Vegetation Recovery	5	Secondary Road	None	None
	9	Secondary Road	None	None
	24	Secondary Road	None	None
	104	Secondary Road	None	None

\* "Secondary Road" indicates that the footprint of the disturbance was classified as having the same indirect disturbance as a secondary road in the GIS model and the scores of the surrounding vegetation decreased as defined by the habitat services metric.

<sup>†</sup> There is a 3-year delay for segments 5, 7, 8, 9, and 10 per the schedule in Table 3.

#### 2.2.2.4 Project Segmentation for Modeling

Each of the segments was modeled independently from every other segment. The footprints of the substations are attached to one of the adjoining segments or split between adjoining segments. Because the segments were modeled independently, if the segments were laid out in a continuous path, the 9-km analysis buffers would overlap where the segments joined. Therefore, indirect losses of habitat services associated with project construction and substation operation would be represented in adjacent segments within 9 km of their junction. Because of this overlap in the analysis areas for the segments, the sum of the values for all the segments in these tables may not equal the same value for the entire line. The segments were modeled independently because a preferred alternative had not yet been selected at the time of analysis.

### 2.3 QUANTIFICATION OF CONSERVATION BENEFIT TO HABITAT SERVICES

Habitat conservation measures (Table 6) were selected by the HEA Technical Advisory Team to be modeled in the HEA. These measures have been identified to improve sage-grouse habitat services and produced a benefit that could be measured by the habitat service metric used in this HEA. These conservation measures serve as a "toolbox" from which mitigation options may be selected by the Project proponent for inclusion in a mitigation package.<sup>2</sup> The benefit (in service-acres) for each habitat conservation measure was calculated with GIS technology, using the same habitat service metric as was used to calculate habitat service losses.

<sup>2</sup> Mitigation may not be limited to the modeled conservation measures. Additional conservation measures that may be considered for mitigation, but could not be modeled, were identified by the HEA Technical Advisory Team. A list of those conservation measures is provided in Appendix E.

The same conservative vegetation growth rates that were used to model vegetation recovery in the Project footprint were applied to the habitat conservation measures proposed for mitigation. The HEA Technical Advisory Team decided that the conservative growth rates were sufficient to offset the potential for mitigation project failure in the model.

**Table 6. Habitat Conservation Projects Modeled in the HEA**

Conservation Project Type	Brief Project Description	Anticipated Benefits	Average Cost of Implementation*
Fence removal and marking with flight diverters	Fences would be removed or marked in: 1) Sections of fence known to cause sage-grouse collisions, 2) Fences within 2 km (1.2 mi) of leks (Braun 2006; Stevens 2011) or other high risk area, 3) Fences in areas with low slope and terrain ruggedness (Stevens 2011), and 4) Fence segments bounded by steel t-posts with spans greater than 4 m (Stevens 2011).	<ul style="list-style-type: none"> <li>• Reduce mortality due to sage-grouse collisions</li> <li>• Increase visibility of fences, where diverters are used</li> <li>• Increase contiguous patches of shrub-steppe habitat</li> <li>• Remove localized grazing pressure where fences are removed, thereby increasing local habitat quality (e.g., bunchgrass cover)</li> </ul>	<ul style="list-style-type: none"> <li>• \$1,400 per mile (\$868 per km) for fence removal or initial installation of flight diverters \$300 per mile per year (\$186 per km per year) for maintenance on flight diverters<sup>†</sup></li> </ul>
Sagebrush restoration and improvement projects	Seeding, planting seedlings, or transplanting containerized sagebrush plants (one plant per 5 m <sup>2</sup> ) and seeding a bunchgrass understory	<ul style="list-style-type: none"> <li>• Create contiguous patches of shrub-steppe habitat with optimal sagebrush cover and height and a bunchgrass understory</li> <li>• Increase availability of high-quality nesting, brood rearing, and winter habitats</li> </ul>	<ul style="list-style-type: none"> <li>• \$3,700 to \$6,900 per acre (\$9,260 to \$17,043 per hectare), depending on method used</li> </ul>
Juniper/conifer removal	Mechanical removal (lop and scatter, cut-pile-cover, or mastication) of juniper/conifer adjacent to areas with optimal sagebrush cover and height	<ul style="list-style-type: none"> <li>• Reverse juniper/conifer encroachment on shrub-steppe habitat to increase contiguous patches of sage-grouse habitat</li> <li>• Increase light penetration to support a forb and grass understory</li> </ul>	<ul style="list-style-type: none"> <li>• \$170 to \$2,000 per acre (\$420 to \$4,940 per hectare), depending on density of vegetation removed.<sup>‡</sup></li> </ul>
Bunchgrass and forb seeding projects	Bunchgrass and forb seeding to increase bunchgrass communities to improve understory quality	<ul style="list-style-type: none"> <li>• Create contiguous patches habitat with high quality understory vegetation</li> <li>• Increase suitable forage and insect availability for sage-grouse browsing during brood rearing</li> <li>• Improve understory of sagebrush</li> </ul>	<ul style="list-style-type: none"> <li>• \$1,200 per acre (\$2,960 per hectare)</li> </ul>
Conservation easements	Removes threat of specific land uses to sensitive wildlife populations	<ul style="list-style-type: none"> <li>• Prevent sage-grouse habitat destruction or degradation near urban areas and oil and gas development</li> <li>• Reduce future fragmentation of shrub-steppe habitat</li> </ul>	<ul style="list-style-type: none"> <li>• \$580 per acre (\$1,430 per hectare) average purchase price</li> <li>• \$2,500 per year for maintenance and monitoring</li> </ul>

\* Cost of implementation includes a 50% markup for indirect costs, which include contract writing, supervision, clearances, monitoring, inspections, and vehicle costs. The markup was calculated from project cost estimates received from the HEA Technical Advisory Team that itemized these indirect expenses and averaged among estimates. Cost is in 2012 dollars; mitigation funds provided in years after 2012 should be adjusted for inflation.

<sup>†</sup> The cost of maintenance for the lifetime of the project is included in the HEA model and the resulting estimated cost per service-acre-year in Table 8.

<sup>‡</sup> The cost of this treatment varies widely depending on the baseline vegetation. The lower end cost includes lop and scatter of Phase I juniper with no understory treatment. The upper end cost includes mastication of Phase III juniper and seeding a bunchgrass understory.

Three to five hypothetical project areas were selected in Idaho and Wyoming for each conservation measure. The variable scores were manipulated using GIS technology to approximate the change expected with implementation of the measure. The benefit of the measure was the difference in the service score before and after implementation. The mean benefit among the hypothetical project areas was entered into the HEA, where estimated time until full benefit and discount rate was applied to estimate the discounted service-acre-years gained per project area.

The cost of the modeled habitat conservation measures was estimated by averaging the known cost of similar projects previously implemented in Idaho and Wyoming (in 2012 U.S. dollars). These cost estimates were used to calculate the price per service-acre-year. An HEA scales the mitigation package (i.e., funding to create habitat services) to offset the loss of habitat services over the lifetime of the Project.

Appendix D describes in detail the methods used to evaluate the benefit of the conservation projects compared to baseline.

### **3.0 HABITAT EQUIVALENCY ANALYSIS RESULTS**

The following sections describe the results of the HEA for habitat service losses over the lifetime of the Project and the results of the HEA for conservation measure benefits. These results are expressed as the service-acre-years lost or gained, which is the sum of the permanent and interim losses gains over the lifetime of the Project with the economic discount rate applied. These results may be used to scale mitigation.

#### **3.1 HEA HABITAT SERVICE LOSS RESULTS**

A separate HEA was run for each of the Project segments. The modeled habitat service level at each of the Project milestones was entered into the HEA to calculate the present value of the habitat services lost over the lifetime of the Project. A linear change in service level was assumed between modeled milestones. The results of the HEAs for Project habitat service losses are provided in Table 7 for the full Analysis Area (i.e., 9-km buffer around Project footprint). These are the habitat service totals that need to be offset with mitigation.

Service losses varied among segments with differences in segment length, Baseline habitat service score, and Project schedule. The highest service loss per segment occurred in segment 04a, primarily due to the comparatively long length of this segment. Highest service losses per kilometer of line occurred in segments 02c and 03p due to the predominance of sagebrush (and resulting high Baseline scores) in these segments and the long recovery times associated with this vegetation type. Due to the 3% discount rate applied in the HEA, those segments constructed later (i.e., segments 05p, 07p, 08p, 09d, and 10p [see Tables 1 and 3]) created a smaller habitat service loss than segments in comparable habitat constructed earlier.

**Table 7. Habitat Services Lost in the 9-km Analysis Area for Each Modeled Segment Over the Lifetime of the Project (Years 1–107)**

Segment	Substations Modeled*	Segment Length (km)	Assessment Area (9-km buffer)		Habitat Service Level at Baseline (service-acres provided in 1 year with no service losses)	Habitat Services Lost (present value service-acre-years lost over lifetime of the Project)
			km <sup>2</sup>	acres		
01Wa <sup>†</sup>	Heward	117	2,548	629,694	11,849,516	380,523
01Wc <sup>†</sup>	Aeolus	114				
02c <sup>‡</sup>	--	147	3,202	791,164	16,327,495	730,926
03p	Anticline Jim Bridger	89	1,688	417,165	9,220,817	412,784
04a	Populus <sup>§</sup>	349	6,502	1,606,729	25,277,708	1,160,272
05p	Populus Borah	88	1,933	477,599	8,139,158	270,405
07p	Populus Cedar Hill	189	3,727	921,053	16,435,527	422,304
08p	Midpoint	210	4,132	1,020,945	18,994,512	683,103
09d	--	258	4,961	1,225,890	25,091,164	573,063
10p	--	54	1,219	301,196	5,186,472	121,263

\* Existing substations with no planned Project-related expansion were not modeled.

<sup>†</sup> The assessment areas for these two segments overlapped and so were analyzed together.

<sup>‡</sup> The modeled segment included Alternative 2c and Alternative 2p west of the terminus of 2c.

<sup>§</sup> The footprint of the Populus substation was divided into thirds with one third assigned to each of the adjoining segments (04a, 05p, and 07p) for the disturbance modeling in GIS.

<sup>¶</sup> Alternative 09d (bounded by Reference Points 9p and 9n [BLM 2011]) was modeled using GIS. The results were proportionally expanded by length to the line east of 9d to the Cedar Hill substation for use in the HEA. This approach assumes similar disturbance levels and baseline habitat quality in 9p east of 9d. This value is provisional.

### 3.2 HEA CONSERVATION BENEFIT RESULTS

A separate HEA was run for each habitat conservation measure. The habitat service increases modeled using GIS-based tools were entered into the HEA, along with estimates of time between receipt of funding and implementation of the measure, and time between implementation of the measure and full service benefit from the measure. The habitat service gains per unit area treated summed over the lifetime of the Project are provided for each conservation measure in Table 8.

New habitat services (measured in present value service-acre-years) varied among conservation measures. The greatest habitat service return per acre treated was for sagebrush restoration by transplanting containerized stems, and the smallest was for bunchgrass seeding. Marking fences was the most economical, as it had the lowest estimated cost per service-acre-year created. Bunchgrass seeding was the least economical because it improved the service score for only one variable when applied to areas with an existing value (e.g., sagebrush with a poor understory). Bunchgrass seeding provided a greater return in services when applied to disturbed areas (i.e., habitats with a current service value of 0), but still remained the least economical option. A range of values was provided for conservation easements, providing different potential levels of credit for the baseline service level in the easement area (i.e., 100%, 75%, 50%, or 25%). Conservation easements preserve existing habitat services in areas of potential development and can create

new habitat services if existing land practices that are damaging to sage-grouse habitat are restricted.

**Table 8.** Mean Present Value Habitat-Service-Acre Gained and Average Cost for Each Habitat Conservation Measure

Conservation Measure	General Method	Mean Habitat Services Gained (present value service-acre-years per unit)	Cost per Services Gained (U.S. dollars per service-acre-year)
Fence removal and marking with flight diverters*	Fence marking within 2 km of leks and in other high risk areas (e.g., winter concentration areas, movement corridors)	51,634 per mile of fence marked	\$0.65 <sup>‡</sup>
	Fence removal within 2 km of leks and in other high risk areas	51,634 per mile of fence removed	\$0.12
Sagebrush restoration and improvement projects	Seeding sagebrush and bunchgrass understory	1,751 per acre of disturbance treated	\$2.14
	Transplanting containerized sagebrush stems and seeding bunchgrass understory	4,556 per acre of disturbance treated	\$1.51
	Planting seedlings and seeding bunchgrass understory	1,935 per acre of disturbance treated	\$2.17
Juniper/conifer removal	Lop and scatter Phase I <sup>†</sup> juniper	1,108 per acre treated	\$0.15
	Cut-pile-cover or mastication of Phase II <sup>‡</sup> juniper	1,481 per acre treated	\$0.44
	Mastication of Phase III <sup>†</sup> juniper and seeding bunchgrass understory	1,751 per acre treated	\$1.14
Bunchgrass seeding projects	Overseeding understory vegetation	56 per acre treated	\$21.28
	Seeding disturbed habitat to create grassland	282 per acre treated	\$4.26
Conservation easements	Land purchase 25% service credit	187 per acre purchased	\$3.29 <sup>‡</sup> (\$2.72 <sup>§</sup> )
	Land purchase 50% service credit	374 per acre purchased	\$1.87 <sup>‡</sup> (\$1.55 <sup>§</sup> )
	Land purchase 75% service credit	560 per acre purchased	\$1.40 <sup>‡</sup> (\$1.16 <sup>§</sup> )
	Land purchase 100 % service credit	747 per acre purchased	\$0.94 <sup>‡</sup> (\$0.78 <sup>§</sup> )

\* Although fence removal is more effective at removing the threat of sage-grouse collision than fence marking, both measures were modeled the same for the HEA due to a limitation in the model.

<sup>†</sup> Phases of juniper describe the dominance of this vegetation on the landscape. Phase I is a sagebrush-dominated landscape with scattered juniper, Phase II is a landscape comprising a 50:50 mixture of sagebrush and juniper, and Phase III is a landscape dominated by juniper.

<sup>‡</sup> Cost estimate including maintenance as described in Table 6; maintenance is not an additional expense.

<sup>§</sup> Cost estimate excluding maintenance.

### 3.3 APPLICATION OF RESULTS TO A MITIGATION PACKAGE

The Proponents, BLM, and agencies will evaluate the services returned per habitat conservation measure, compare those services gained to the services lost as a result of the Project, and develop an appropriate mitigation plan to compensate for services lost. This analysis is a decision-making support tool for the development of the mitigation plan.

To accomplish a 1:1 trade-off in habitat service-acre-years over the lifetime of the Project per a traditional HEA, habitat conservation measures from Table 8 should be selected to offset 100%

of the habitat service losses quantified for each segment in Table 7. The recommended approach to this process is outlined in the steps below.

1. Select the habitat conservation measures most appropriate for each segment from Table 6 and define the proportion of each measure to be used as mitigation (e.g., mitigation in Segment A will be composed of w% fence modification, x% sagebrush restoration, y% juniper removal, and z% conservation easements).
2. Calculate the habitat services to be replaced using each habitat conservation measure. The total of the habitat services replaced using each measure should equal the total services lost in Table 7.
3. Calculate the cost to implement each habitat conservation measure in each segment. Multiply the habitat services to be replaced using a measure by the cost per habitat services gained for that measure from Table 8.
4. Sum the costs of the habitat conservation projects separately for each segment. The total would be the mitigation for the modeled habitat service losses in that segment.

The total mitigation due should be less than the sum of all the segment parts, because of the overlap in the 9-km buffers around the segments (described in Section 2.2.2.4). This adjustment can be made algebraically using the segment lengths.

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## **APPENDIX A**

### **Development of Habitat Service Metrics**

This appendix contains the methods used to develop the sage-grouse habitat metric for the Project.

## **DEVELOPMENT OF HABITAT SERVICE METRIC FOR HABITAT EQUIVALENCY ANALYSIS**

A habitat service metric was developed for the greater sage-grouse (*Centrocercus urophasianus*; henceforth, sage-grouse) using variables identified in the peer-reviewed literature as representative of sage-grouse habitat and agreed to at the May 12, 2011, meeting of the Habitat Equivalency Analysis (HEA) Technical Advisory Team. On December 7, 2011, after several review periods, the Team reached consensus on metric.

For each of the model variables, a habitat service score ranging from 0 to 3 (no services [non habitat] to high services [suitable habitat]) was assigned, similar to the sage-grouse habitat assessment framework developed by Stiver et al. (2010). Scoring habitat services is a critical step in the HEA process, because it provides a way to measure the relative quality of specific habitat functions in a specific area. The scores for this HEA were primarily based on information contained in the literature regarding sage-grouse habitat use and selection. When literature did not allow for direct assignment of value ranges for HEA scores, professional judgments, which were based on peer-reviewed literature, were used. Professional judgments were associated with specific literature references when possible and/or confirmed with academic and agency biologists. When a basic life requisite of sage-grouse was absent (e.g., vegetation was absent or forested, slopes were >40%, high levels of disturbance were present), the assigned score for the associated variable was 0. When a particular variable (e.g., % sagebrush cover) matched literature-based recommended conditions (e.g., 15%–25%), that variable was given a service score of 3. The number of variables relating to a habitat attribute (e.g., six for vegetation vs. one for slope) gives some attributes more influence than others without having to apply different variable weights. In the metric, there are three variables that score sagebrush characteristics (i.e., sagebrush patch size, sagebrush % cover, and sagebrush canopy height), so habitat patches that are not dominated by sagebrush will score low (1) for those three variables, resulting in a lower overall score.

Sage-grouse habitat suitability publications vary in their baseline environmental conditions affecting a particular study site. Even studies within the same state may describe different suitable habitat conditions depending on elevation, precipitation zone, and other geographic or climatic factors affecting each study site. No specific habitat studies have been conducted on the Gateway West Transmission Line Project (Project) transmission line corridor alternatives, therefore the habitat metrics described below mostly rely on information presented in Bureau of Land Management (BLM) et al. (2000), Cagney et al. (2009), Connelly et al. (2000), Connelly et al. (2011), and other summary publications. Specific citations are given to support the habitat model framework when applicable. The following sections describe the development of the habitat service model variables.

### **METRIC OF SAGE-GROUSE HABITAT SERVICES**

The metric for sage-grouse habitat services used in this HEA is a simple additive model (Table A1). Each cell in the analysis area is scored separately by multiplying the sum of Variables 01 through 03 and 05 through 11 by the vegetation exclusion Variable 04. Vegetation types that are not habitat for sage-grouse were not modeled, being excluded by Variable 04. Each of the variables is described in detail below.

**Table A1. Anthropogenic and Habitat Variables Used as a Metric of Sage-Grouse Habitat Services**

Variable Number	Variables	3	2	1	0	Primary Citations
VAR01	Distance to interstate highway or federal highway (meters [m])	>5,000	700–5,000	100–700	<100	Craighead Beringia South (2008); Johnson et al. (2011); Pruett et al. (2009)
VAR02	Distance to county/state highway or heavily travelled gravel road, well pads, or mine footprints (m)	>200	50–200	25–50	<25	Connelly et al. (2004); Craighead Beringia South (2008); Johnson et al. (2011); Pruett et al. (2009); Rogers (1964)
VAR03	Distance to fence (kilometers)*	>2.0	0.4–2.0	<0.4	N/A	Christiansen (2009); Stevens (2011)
VAR04	Vegetation class	N/A	N/A	All vegetation types except those identified as scoring 0	Forested, urban, open water, roads, well pads, and mine footprints	Multiple sources per U.S. Fish and Wildlife listing decision in <i>Federal Register</i> ; Johnson et al. (2011)
VAR05	Percent slope	<10	10–30	30–40	>40	Beck (1977); Lincoln County Sage Grouse Technical Review Team (2004)
VAR06	Distance to occupied lek (kilometers)	0–5	5–8.5	>8.5	N/A	Cagney et al. (2009); Connelly et al. (2000); Connelly et al. (2011); Holloran and Anderson (2005)
VAR07	Sagebrush patch size (hectares)	>130	10–130	<10	N/A	Connelly et al. (2011); Wallestad (1971)
VAR08	Percent sagebrush cover	15–25	5–15 or >25	<5	N/A	Cagney et al. (2009); Connelly et al. (2000); Stiver et al. (2010)
VAR09	Sagebrush canopy height (centimeters)	30–80	20 to <30 or >80	<20	N/A	Crawford et al. (2004); Connelly et al. (2000); Stiver et al. (2010)
VAR10	Percent bunchgrass cover	5–15	2–5 or >15	<2	N/A	BLM et al. (2000); Connelly et al. (2000); Gregg et al. (1994); Stiver et al. (2010)
VAR11	Distance of habitat to sage or shrub dominant (m)	<90	90–275	>275	N/A	BLM et al. (2000); Connelly et al. (2000); Lincoln County Sage Grouse Technical Review Team (2004)

\* Allotment boundaries are being used as a surrogate for fences in this variable.

## DESCRIPTIONS OF METRIC VARIABLES

### Anthropogenic Variables

Habitat within and surrounding the Project transmission line corridor is currently influenced by fences used for livestock management (e.g., to control livestock movements and vegetation use

within grazing allotments and pastures, to delineate or protect private property and agricultural croplands, and to restrict livestock from improved and unimproved roadways) and by roads that fragment the vegetative landscape and alter wildlife use patterns. Two anthropogenic-influenced variables were used to address the effects of roads and fences on sage-grouse habitat suitability.

#### Distance to Roads and Highways

Research into the effects of roads on sage-grouse is varied. For instance in Colorado, Rogers (1964) mapped 120 leks with regard to distance from roads and found that 42% of leks were over 1.6 kilometers (1 mile) from the nearest improved road, but that 26% of leks were within about 90 meters (m) (about 100 yards) of a county or state highway, and two leks were on a road. Connelly et al. (2004) also note the use of roads for lek sites. In contrast, Craighead Beringia South (2008) reported results from a 2007 to 2009 study of sage-grouse seasonal habitat use in Jackson Hole, Wyoming. Results indicate that sage-grouse avoid areas within approximately 100 m of paved roads. Similarly, Pruett et al. (2009) found that lesser prairie-chickens avoided one of the two highways in the study by 100 m; however, some prairie-chickens crossed roads and had home ranges that overlapped the highways, thus roads did not completely exclude them from neighboring habitat. Johnson et al. (2011) examined the correlation between trends in lek attendance and the environmental and anthropogenic features within 5- and 18-kilometer (km) buffers around leks. They found that lek attendance declined over time with length of interstate highway within 5 km, although the authors note that this trend was based on relatively few data points and no pre-highway data were available for comparison. Interstate highways >5 km away and smaller state and federal highways had little or no effect on trends in lek attendance. Thresholds less than 5 km were not examined.

In the habitat services metric, those habitats located within 25-m and 100-m, respectively, of a county/state highway or interstate/federal highway were considered the least serviceable to sage-grouse due to traffic and associated noise/human disturbance and given a score of 0 (no services). Unpaved roads with high traffic loads (i.e., oil and gas service roads, mine service roads, etc.) were scored similarly to paved roads with similar traffic loads (e.g., county/state highway). Those habitats located farther than 200 m and 5,000 m, respectively, of a county county/state highway or interstate/federal highway were considered the most serviceable to sage-grouse (i.e., exhibited no decrease in lek attendance) and given a score of 3. A logarithmic curve was fit between the highest and lowest categories so that score increased with distance from the road to estimate the distance breaks associated with scores 1 and 2. A logarithmic rate of change simulates sound attenuation rates better than a linear rate of change (Crocker 2007). Conflicting research results regarding sage-grouse use near and on unpaved resource/collector roads (e.g., two-track roads) did not allow for quantification of the disturbance caused these roads in the model (refer to Appendix F, notes dated 06/21/2011).

While the application of distances to all scores (0–3) is not perfectly supported in the peer-reviewed literature, our approach places a penalty upon habitats that are bisected by all types of large roadways. Penalties are higher for roads that typically have higher traffic levels and risk to sage-grouse (e.g., mortality from collision, noise disturbance) than less-utilized secondary roads that generally have less traffic and implied risk.

### Distance to Fence

Fence collisions have been reported as a cause of significant injury and mortality to grouse species (sage-grouse [Braun 2006; Call and Maser 1985; Connelly et al. 2004; Christiansen 2009; Danvir 2002; Stevens 2011]; lesser prairie-chicken [Wolfe et al. 2007]; ptarmigan [Bevanger and Broseth 2000]; and red grouse, black grouse, and capercaillie [Baines and Summers 1997; Catt et al. 1994; Petty 1995]). In addition to direct mortality, fences provide corridors for mammalian predators increasing the opportunity for predation of hens and broods (Braun 1998).

In Wyoming, Christiansen (2009) reported preliminary results of a multi-year study (2005–ongoing) near Farson on sage-grouse fence strikes and mortalities and the utility of fence markers on reducing collisions. After installation of fence markers on portions of high risk fences, grouse mortality decreased by 70%. Although the study did not compare the number of strikes with regard to distance to lek, the author recommends that fences should not be located within 0.25 mile (0.4 km) of leks. Therefore, all habitats within 0.25 mile (0.4 km) of a fence were scored as a 1 (few services) due to the increased risk that sage-grouse in those areas might collide with that fence.

In Idaho, Stevens (2011) evaluated sage-grouse and fence collision risk, and tested the efficacy of reflective vinyl fence markers at eight study sites. Modeling predicted marking reduced collision rates by 74% at the mean lek size and fence distance from lek. Collision probability varied by region, topography, fence type, fence density, and lek proximity. Areas with high slope or terrain ruggedness generally showed lower collision risk than flat areas. Collisions were more common on fence segments bound by steel t-posts with spans between posts exceeding 4 m. Collision probability increased with fence length per km<sup>2</sup> and proximity to nearest active lek. The author recommended 2-km mitigation buffers around leks in high risk areas, which is consistent with the recommendation by Braun (2006).

As the distance to fence increases, there is decreased likelihood of a sage-grouse striking a fence and potentially less risk of depredation by mammalian and avian predators. Consistent with recommendations by Stevens (2011) and Braun (2006), habitats at least 2 km from a fence were given the highest score of 3. A linear relationship was then used to determine the remaining metric scores (i.e., score of 2 between 0.4 and 2.0 km, and score of 1 <0.4 km of a fence). Scoring did not change with fence proximity to lek, region, or topography because these variables are already accounted for in the model. Habitats near fences received the same score for this variable, regardless of fence type or configuration, because data were not sufficient to differentiate among them in the model.

### **Vegetation Class and Slope**

Two metric variables used to refine sage-grouse habitat potential were vegetation class and slope. Vegetation class removed land cover types that were not sage-grouse habitat. Slope removed areas with slopes >40% and prioritized areas with slopes <5%.

### Vegetation Class

To more accurately model sage-grouse utilization areas, habitats typically avoided by sage-grouse were scored 0 for the Vegetation Class metric. These habitats include roadways, urban and developed areas, open water, and all forest types.

This is a multiplicative variable, so a score of 0 for this variable resulted in a total score of 0 for whole habitat service metric; disturbances of these areas would require no mitigation in this model. All other vegetation types received a score of 1 because they provide some level of service to sage-grouse.

### Slope

Sage-grouse generally use flat or gently sloping terrain (Connelly et al. 2011; Eng and Schladweiler 1972; Nisbet et al. 1983; Rogers 1964). Beck (1977) plotted the distribution of 199 sage-grouse flocks in Colorado and found that 66% of flocks were on slopes less than 5% and only 13% of flocks were on slopes greater than 10%. Slopes greater than 40% are unsuitable nesting habitat (Lincoln County Sage Grouse Technical Review Team 2004). Therefore, areas with less than 5% slope were assigned a habitat service score of 3, and those exceeding 10% subjectively received incrementally lower habitat service scores to slopes >40% being of no service value (score of 0).

### **Distance to Lek (10-year Average Count >0 Males)**

Current sage-grouse habitat management guidance uses occupied leks as focal points for nesting habitat management (Connelly et al. 2000; Connelly et al. 2011); therefore, distance to lek was used as a variable in the Habitat Services Metric. These guidelines recommend protecting sagebrush communities within 3.2 km of a lek in uniformly distributed habitats and 5.0 km in non-uniformly distributed habitats. Holloran and Anderson (2005) studied nesting sage-grouse at 30 leks in central and western Wyoming and determined that 45% and 64% of female sage-grouse nested within 3.2 km and 5.0 km, respectively, of the lek where the hen was radio-collared. Moreover, statistical analyses suggested that the area of interest for nesting sage-grouse should be truncated at 8.5 km from a lek. Similar frequencies are reported in Cagney et al. (2009)—66% within 5.0 km and 75% within 6.4 km of a lek where the female bred.

Female sage-grouse do nest at distances greater than 8.5 km (farthest distance reported in Holloran and Anderson [2005] was 27.4 km), so all distances >8.5 km from occupied leks were given a service score of 1 to reflect some potential use by nesting sage-grouse. Conversely, because the sagebrush community within approximately 5 km of a lek also provides other services to female grouse during the lekking season, such as forage, roost sites, and cover from predators and inclement weather (Cagney et al. 2009), the 5 km around an occupied lek represents habitat that provides the most services (service score of 3).

### **Sagebrush Patch Size**

A 130-hectare (ha) patch size for sagebrush was used as the recommended service condition (score of 3) based on professional judgment. Professional judgment was used because “conclusive data are unavailable on minimum patch sizes necessary to support viable populations of sage-grouse” (Connelly et al. 2011).

Patch size requirements may also change seasonally. Sage-grouse in North Park, Colorado, concentrated in seven patches of habitat totaling 85 km<sup>2</sup> (8,500 ha) in winter (Beck 1977). Sage-grouse hens in central Montana used patches averaging 86 ha in size during June and July, and 52 ha in August and September (Wallestad 1971 per Connelly et al. 2011).

Patch size was determined as contiguous sage-steppe habitat with no fragmentation created by disturbances such as roads, unreclaimed pipeline corridors, etc. As patch size decreases, the services that patch provides to support sage-grouse are also likely to decrease. Thus, sagebrush patches sized 10 to 130 ha received a score 2 and patches <10 ha received a score of 1.

### **Sagebrush Cover**

Recommended sagebrush cover for sage-grouse habitat varies seasonally. Because of lack of suitable data available across all Project alternatives, for the purposes of the Gateway West HEA modeling effort, seasonal habitats were not modeled. However, seasonal differences in the selection for sagebrush cover was considered when developing habitat services metrics. The seasonal habitat needs of sage-grouse are described below, followed by scoring of percent sagebrush cover in the habitat services metric.

#### Seasonal Habitat Use

##### *Nesting*

Connelly et al. (2000) cite 13 references to sagebrush coverage that range from 15% to 38% mean canopy cover surrounding the nest. Citations contained within Crawford et al. (2004) reported 12% to 20% cover and 41% cover in nesting habitat. In their species assessment, Connelly et al. (2000) conclude that 15% to 25% canopy cover is the recommended range for productive sage-grouse nesting habitat. This is also the range identified in the sage-grouse habitat assessment framework (Stiver et al. 2010) as providing the highest service level for sage-grouse based on a review of the available literature. Wallestad and Pyrah (1974) reported that successful nests were in stands where sagebrush cover approximated 27%. This cover range is used as a goal in some sage-grouse management guidelines (Bohne et al. 2007; BLM et al. 2000). Cagney et al. (2009) guidelines for grazing in grouse habitat, which uses information synthesized from over 300 sources, states that hens tend to select an average 23% live sagebrush canopy cover when selecting for nesting sites.

### *Brood Rearing*

Connelly et al. (2000) found that productive brood-rearing habitat should include 10% to 25% cover of sagebrush. This is the range used as a goal in sage-grouse management guidelines (Bohne et al. 2007; BLM et al. 2000).

### *Winter*

Connelly et al. (2000) cite 10 references to sagebrush coverage in winter-use areas that range from 15% to 43% mean canopy cover (Crawford et al. [2004] also cite two of these references in their assessment); however, they considered a canopy of 10% to 30% cover (above the snow) as a characteristic of sagebrush needed for productive sage-grouse winter habitat. This is the cover range used as a goal in sage-grouse management guidelines (Bohne et al. 2007; BLM et al. 2000).

### Scoring in Habitat Services Metric

In general, the recommended sagebrush cover for nesting habitats was intermediate to and overlapped that of brood-rearing and winter habitats. Thus, favorable conditions for nesting were given the highest scores for percent sagebrush cover in the sage-grouse habitat services metric.

The sagebrush cover scores assigned for nesting habitat in the sage-grouse habitat assessment framework by Stiver et al. (2010) to different sagebrush cover categories were assigned to this variable. Sagebrush percent canopy cover of 15% to 25% was assumed to provide the highest level of services (score of 3) to nesting sage-grouse. It is the same as the range given in Connelly et al. (2000) and similar to the average range reported in Cagney et al. (2009). Areas with slightly less or more cover than this were given a habitat services score of 2 (e.g., 5–15 or >25). Habitats with <5% cover received a score of 1.

### **Sagebrush Canopy Height**

Sagebrush canopy height is an important aspect of all sage-grouse seasonal habitats. As described above, seasonal habitat models will not be developed for the Project. However, seasonal habitat requirements were considered when developing habitat metric values. The seasonal habitat needs of sage-grouse are described below, followed by scoring of percent sagebrush cover in the habitat services metric.

### Seasonal Habitat Use

#### *Nesting*

Gregg et al. (1994, cited in Crawford et al. 2004) found that the area surrounding successful nests in Oregon consisted of medium-height (40 to 80 centimeters [cm]) sagebrush. Connelly et al. (2000) cite 11 references to sagebrush height that range from 29 to 79 cm mean height. In their assessment, Connelly et al. (2000) conclude that sagebrush with a height of 30 to 80 cm is needed for productive sage-grouse nesting habitat in arid sites and 40 to 80 cm in mesic sites. These ranges are supported by Stiver et al. (2010), who recommend a range of 30 to 80 cm, and BLM et al. (2000), which state that optimum sage-grouse nesting habitat consists of sagebrush stands containing plants 40 to 80 cm tall.

## *Winter*

Important structural components in winter habitat include medium to tall (25–80 cm) sagebrush stands (Crawford et al. 2004). Connelly et al. (2000) cite 10 references to sagebrush height in winter habitat that range from 20 to 46 cm above the snow. Two studies measured the entire plant height and provided a range from 41 to 56 cm. In their assessment, Connelly et al. (2000) conclude that characteristics of productive winter habitat include sagebrush that is 25 to 35 cm in height above the snow. This is the height range used as a goal in sage-grouse management guidelines (Bohne et al. 2007; BLM et al. 2000).

### Scoring in Habitat Services Metric

Sagebrush canopy heights that provided high-quality nesting habitat generally also provided high-quality winter habitat for sage-grouse. Thus, favorable conditions for nesting were given the highest scores for sagebrush canopy height in the sage-grouse habitat services metric.

The sagebrush cover scores assigned for nesting habitat in the sage-grouse habitat assessment framework by Stiver et al. (2010) to different sagebrush cover categories were assigned to this variable. Areas of sagebrush with a height of 30 to 80 cm were assigned a habitat services score of 3. As sagebrush canopy height decreases, the value of a sagebrush plant to provide cover for nesting females and their nests is diminished. Additionally, low-lying sagebrush is less available to sage-grouse during the winter due to snow cover. Areas with canopy heights greater than 80 cm provided intermediate levels of services because they may provide relatively poor cover for nesting sage-grouse and have foliage that is difficult for sage-grouse to access during mild and moderate winters. Sites with lower and higher sagebrush canopy heights were scored lower (i.e., sagebrush 12 to <30 cm or >80 cm in height received a score of 2). Areas with minimal sagebrush canopy heights were considered to have the lowest habitat service value (i.e., sagebrush <20 cm received a score of 1).

### **Percent Bunchgrass Cover**

Bunchgrasses, as opposed to rhizomatous grasses, are recognized as an important component of sage-grouse nesting and brood-rearing habitats (Connelly et al. 2000; Crawford et al. 2004). The structure and abundance of bunchgrasses influence the quality of a sagebrush/bunchgrass community site for nesting sage-grouse. Tall, dense, residual grass in nesting habitat improves hatching success by providing cover for incubating females (Cagney et al. 2009). Herbaceous cover may provide scent, visual, and physical barriers to potential predators (DeLong et al. 1995, as cited in Connelly et al. 2000).

Specifically, Gregg et al. (1994, cited in Crawford et al. 2004) found that the area surrounding successful nests in Oregon had 18% cover of tall bunchgrass. Connelly et al. (2000) cite 11 references to grass coverage that range from 3% to 51% mean canopy cover surrounding the nest. In their assessment, Connelly et al. (2000) conclude that  $\geq 15\%$  perennial grass/forb canopy cover is needed for productive sage-grouse nesting habitat in arid sites and  $>25\%$  in mesic sites. They also indicated that forb cover should be at least 10%. Stiver et al. (2010) recommend  $>10\%$  perennial grass canopy cover at arid sites and  $>15\%$  at mesic sites. BLM et al. (2000) state that optimum sage-grouse nesting habitat consists of at least 15% grass canopy cover.

Based on the research presented above, habitat conditions providing the most service to sage-grouse (i.e., habitat service score of 3) consist of 15% to 25% cover because this is within the range suggested by the management guidelines (BLM et al. 2000; Connelly et al. 2000). Areas with slightly less or more cover than this were given a ranking of 2. Habitat services scores were then scaled for higher and lower cover percentages as those values deviate further from recommended conditions.

### **Distance to Vegetation Dominated by Sagebrush or Shrub**

Sage-grouse will use shrubby habitats other than sagebrush during the brood-rearing season (Connelly et al. 2000) and for grouse movement and dispersal (Stiver et al. 2010), so all shrub species were considered for this model variable. The Lincoln County Sage Grouse Technical Review Team (2004) identified proximity to sagebrush cover as an important component in habitat suitability of non-sagebrush, brood-rearing habitats (e.g., mesic lowland habitats, hay meadows). The team considered brood-rearing areas within <100 yards, 100 to 300 yards, and >300 yards of sagebrush cover as suitable, marginal, and unsuitable habitat, respectively. Similarly, Stiver et al. (2010) considered mesic habitats <90 m, 90 to 275 m, and >275 m to be suitable, marginal, and unsuitable late brood-rearing/summer habitat, respectively.

For this variable, habitats (regardless of vegetation type) <90 m, 90 to 275 m, and >275 m were assigned scores of 3, 2, and 1, respectively. The scoring was applied to all vegetation types, not just to mesic habitats, because this variable is relevant to bird movement and dispersal from all habitat types and the model is not restricted to the brood-rearing period.

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## **APPENDIX B**

### **Quantification of Baseline Habitat Service Level**

This appendix describes GIS methods used to map Baseline habitat quality and calculate the Baseline habitat service level for each modeled segment.

## QUANTIFICATION OF BASELINE HABITAT SERVICE LEVEL

The pre-construction baseline of the habitat services was based on vegetation surveys and remote sensing data collected through 2011. This 2011 baseline is used as a point of comparison to quantify the net habitat losses due to construction and net habitat gains due to habitat conservation. The baseline service level was determined by applying the habitat service metrics to the Assessment Area. The Assessment Area included the footprint of the Gateway West Transmission Line Project (Project) and a 9-km buffer around the footprint, because greater sage-grouse (*Centrocercus urophasianus*; henceforth, sage-grouse) habitat service losses were expected to extend beyond the area of direct disturbance.

ESRI ArcGIS ArcInfo 9.3.1, Spatial Analyst, and ModelBuilder software and tools were used to conduct analyses. Due to the extent and quantity of high-resolution data used for the GIS models, all data were converted to a raster/grid format. Raster or grid algebra processing is significantly faster for a project of this size.

### PREPARATION OF GIS MODEL INPUT LAYERS

Habitats within and surrounding the Gateway West proposed transmission corridor, are summarized in a series of representative raster layers for eleven class variables (see Appendix A). These eleven variables consist of data representations within the project area for human disturbance, particular landscape characteristics, proximity to greater sage-grouse lek locations, and additionally capture vegetation metrics that may influence the use of habitat by greater sage-grouse.

Data acquired for this study consisted of pre-existing and currently available GIS digital data. Source metadata for digital data used for this study is available from host agencies. No project-specific data were collected for the HEA baseline model and therefore all results supplied here are based on readily available GIS data from the World Wide Web and from GIS data supplied by federal or state agencies.

A spatial resolution of 30-meters was deemed sufficient to capture a ‘landscape level’ perspective of habitat across the project area. An area as wide as 9-kilometers surrounding the proposed transmission corridor was assessed, and all model inputs were retained and processed at these resolution and extent, respectively. Pixel alignment was maintained throughout variable processing steps and relies upon the accuracy of the source data used.

Representative raster data were formed for each variable listed within the HEA metric (Appendix A), were coded by a range of values, and given a score from zero to three (0 – high score). These variables fell into three predominant categories, landscape characteristics (percent slope, patch size); proximity measures (distance to or from adjacent features), and vegetation parameters (vegetation type, percent cover, and height class); with each having a particular contribution to Greater Sage-grouse habitat and each providing equal weight within the HEA model.

The following sections describe the datasets used to describe each of the variables described in Appendix A:

### **Distance to Roads and Highways or Other Infrastructure**

Road layers used in developing the baseline HEA model were provided by the BLM or obtained from standard road and infrastructure layers. Road layers were compared between states to ensure consistency in classification prior to using them in HEA model development. HEA model scores were applied to 30-meter raster cells according to the process described in Appendix A. For example, all cells within 100 meters of interstate highways were given a score of 0 and flagged as providing no habitat for greater sage-grouse, those between 100 meters and 700 meters were given a score of 1, those between 700 meters and 5 kilometers were given a score of 2, and those that were greater than 5 km from the interstate were given a score of 3.

### **Distance to Fence**

Grazing allotment boundaries were used as surrogates for fence layers in the HEA baseline model development. Fence layers between states and BLM field offices were inconsistent and the HEA Agency Review Team determined that grazing allotment boundaries would provide a suitable surrogate. Scores for distance to fence were applied to the 30-meter grid cells in the model in the same manner as described for roads and highways with cells closest to fences receiving the lowest scores and those farthest from roads and highways receiving the highest scores.

### **Vegetation Class**

Vegetation type and attributes for each vegetation type were determined using GAP and LANDFIRE datasets. Both datasets used much of the same training data to develop vegetation classifications and a high degree of overlap was observed between the two datasets. As described in Appendix A, those vegetation types that do not provide suitable habitat for sage-grouse were given a score of 0 and removed from the HEA model. All vegetation types that potentially provide habitat for sage-grouse were given a score of 1.

### **Slope**

Slope was calculated using 30-meter digital elevation models and scored according to the process described in Appendix A.

### **Distance to Lek (10-year Average Count >0 Males)**

Lek data from 2011 were obtained from Wyoming Department of Game and Fish and Idaho Department of Fish and Game. Leks that had been active in the past 10 years or that had an unknown status were included in the HEA model. Those that were labeled as unoccupied or inactive were not included. Cells surrounding leks were scored according to the methods described in Appendix A with cells closest to leks receiving the highest scores.

### **Sagebrush Patch Size**

Sagebrush patch size was determined using the vegetation layers and calculating the area of all contiguous 30-meter cells. HEA model scores were applied using the methods described in

Appendix A. Areas with more contiguous cells and greater patch size received higher scores than those with few contiguous cells.

### **Sagebrush Cover, Sagebrush Canopy Height, Percent Bunchgrass Cover**

When possible, percent cover and height were determined directly from the vegetation attribute data included in the GAP and Landfire vegetation datasets. Where direct data were not available, attributes for percent cover and height were imputed from sampling datasets and Landsat image segmentation. A standard image segmentation process was used on the most recent Landsat imagery for the project area. Image segmentation was completed at a scale of 1:12000 using Erdas remote sensing software. Image segmentation identifies areas of the landscape with the most similar spectral signatures and characteristics. Sampling data from GAP/Landfire datasets as well as numerous datasets obtained from BLM and the state agencies were used to attribute vegetation percent cover and height for segments of the landscape with the most similar characteristics. Once imputed vegetation values had been applied to the 30-meter grid, HEA scores were applied using the methods described in Appendix A.

### **Distance to Vegetation Dominated by Sagebrush or Shrub**

The distance from each cell to the nearest sagebrush or shrub dominated cell was calculated. Cells within or closest to sagebrush or shrub landscapes were scored higher than those that were distant from shrub-dominated cells.

### **SUMMATION OF BASELINE SERVICES IN THE HEA MODEL**

Spatial grids representing the above HEA variables (1 – 11) were combined through additive and multiplicative raster calculations to create a final raster layer. A simple additive overlay process was used to calculate the HEA metric value for each cell. The value of each cell was the sum of variables 1-3 and 5-11. The resulting value was then multiplied by the variable 3 (vegetation class) score of 0 or 1 to remove all vegetation types that do not provide habitat for sage-grouse. The final layer, a numeric grid, values each cell by the cumulative result given the 11 input habitat variables. The range of output values represent the baseline services across the project area and give a representation of habitat conditions prior to any construction occurring throughout the Gateway West Transmission Line corridor and project area.

The geographic information system (GIS) model exported a spreadsheet that listed all the service scores possible and the acres of the Assessment Area that fell into each of those scores. For input into the Habitat Equivalency Analysis (HEA) model, the service scores were multiplied by the acres for that score and summed to calculate the total habitat services (unit is service-acres) (Equation 1). The total habitat services provided by the Assessment Area was calculated for the baseline Project milestone.

Equation 1.

$$VJ = \sum_1^i (V_i * J_{V_i})$$

where:

$VJ$  is the habitat services (service-acres) provided by the Assessment Area,

$V$  is the habitat service score (i.e., the sum of the variable scores in the habitat service metric),

$i$  is the number of possible unique values for  $V$ , and

$J_{V_i}$  is the number of acres for each value of  $V_i$ , where  $\sum_1^i J_{V_i}$  would equal the total acreage of the Assessment Area ( $J$ ).

## **APPENDIX C**

### **Quantification of Habitat Service Losses**

This appendix describes Project effects, Project schedule, GIS methods to model Project effects and recovery, and HEA for habitat service losses.

## QUANTIFICATION OF HABITAT SERVICE LOSSES

Habitat service losses caused by Gateway West Transmission Line Project (Project) disturbances were modeled using geographic information system (GIS) technology for important Project milestones by decreasing the variable scores for the habitat services metric below the Baseline level in the footprint of the project (direct disturbances) and in buffers around the footprint (indirect disturbances). The habitat service scores for each milestone were entered into the Habitat Equivalency Analysis (HEA) to calculate the interim and permanent habitat service losses associated with the Project.

### DESCRIPTION OF DISTURBANCES BY PROJECT MILESTONE

The habitat services provided by the Assessment Area (which includes the footprint of the Project and a 9-km buffer around the footprint) were measured at several different Project milestones that reflected varying levels of disturbance. These snapshots of the changing habitat services over time were then entered into the HEA model, which calculates the total interim and permanent habitat injuries.

The Project milestones modeled using GIS-based tools for the HEA are:

1. **Baseline**—the baseline milestone quantifies habitat services available to sage-grouse before disturbance. The calculation of Baseline is described above.
2. **Construction**—the substation and transmission line construction milestone quantifies habitat services available to sage-grouse during the construction or operation of the substations proposed as part of this Project and the construction of the transmission line. Magnitude of the loss of habitat services during construction is dependent on proximity to the Project and the amount of new surface disturbance.
3. **Restoration**—the restoration milestone quantifies habitat services available to sage-grouse after substation and transmission line construction is complete and some services return with the reduction in noise and human presence.
4. **Recovery**—the recovery milestone quantifies habitat services available to sage-grouse after a vegetation type has recovered to the greatest extent expected after Project restoration is complete. Habitat services return to baseline conditions in restored areas with the time to recovery being dependent on the vegetation type. There were four vegetation-based recovery endpoints: 1) agriculture and introduced vegetation including cheatgrass (1 year after Restoration); 2) grassland, wetland, and riparian (5 years after Restoration), 3) shrubs other than sagebrush (20 years after restoration); and 4) sagebrush (100 years after Restoration; see Recovery Milestone description in Appendix C for vegetation recovery rates associated with these endpoints).

### QUANTIFYING LOSS OF HABITAT SERVICES DUE TO SURFACE DISTURBANCE DURING CONSTRUCTION

The footprint of the Project segments and alternatives presented in the draft environmental impact statement (DEIS) (BLM 2011) were provided electronically to SWCA Environmental Consultants by Tetra Tech. The footprint files specified the locations of and direct disturbance

associated with substations, regeneration stations, roads, transmission structures, and other project infrastructure.

For the Construction milestone, direct disturbances were defined as the loss of all habitat services within the entire construction footprint for the segment modeled (Table C1). The habitat service scores for all cells in the project footprint were changed from the Baseline service scores to 0 in the GIS model for this milestone.

**Table C1. Direct Disturbance Levels Modeled by Project Year and Disturbance Type**

Project Milestones	Project Year Applied	Percent Baseline Services Present by Direct Disturbance Type		
		Substations and Regeneration Stations	Transmission Towers	Access Roads, Transmission Lines, and Temporary Infrastructure
Baseline	0	100%	100%	100%
Construction	1, 2, 3	0%	0%	0%
Restoration	4	0%	0%	0%
Progressive Vegetation Recovery	5 (endpoint1)	0%	<ul style="list-style-type: none"> <li>• 0% in tower pad<sup>†</sup> (0.06 acre)</li> <li>Elsewhere<sup>‡</sup>: <ul style="list-style-type: none"> <li>• 100% of agricultural baseline services</li> <li>• 20% of grassland, wetland, and riparian baseline services</li> <li>• 5% shrub baseline services</li> <li>• 1% of sagebrush baseline services</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• 100% of agricultural baseline services</li> <li>• 20% of grassland, wetland, and riparian baseline services</li> <li>• 5% shrub baseline services</li> <li>• 1% of sagebrush baseline services</li> </ul>
	9 (endpoint 2)	0%	<ul style="list-style-type: none"> <li>• 0% in tower pad (0.06 acre)</li> <li>Elsewhere: <ul style="list-style-type: none"> <li>• 100% of agricultural, grassland, wetland, and riparian baseline services</li> <li>• 25% shrub baseline services</li> <li>• 5% of sagebrush baseline services</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• 100% of agricultural, grassland, wetland, and riparian baseline services</li> <li>• 25% shrub baseline services</li> <li>• 5% of sagebrush baseline services</li> </ul>
	24 (endpoint 3)	0%	<ul style="list-style-type: none"> <li>• 0% in tower pad (0.06 acre)</li> <li>Elsewhere: <ul style="list-style-type: none"> <li>• 100% of agricultural, grassland, wetland, riparian, and shrub baseline services</li> <li>• 20% of sagebrush baseline services</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• 100% of agricultural, grassland, wetland, riparian, and shrub baseline services</li> <li>• 20% of sagebrush baseline services</li> </ul>
	104 (endpoint 4)	0%	<ul style="list-style-type: none"> <li>• 0% in tower pad (0.06 acre)</li> <li>Elsewhere: <ul style="list-style-type: none"> <li>• 100% of agricultural, grassland, wetland, riparian, shrub, and sagebrush baseline services</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• 100% of agricultural, grassland, wetland, riparian, shrub, and sagebrush baseline services</li> </ul>

\* There is a 3-year delay for segments 5, 7, 8, 9, and 10 per schedule in Table 3 (in main body of report).

<sup>†</sup> Tower pad in this table refers to the permanent tower footprint.

<sup>‡</sup> Elsewhere refers to construction roads that were reduced to two-track roads, or any areas where vegetation was cleared for Project construction that were subsequently revegetated during Restoration (e.g. staging areas).

## QUANTIFYING LOSS OF HABITAT SERVICES DUE TO INDIRECT DISTURBANCES DURING CONSTRUCTION

Indirect disturbances were simulated by applying buffers to the construction footprint and decreasing the habitat service scores below the Baseline habitat service scores within the buffers. The HEA Technical Advisory Team identified noise and human presence as the only indirect disturbance to be modeled in the HEA (refer to Appendix F, notes dated 06/21/2011).

Use of construction equipment such as backhoes, cranes, front-end loaders, bulldozers, graders, excavators, compressors, generators, and various trucks would be needed for mobilizing crew, transportation and use of materials, line work, site clearing, and preparation during the construction phase of the Project. Use of drill rigs, large augers, and rock drills would be required for the poured-in-place foundations at each tower location. Spur roads and access roads would require use of earthmoving equipment such as bulldozers and graders. Table C2 provides the typical noise levels for the construction equipment that would potentially be used during the construction phase of the Project (ranging 80 to 90 A-weighted decibels [dBA] at 50 feet [15 meters (m)] from any work site).<sup>3</sup>

**Table C2.** Typical Noise Levels from Construction Equipment

Equipment Type	Noise Level at 50 feet (dBA)
Crane	88
Backhoe	85
Pan loader	87
Bulldozer	89
Fuel truck	88
Water truck	88
Grader	85
Roller	80
Mechanic truck	88
Flat bed truck	88
Dump truck	88
Tractor	80
Concrete truck	86
Concrete pump	82
Front end loader	83
Scraper	87
Air compressor	82
Average construction site	85

Noise during the construction phase of the Project is similar in magnitude to noise produced by vehicles using secondary roads (county highways, state highways, and heavily travelled gravel roads [e.g., access roads for oil and gas development, mining, etc.]). Passenger vehicles, medium

<sup>3</sup> Construction noise values provided by Tetra Tech.

trucks, and heavy trucks going 55 miles per hour (mph) produce typical noise levels of 72 to 74 dBA, 80 to 82 dBA, and 84 to 86 dBA, respectively, from a distance of 50 feet. Therefore, the noise disturbance associated with construction was modeled like the noise disturbance associated with secondary roads for the HEA (Table C3).

In the GIS model, buffers were placed around the project footprint for the Construction milestone that were identical to those around secondary roads (>200 m, 50–200 m, 25–50 m, or <25 m). The habitat services in these buffers were scored by the metric as if they were in the same proximity to a secondary road (i.e., the score for VAR02 decreased).

**Table C3. Indirect Disturbance Levels Modeled by Project Year and Disturbance Type**

Project Milestones	Project Year Applied	Indirect Disturbance Buffers* Applied by Disturbance Type		
		Substations and Regeneration Stations	Transmission Towers	Access Roads, Transmission Lines, and Temporary Infrastructure
Baseline	0	None	None	None
Construction	1, 2, 3	Secondary Road	Secondary Road	Secondary Road
Restoration	4	Secondary Road	None	None
Progressive Vegetation Recovery	5	Secondary Road	None	None
	9	Secondary Road	None	None
	24	Secondary Road	None	None
	104	Secondary Road	None	None

\* "Secondary Road" indicates that the footprint of the disturbance was classified as a secondary road in the GIS model and the scores of the surrounding vegetation decreased as defined by the habitat services metric.

## QUANTIFYING HABITAT SERVICES LOSSES DURING RESTORATION AND RECOVERY

Project-related habitat service losses are anticipated to decrease once construction is complete. Although still below baseline levels, the habitat service scores rise during restoration and recovery with vegetation regrowth (direct disturbances) and decreased levels of noise and human presence (indirect disturbances).

### Restoration Milestone

For the Restoration milestone, direct disturbances were still defined as the loss of all habitat services in the construction footprint because the vegetation had not regrown sufficiently to provide habitat (see Table C1). The habitat service scores for all cells in the Project footprint were changed from the Baseline service scores to 0 in the GIS model for this milestone.

The indirect disturbance buffers were applied to substations and regeneration stations for the Restoration milestone, like those applied during the Construction milestone (see Table C3). The noise associated with the operation of the substations and regeneration stations was characterized as a permanent indirect disturbance in the model. No indirect disturbances were modeled for the rest of the Project footprint because little vehicle traffic or human presence is anticipated in these areas after construction of the line is complete.

## Recovery Milestone

For the Recovery milestone, direct disturbances were defined as the loss of all habitat services in the footprint of permanent facilities (i.e., substations, regeneration stations, and transmission structure pads) and the partial loss of services in areas of vegetation regrowth (see Table C1). Indirect disturbances modeled were the disturbance buffers applied to the substations and regeneration stations like for the Construction milestone (see Table C3).

Habitat services in areas where the vegetation was restored (i.e., outside the footprint of permanent facilities) returned to baseline conditions during the Recovery milestone. The rate that services returned depended on the vegetation type. Vegetation was aggregated into four types, each with its own Recovery endpoint: 1) agriculture and introduced vegetation (e.g., cheatgrass); 2) grassland, wetland, and riparian; 3) shrub; and 4) sagebrush.

### Vegetation Recovery Rates

Aggregate vegetation recovery rates for endpoints 1 through 3 (Table C4) were estimated as the average time to obtain Class A and Class B seral stages among the specific vegetation types within the aggregate in LANDFIRE Rapid Assessment Modeling and Mapping Zones: Northern and Central Rockies, Great Basin, and Northwest (U.S. Geological Survey). Seral stages used in LANDFIRE are described by the overall structural component and successional progression to a climax plant community (potential vegetation type [PVT]): class A is low cover, low height; and class B is high cover, low height.

Multiple papers have looked at the recovery rate of the types of sagebrush communities inhabited by the sage-grouse.<sup>4</sup> Most of these papers looked at recovery following fire, with full recovery considered to be when the stand achieved full potential canopy closure. The times necessary for full recovery, as reported in these papers, varies widely. Bunting (2002) stated that recovery times of sagebrush communities vary, and may be as short as 15 years for mountain big sagebrush or as long as 50 to 75 years for Wyoming big sagebrush. Cooper et al. (2007) looked at post-fire recovery of sagebrush shrub-steppe communities in central and southeast Montana; they found that full recovery of Wyoming big sagebrush took “well over 100 years” and that recovery of mountain big sagebrush cover took slightly more than 30 years. They found that the mean recovery rate for Wyoming big sagebrush canopy cover was 0.16% per year in their study area, and the fastest recovery rate was 0.72% per year (Cooper et al. 2007). Wambolt et al. (2001) reported 72% recovery of Wyoming big sagebrush after 32 years at one site in southwestern Montana, and 96% recovery after only 9 years at another site. Baker (2006) found that recovery times for mountain big sagebrush ranged from 35 to 100 years, and that recovery times for Wyoming big sagebrush ranged from 50 to 120 years.

Based on these varying reports, the recovery time for sagebrush (Recovery endpoint 4) was conservatively set to 100 years (see Table C4). This value is conservative because most species will recover in less than 100 years with passive reclamation, and the active restoration techniques proposed for the Project should increase the recovery rate. Based on the experience of the HEA Technical Advisory Team, sagebrush in some of the restoration areas may never return to a

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<sup>4</sup> Overview of sagebrush recovery was provided by Tetra Tech.

condition that provides habitat for sage-grouse. The Team decided that this conservative recovery rate adequately offsets potential reclamation failures.

**Table C4. Vegetation Recovery Rates Used in HEA Model**

Years to Full Recovery (100% of Baseline) After Restoration in the Model	Percent of Baseline Habitat Services Returned by Recovery Endpoint	Vegetation Types Included
1	Endpoints 1–4: 100%	<ul style="list-style-type: none"> <li>• Agriculture</li> <li>• Introduced vegetation (e.g., cheatgrass)</li> <li>• Recently burned</li> </ul>
5	Endpoint 1: 20% Endpoints 2–4: 100%	<ul style="list-style-type: none"> <li>• Floodplain and riparian</li> <li>• Lowland grassland and prairie (xeric-mesic)</li> <li>• Depressional wetland</li> <li>• Montane grassland</li> <li>• Freshwater herbaceous marsh, swamp, or baygall</li> <li>• Bog or fen</li> <li>• Alpine grassland</li> </ul>
20	Endpoint 1: 5% Endpoint 2: 25% Endpoints 3 and 4: 100%	<ul style="list-style-type: none"> <li>• Shrub-dominated steppe</li> <li>• Scrub shrubland</li> <li>• Deciduous-dominated shrubland</li> </ul>
100	Endpoint 1: 1% Endpoint 2: 5% Endpoint 3: 20% Endpoint 4: 100%	<ul style="list-style-type: none"> <li>• Sagebrush-dominated shrubland and steppe</li> </ul>
Classifications Excluded from the Model	N/A	<ul style="list-style-type: none"> <li>• Deciduous-dominated forest and woodland (xeric-mesic)</li> <li>• Conifer-dominated forest and woodland (xeric-mesic)</li> <li>• Beach, shore, and sand</li> <li>• Conifer-dominated savanna</li> <li>• Developed</li> <li>• Open water</li> <li>• Mixed deciduous/coniferous forest and woodland (xeric-mesic)</li> <li>• Conifer-dominated forest and woodland (mesic-wet)</li> <li>• Bluff and badland</li> <li>• Cliff, canyon, and talus</li> <li>• Mining</li> <li>• Harvested forest</li> </ul>

Modeling Vegetation Recovery

At each of the Recovery endpoints, the percentage of the Baseline services present in a cell in the GIS model depended on the vegetation type as defined in Table C1. For example, during Recovery endpoint 1: cells containing agriculture or other introduced vegetation were returned to 100% of their Baseline service value; cells containing grassland, wetland, or riparian vegetation were returned to 20% of their Baseline service value (i.e., 20% of the recovery time defined in Table C4 had passed since Restoration); cells containing shrubs other than sagebrush were returned to 5% of their Baseline service value; and cells containing sagebrush were returned to 1% of their Baseline service value.

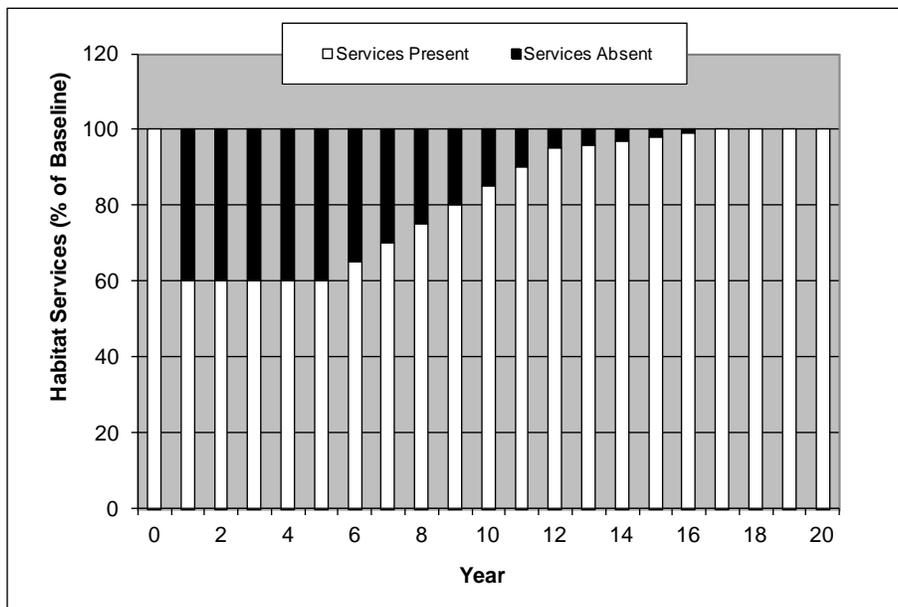
Vegetation Recovery on Transmission Tower Pads

Area of vegetation loss associated with each transmission structure decreases from 1.43 acres during Construction and Restoration to 0.06 acre during Recovery (BLM 2011). In cells where there is a transmission pad, vegetation does not return 100% of baseline services at the end of

Recovery. Instead, vegetation disturbed by transmission structure construction returns to 95.8% of baseline services (4.2% long-term disturbance = 0.06/1.43) at the end of Recovery.

### HEA TO QUANTIFY INTERIM AND PERMANENT HABITAT INJURIES

The GIS modeling described above produced a measure of habitat services (in service-acres) for each of the Project milestones for each of the modeled project segments. The HEA is a stepwise model which quantifies the habitat injury separately in each year (Figure C1), so each of the milestones had to be assigned to a calendar year per the schedule provided by the Project proponents (Table C5). A linear change in habitat services was assumed between restoration and recovery and between the four recovery endpoints. The analysis was carried out to 2125, which encompasses the expected lifetime of the Project and allows complete recovery of sagebrush vegetation.



**Figure C1.** Hypothetical example of how the HEA model considers habitat services absent and habitat services present in each year to calculate the total services lost over the Project period (i.e., sum of the black bars).

**Table C5. Project Milestone Years by Segment**

Project Year	Project Milestone by Modeled Segment								
	01Wa + 01Wc	02c	03p	04a	05p	07p	08p	09d	10p
0	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
1	Construct	Construct	Construct	Construct	Baseline	Baseline	Baseline	Baseline	Baseline
2	Construct	Construct	Construct	Construct	Baseline	Baseline	Baseline	Baseline	Baseline
3	Construct	Construct	Construct	Construct	Baseline	Baseline	Baseline	Baseline	Baseline
4	Restoration	Restoration	Restoration	Restoration	Construct	Construct	Construct	Construct	Construct
5	Recovery 1	Recovery 1	Recovery 1	Recovery 1	Construct	Construct	Construct	Construct	Construct
6	--	--	--	--	Construct	Construct	Construct	Construct	Construct
7	--	--	--	--	Restoration	Restoration	Restoration	Restoration	Restoration
8	--	--	--	--	Recovery 1				
9	Recovery 2	Recovery 2	Recovery 2	Recovery 2	--	--	--	--	--
10	--	--	--	--	--	--	--	--	--
11	--	--	--	--	--	--	--	--	--
12	--	--	--	--	Recovery 2				
13–23	--	--	--	--	--	--	--	--	--
24	Recovery 3	Recovery 3	Recovery 3	Recovery 3	--	--	--	--	--
25	--	--	--	--	--	--	--	--	--
26	--	--	--	--	--	--	--	--	--
27	--	--	--	--	Recovery 3				
28–103	--	--	--	--	--	--	--	--	--
104	Recovery 4	Recovery 4	Recovery 4	Recovery 4	--	--	--	--	--
105	End of Analysis	End of Analysis	End of Analysis	End of Analysis	--	--	--	--	--
106					--	--	--	--	--
107					Recovery 4				
108					End of Analysis				

Note: Recovery Endpoints: 1) Recovery of agriculture/pasture and introduced vegetation is complete; 2) Recovery of grassland, wetland, and riparian is complete; 3) Recovery of shrub is complete (excluding sagebrush); and 4) Recovery of sagebrush complete. Years marked by shaded cells were not included in the HEA.  
 -- = linear change in habitat service level between recovery endpoints

The HEA model balances the cumulative injury ( $I$ , service-acre-years) over the lifetime of the Project with the cumulative benefit of habitat restoration and conservation ( $R$ , service-acre-years), so that  $R \geq I$ . Variables in the equation used to calculate  $I$  are indicated with the superscript  $j$ . Variables in the equation used to calculate  $R$  are indicated with the superscript  $p$ . For each segment, the habitat injury ( $I$ , service-acre-years) was quantified for the life of the Project using Equation 2. Equation 2 was adapted from Equation 8.1 in Allen et al. (2005). The discount rate ( $r$ ) was set to 3%, which is relatively standard for this type of analysis. The discount rate refers to an economics social discount rate at which services being provided in different time periods are converted into current time period equivalents (Allen et al. 2005). The discount rate effectively weighs the habitat service losses so that losses occurring early in the project result in a greater overall injury than losses occurring later in the project. Likewise, conservation occurring early in the project would result in a greater benefit than conservation occurring late in the project.

Equation 2. 
$$I = \sum_{t=0}^y JV^j * \rho_t * [(b^j - x_t^j) / b^j]$$

where:

$I$  is the present value of the service-acre-years lost over  $y$  due to interim and permanent injury,

$t = 0$  is the year the project begins,

$y$  is the analysis period, in years (i.e., 107),

$JV^j$  is the value of the habitat services provided by the injured habitat (service-acres) before injury (i.e., at the Baseline milestone),

$b^j$  is the mean service score provided by the Assessment Area ( $JV^j/J$ , where  $J$  is the injury Assessment Area in acres) at the Baseline milestone (time  $[t] = 0$ ),

$\rho_t$  is the discount factor, where  $\rho_t = 1/(1+r)^{t-C}$ , where  $r$  is the discount rate for the time period and  $C$  is the time the claim is presented ( $C = \text{Project Year 1}$ ), and

$x_t^j$  is the mean service score provided by the Assessment Area at the end of year  $t$  if Project disturbances are applied.

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## **APPENDIX D**

### **Quantification of Mitigation Project Habitat Service Gains**

This appendix describes mitigation projects selected for modeling, GIS methods to quantify habitat service gain associated with mitigation projects, and HEA for mitigation service gains.

## MODELING MITIGATION PROJECT HABITAT SERVICE GAINS

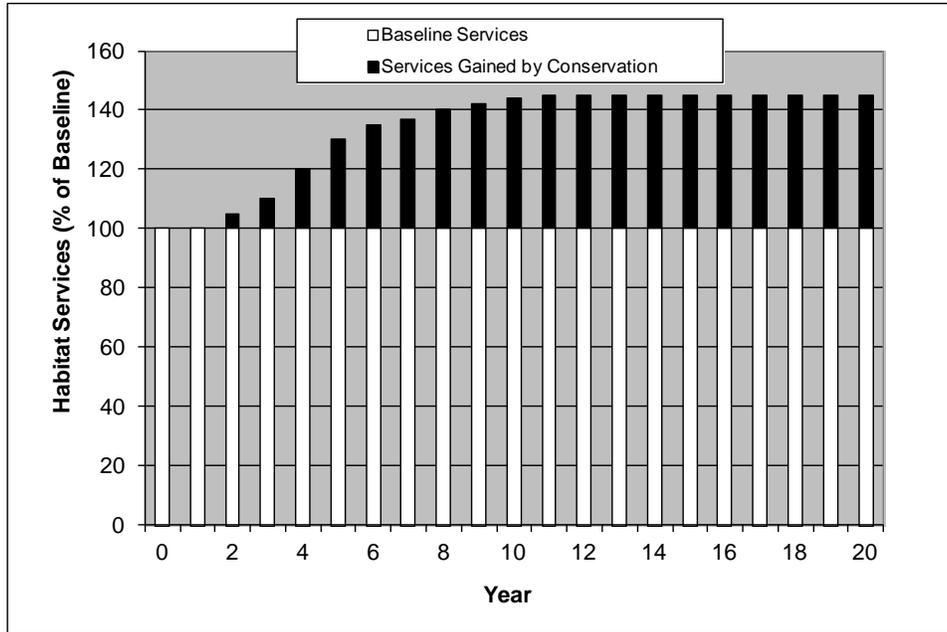
The Habitat Equivalency Analysis (HEA) Technical Advisory Team identified habitat conservation measures intended to create new, or protect existing, greater sage-grouse (*Centrocercus urophasianus*; henceforth, sage-grouse) habitat services threatened by the Gateway West Transmission Line Project (Project) (Table D1). These measures serve as a “toolbox” from which mitigation options may be selected by the Project proponent for inclusion in a mitigation package. The purpose of implementing the conservation measures is to offset the cumulative sage-grouse habitat service losses in the Assessment Area (the Project footprint with 9-km buffer) over the Project lifetime (i.e., *I* in Equation 2 from Appendix C). The HEA was used to evaluate the benefit of a sample of conservation projects in the Assessment Area.

**Table D1.** Habitat Conservation Projects Modeled in the HEA

Conservation Project Type	Brief Project Description	Anticipated Benefits
Fence removal and marking with flight diverters	Fences would be removed or marked in: 1) Sections of fence known to cause sage-grouse collisions, 2) Fences within 2 km (1.2 mi) of leks (Braun 2006; Stevens 2011) or other high risk area, 3) Fences in areas with low slope and terrain ruggedness (Stevens 2011), and 4) Fence segments bounded by steel t-posts with spans greater than 4 m (Stevens 2011).	<ul style="list-style-type: none"> <li>• Reduce mortality due to sage-grouse collisions</li> <li>• Increase visibility of fences</li> <li>• Increase contiguous patches of shrub-steppe habitat</li> <li>• Remove localized grazing pressure and increase habitat</li> </ul>
Sagebrush restoration and improvement projects	Seeding, planting seedlings, or transplanting containerized sagebrush plants (one plant per 5 m <sup>2</sup> ) and seeding a bunchgrass understory.	<ul style="list-style-type: none"> <li>• Create contiguous patches of shrub-steppe habitat with optimal sagebrush cover and height and a bunchgrass understory</li> <li>• Increase availability of high quality nesting, brood rearing, and winter habitats</li> </ul>
Juniper/conifer removal	Mechanical removal (lop and scatter, cut-pile-cover, or mastication) of juniper/conifer adjacent to areas with optimal sagebrush cover and height	<ul style="list-style-type: none"> <li>• Reverse juniper/conifer encroachment on shrub-steppe habitat to increase contiguous patches of sage-grouse habitat</li> <li>• Increase light penetration to support a forb and grass understory</li> </ul>
Bunchgrass seeding projects	Bunchgrass seeding and prescriptive grazing to increase bunchgrass communities	<ul style="list-style-type: none"> <li>• Create contiguous patches of sagebrush habitat with bunchgrass understory</li> <li>• Increase suitable forage and insect availability for sage-grouse browsing during brood rearing</li> </ul>
Conservation easements	Removes threat of specific land uses to sensitive wildlife populations	<ul style="list-style-type: none"> <li>• Prevent sage-grouse habitat destruction or degradation near urban areas and oil and gas development</li> <li>• Reduce future fragmentation of shrub-steppe habitat</li> </ul>

### GIS MODELING OF CONSERVATION BENEFITS

This section describes the methods used to evaluate the habitat services benefit provided by the conservation projects (Figure D1). The analysis of conservation benefit was conducted like the analysis of Project-related habitat service losses. Both analyses used the same habitat services metric (see Appendix A), the same unit of measure (service-acres), the same analysis period (107 years), and the same discount rate (3%).



**Figure D1.** Hypothetical example of how the HEA model considers habitat services gained by conservation to calculate the total services gained over the project period (i.e., sum of the black bars).

### Modeling Conservation Projects

Target areas for conservation projects had not been selected at the time of the analysis, so hypothetical conservation project areas were modeled to estimate average habitat service gain. Three to five hypothetical project areas were selected in Idaho and Wyoming for each conservation measure identified in Table D1. These project areas were selected based on patterns in vegetation and disturbance in areas where they would create a habitat services gain, without regard to land ownership or land access.

The variable scores were manipulated using geographic information system (GIS) technology for each hypothetical project area to approximate the change in habitat services expected with implementation of the measure (Table D2). The new habitat service score was calculated for each cell in the Project area using the habitat services metric (see Appendix A). The benefit of the project was the difference in the habitat service level (sum of all the cell scores in the project area [service-acres]) at Baseline and after “implementation” of the measure.

**Table D2. Site Selection and Changes in Metric Scoring Applied During GIS Analysis of Conservation Measure Benefit**

Type of Improvement	Site Selection Criteria	Changes in Metric Scoring	Analysis Product
Fence removal and marking with reflectors	Priority areas for fence removal and/or marking are as follows: 1) Sections of fence known to cause sage-grouse collisions, 2) Fences within 2 km (1.2 mi) of leks (Braun 2006; Stevens 2011) or other high risk area, 3) Fences in areas with low slope and terrain ruggedness (Stevens 2011), and 4) Fence segments bounded by steel t-posts with spans greater than 4 m (Stevens 2011).	Change Distance to Fence score to 3 within analysis area*	Analysis provided the services gained, the analysis area, and the kilometers of fence marked and removed in the analysis area.
Sagebrush restoration and improvement projects	Smaller patches of agriculture or surface disturbance (i.e., well pads) surrounded by sagebrush habitat.	<ul style="list-style-type: none"> <li>• Change Vegetation Class score to 1</li> <li>• Change Sagebrush Patch Size score as appropriate</li> <li>• Change % Sagebrush Cover score to 3</li> <li>• Change the % Sagebrush Canopy Height score to 3</li> <li>• Change the scores of the surrounding cells for Distance of Habitat to Sage or Shrub Dominant as appropriate</li> <li>• Change % Bunchgrass Cover to 3</li> </ul>	Analysis provided the services gained, the area of the analysis, and the area of the habitat improvement (i.e., the agricultural field or well pad)
Juniper/conifer removal	Phase I Juniper (a sagebrush-dominated landscape with scattered juniper) adjacent to sagebrush	<ul style="list-style-type: none"> <li>• Change Vegetation Class score to 1</li> <li>• Change Sagebrush Patch Size score as appropriate</li> <li>• Change % Sagebrush Cover score to average score of local sagebrush vegetation</li> <li>• Change the % Sagebrush Canopy Height score to average score of local sagebrush vegetation</li> <li>• Change the scores of the surrounding cells for Distance of Habitat to Sage or Shrub Dominant</li> </ul>	Analysis provided the services gained, the total analysis area, and the acres of juniper removed.
	Phase II Juniper (50:50 mix sagebrush and juniper) adjacent to sagebrush	<ul style="list-style-type: none"> <li>• Change Vegetation Class score to 1</li> <li>• Change Sagebrush Patch Size score as appropriate</li> <li>• Change % Sagebrush Cover score to average score of local sagebrush vegetation</li> <li>• Change the % Sagebrush Canopy Height score to average score of local sagebrush vegetation</li> <li>• Change the scores of the surrounding cells for Distance of Habitat to Sage or Shrub Dominant</li> </ul>	Analysis provided the services gained, the total analysis area, and the acres of juniper removed.

Type of Improvement	Site Selection Criteria	Changes in Metric Scoring	Analysis Product
	Phase III Juniper (a juniper-dominated landscape) adjacent to sagebrush	<ul style="list-style-type: none"> <li>• Change Vegetation Class score to 1</li> <li>• Change Sagebrush Patch Size score as appropriate</li> <li>• Change % Sagebrush Cover score to average score of local sagebrush vegetation</li> <li>• Change the % Sagebrush Canopy Height score to average score of local sagebrush vegetation</li> <li>• Change the scores of the surrounding cells for Distance of Habitat to Sage or Shrub Dominant</li> </ul>	Analysis provided the services gained, the total analysis area, and the acres of juniper removed.
Bunchgrass seeding projects	Grasses with low % cover scores.	<ul style="list-style-type: none"> <li>• Change Vegetation Class score to 1</li> <li>• Change % Bunchgrass Cover to 3</li> </ul>	Analysis provided the services gained and the total analysis area.
Conservation easements	Areas with high habitat service scores adjacent to oil and gas development (Wyoming) or urban development (Idaho)	No change to metric score. Calculate total within boundary. Size similar to those already established in Wyoming.	Analysis provided the baseline services present in the analysis area, and the analysis area

\* Although fence removal is more effective at removing the threat of sage-grouse collision than fence marking, both measures were modeled the same for the HEA due to a limitation of the model.

## HEA TO QUANTIFY INTERIM AND PERMANENT HABITAT IMPROVEMENTS

The benefit (in service-acres) of each hypothetical project was entered into a separate HEA, where estimated time until full benefit (Table D3) and discount rate (3%) were applied to estimate the present value habitat service gain that would be created by implementing the project.

Time of mitigation funding was set to Year 1 of the Project, with an assumed lag time until conservation measure could be implemented on the ground (see Table D3). If mitigation funding was provided after Year 1 of the Project, fewer present value service-acre-years would be gained per mitigation dollar spent. This is a function of the discount rate in Equation 3.

For each conservation project modeled, the present value habitat service gain ( $R$ , service-acre-years) was quantified for the life of the Project (107 years) using Equation 3 (adapted from Equation 8.1 in Allen et al. 2005).

Equation 3. 
$$R = \sum_{t=0}^y PV^P * \rho_t * [(x_t^P - b^P) / b^P]$$

where:

$R$  is the present value of the service-acre-years gained by the habitat improvement project,

$t = 0$  is the year the transmission line Project begins,

$y$  is the analysis period, in years (i.e., 107),

$PV^P$  is the value of the habitat services provided by the improved habitat (service-acres) before improvement (i.e., at the Baseline milestone),

$b^P$  is the mean service score provided by the Assessment Area ( $PV^P/P$ , where  $P$  is the injury Assessment Area in acres) at the Baseline milestone (time [ $t$ ] = 0),

$\rho_t$  is the discount factor, where  $\rho_t = 1/(1+r)^{t-C}$ , where  $r$  is the discount rate for the time period and  $C$  is the time the claim is presented ( $C = \text{Project Year 1}$ ), and

$x_t^P$  is the mean service score provided by the Assessment Area at the end of year  $t$  if conservation measure benefits are applied.

The present value habitat service gain ( $R$ ) was standardized among projects by dividing by size of project (units in acres or linear mile depending on the conservation measure modeled) and averaged among hypothetical projects applying the same conservation measure to produce the service-years gained per unit of treatment ( $\bar{R}^m$ ). This value is used in the mitigation calculations.

Identical to the recovery of sagebrush in the footprint of the project, sagebrush grown from seed did not reach full habitat service potential for 100 years in the model (see Table D3). This recovery rate is conservative because most species will mature and attain full habitat services in less than 100 years with passive restoration/improvement techniques, and the active techniques proposed for mitigation are expected to increase the recovery rate. Based on the experience of the HEA Technical Advisory Team, some of the sagebrush habitat improvements used for mitigation may fail to provide habitat for sage-grouse or may fall short of their planned potential. The Team decided that this conservative recovery rate adequately offsets potential mitigation project failures in the analysis.

**Table D3.** Time to Project Implementation and Time to Full Benefit of Project Used in HEAs of Conservation Measures

Type of Improvement	Year of Implementation Assuming Funding at Project Initiation	Time to Full Benefit of Project After Implementation
Fence removal and marking with reflectors	Year 1	Immediate full benefit
Sagebrush restoration and improvement projects	Year 3	Seeding sagebrush and bunchgrass understory: 100 years to full benefit (assume linear increase in services)*
	Year 5	Transplanting containerized stems and seeding bunchgrass understory: 15 years to full benefit (assume linear increase in services)
	Year 3	Planting seedlings and seeding bunchgrass understory: 90 years to full benefit (assume linear increase in services)
Juniper/conifer removal	Year 3	Lop and Scatter Phase I Juniper: 20 years to full benefit (assume linear increase in services)
	Year 3	Cut-Pile-Cover or Mastication of Phase II Juniper: 50 years to full benefit (assume linear increase in services)
	Year 3	Mastication of Phase III Juniper plus bunchgrass seeding: 100 years to full benefit (assume linear increase in services)
Bunchgrass seeding projects	Year 3	Active restoration measures: 5 years to full benefit (assume linear increase in services)
Conservation easements	Year 2	Immediate full benefit once established

\* Time to sagebrush establishment is based on passive restoration rates. Rates of establishment are expected to be higher for this active restoration, but the longer time is used in the analysis to offset potential restoration project failures.

## ESTIMATING COST TO IMPLEMENT MODELED HABITAT CONSERVATION MEASURES

The cost of the modeled habitat conservation measures was estimated by averaging the known cost of similar projects previously implemented in Idaho and Wyoming (in 2012 U.S. dollars) (Table D4). Project budgets that included administrative and other indirect costs were 50% more expensive on average than project budgets that only included labor and materials, so the labor and materials budgets were increased by 50% to account for indirect expenses before averaging.

The cost per unit treated was divided by the average service-acre-years per unit area treated (calculated in the previous section), to estimate the price per service-acre-year gained for each of the conservation measures. This is the currency that will be used to offset the permanent and interim habitat service losses associated with Project construction and operation for the lifetime of the analysis (i.e., 100 years after restoration).

**Table D4. Estimated Costs for Modeled Conservation Measures**

Conservation Measure	General Measure	Average Cost*	Source
Fence removal and marking with flight diverters	Fence marking with flight diverters	\$1,400/mile for initial installation (materials, labor, and estimated indirect costs) plus \$300/mile every year for maintenance (materials and labor)	<ul style="list-style-type: none"> <li>SWCA Environmental Consultants (SWCA)</li> </ul>
	Fence removal	\$1,400/mile for fence removal (labor and estimated indirect costs)	<ul style="list-style-type: none"> <li>SWCA</li> </ul>
Sagebrush restoration and improvement projects	Seeding sagebrush and bunchgrass understory	\$3,750/acre for seeding sagebrush and understory (materials and labor, + 50% for indirect costs)	<ul style="list-style-type: none"> <li>SWCA</li> <li>Wyoming Game and Fish Department (WGFD) Habitat Improvements List dated July 28, 2009</li> </ul>
	Transplanting containerized sagebrush stems and seeding bunchgrass understory	\$6,900/acre for transplanting sagebrush at one per 5 m <sup>2</sup> and seeding understory (materials and labor + 50% indirect costs)	<ul style="list-style-type: none"> <li>SWCA</li> <li>WGFD Habitat Improvements List dated July 28, 2009</li> </ul>
	Planting seedlings and seeding bunchgrass understory	\$4,200/acre to grow and plant seedlings at one per 5 m <sup>2</sup> (materials and labor + 50% indirect costs)	<ul style="list-style-type: none"> <li>SWCA</li> <li>Idaho BLM (personal communication, Tim Carrigan, with Ann Widmer, SWCA)</li> </ul>
Juniper/conifer removal	Lop and scatter Phase I juniper	\$170/acre (materials, labor, and estimated indirect costs)	<ul style="list-style-type: none"> <li>WGFD Habitat Improvements List dated July 28, 2009</li> <li>Idaho BLM (personal communication, Tim Carrigan, with Ann Widmer, SWCA)</li> <li>The Nature Conservancy 2011</li> </ul>
	Cut-pile-cover or mastication of Phase II juniper	\$650/acre (materials, labor, and estimated indirect costs)	<ul style="list-style-type: none"> <li>Idaho BLM (personal communication Tim Carrigan, with Ann Widmer, SWCA)</li> </ul>
	Mastication of Phase III juniper and seeding bunchgrass understory	\$2,000/acre (materials, labor, and estimated indirect costs)	<ul style="list-style-type: none"> <li>WGFD Habitat Improvements List dated July 28, 2009</li> <li>Idaho BLM (personal communication, Tim Carrigan, with Ann Widmer, SWCA)</li> </ul>
Bunchgrass seeding projects	Overseeding understory vegetation	\$1,200/acre (materials, labor, and indirect costs)	<ul style="list-style-type: none"> <li>SWCA</li> <li>WGFD Habitat Improvements List dated July 28, 2009</li> </ul>
Conservation easements	Land purchase	\$580/acre average purchase price + \$2,500/year for maintenance	<ul style="list-style-type: none"> <li>Michie's Legal Resources (2011): Golden Willow Ranch conservation easement, Mowry Ranch conservation easement, Vee Cross Ranch conservation easement, and Badwater Ranch conservation easement</li> <li>WGFD (personal communication, Matt Fry, with Ann Widmer, SWCA)</li> </ul>

\* Cost of implementation includes a 50% markup for indirect costs, which include contract writing, supervision, clearances, monitoring, inspections, and vehicle costs.

## APPROACH TO OFFSET HABITAT SERVICE LOSSES WITH CONSERVATION HABITAT GAINS

An HEA scales the mitigation package (i.e., funding to create habitat services) to offset the loss of habitat services over the lifetime of the Project. The injury is offset by planned conservation projects in Equation 4, where the mitigation project size ( $P^m$ ) can be solved for each conservation measure type ( $m$ ).

Equation 4

$$I = \sum_{m=1}^i P^m * \bar{R}^m$$

where:

$I$  is the present value of the service-acre-years lost over  $y$  due to interim and permanent injury,

$i$  is the number of conservation measures modeled,

$P^m$  is the size of the mitigation project of type  $m$  (in units of acres or miles), and

$\bar{R}^m$  is mean service-years gained per unit (acres or miles) of treatment.

Once the  $P^m$  is defined for each conservation measure for a segment, the costs per unit can be applied. Mitigation due for a segment is the sum of the costs to implement each of the mitigation projects for that segment.

The total mitigation due should be less than the sum of all the segment parts due to the overlap in the 9-km buffers around the segments described in Section 2.2.2.4 of the main report. This adjustment can be made algebraically using the segment lengths.

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- Allen, P.D. II, D.J. Chapman, and D. Lane. 2005. Scaling environmental restoration to offset injury using habitat equivalency analysis. In *Economics and Ecological Risk Assessment: Applications to Watershed Management*, edited by R.F. Bruins and M.T. Heberling, pp. 165–184. Boca Raton, Florida: CRC Press.
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## **APPENDIX E**

### **Habitat Conservation Measures Not Modeled**

This appendix lists additional habitat conservation measures that were identified by the HEA Technical Advisory Team, but could not be modeled in the HEA.

The Habitat Equivalency Analysis (HEA) Technical Advisory Team identified a number of measures that may be useful for mitigating the greater sage-grouse (*Centrocercus urophasianus*; henceforth, sage-grouse) habitat service losses caused by the Gateway West Transmission Line Project. Those measures that could not be modeled in the HEA but may be considered on a case-by-case basis are:

- Research
  - Quantify unknown and indirect disturbances created by transmission lines (i.e., behavior and predation responses)
  - Determine if mitigation is effective in reducing effects to sage-grouse
- Multiple habitat enhancement techniques used in conjunction
  - For example, where there is an existing sagebrush component, there may be mechanical options (i.e., Dixie harrow and Lawson aerator) that could be used in concert with herbicide and seeding treatments to improve habitat conditions
- Removal of non-native vegetation in order to restore native vegetation and improve habitat to optimal nesting and brood rearing cover
- Reclamation of roads and two-tracks in core habitat
- Adoption of perch inhibitors on the lines to discourage raptor perching in sage-grouse core areas or until research shows other alternatives to discourage perching
- Use of larvicides in areas at high risk for West Nile virus
- Creation of fire breaks near highly attended leks to prevent potential future loss due to wildfire
- Herbicide spray treatments to control introduced annual grasses and weed infestations
- Intensive grazing management to improve bunchgrass understory

## **APPENDIX F**

### **Notes from Meetings of the HEA Technical Advisory Team**

This appendix provides notes from the meetings of the HEA Technical Advisory Team that were compiled by Enviroissues and provided to SWCA for inclusion in this report. These notes provide context for decisions made in the HEA process.

**MEETING NOTES - FINAL**  
**Gateway West Transmission Line Project**  
**PIAA-HEA Discussion for Greater Sage-grouse Framework Meeting**  
**Salt Lake City, UT**

Date: Wednesday January 19, 2011  
Time: 8:00 am - 4:30 pm (Mountain)

<b>TYPE OF MEETING</b>	<b>PIAA-HEA Discussion for Greater Sage-grouse Framework</b>	
<b>NOTE TAKER</b>	Steve Negri	
<b>ATTENDEES</b>	<p><b><u>BLM – Wyoming State Office</u></b>  <input checked="" type="checkbox"/> Walt George  <input checked="" type="checkbox"/> Chris Keefe  <input checked="" type="checkbox"/> Tyler Abbott  <input checked="" type="checkbox"/> Frank Blomquist  <input checked="" type="checkbox"/> Larry Neasloney</p> <p><b><u>BLM – Idaho State Office</u></b>  <input checked="" type="checkbox"/> Paul Makela  <input checked="" type="checkbox"/> Tim Carrigan</p> <p><b><u>State of Wyoming WGFD</u></b>  <input checked="" type="checkbox"/> Matt Fry (by phone)</p> <p><b><u>USFWS</u></b>  <input checked="" type="checkbox"/> Clark McCreedy  <input checked="" type="checkbox"/> Pat Deibert  <input checked="" type="checkbox"/> Jeri Wood</p> <p><b><u>State of Idaho IDFG</u></b>  <input checked="" type="checkbox"/> Lance Hebdon</p>	<p><b><u>State of Nevada</u></b>  <input checked="" type="checkbox"/> Sandra Brewer  <input checked="" type="checkbox"/> Nycole Burton</p> <p><b><u>Applicants – Rocky Mountain Power/Idaho Power Company</u></b>  <input checked="" type="checkbox"/> Brian King</p> <p><b><u>Tetra Tech (TT)</u></b>  <input checked="" type="checkbox"/> Joe Iozzi  <input checked="" type="checkbox"/> Steve Negri  <input checked="" type="checkbox"/> John Crookston  <input checked="" type="checkbox"/> Mary Garner</p> <p><b><u>SWCA</u></b>  <input checked="" type="checkbox"/> Jon Kehmeier  <input checked="" type="checkbox"/> Ann Widmer  <input checked="" type="checkbox"/> David Brown  <input checked="" type="checkbox"/> Thomas Sharp</p>

<b>HANDOUTS / MATERIALS</b>	<ul style="list-style-type: none"> <li>• Agenda</li> </ul>
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**AGENDA TOPICS**

**INTRODUCTIONS/SIGN-IN**

	<ul style="list-style-type: none"> <li>• Walt George gave an update on project status and on use of Sage-grouse Framework Developed for Transmission Lines.</li> </ul>
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**REVIEW AND DISCUSSION OF HEA PROCESS USING EXAMPLES OF OTHER PROJECTS**

<b>SWCA PRESENTATION ON HEA APPROACH</b>	<ul style="list-style-type: none"> <li>• Jon Kehmeier and Ann Widmer presented a PowerPoint on what typically goes into a Habitat Equivalency Analysis (HEA) model, including data requirements, analysis boundaries, inputs, discount rates, and model outputs that can be used to determine mitigation values.</li> </ul>
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	<ul style="list-style-type: none"> <li>• Which base habitat layer should be used in the HEA model was discussed. Layers considered for use included Sage-map, GAP, Idaho Key Habitats, and LANDFIRE.</li> <li>• Jon explained that the decision as to which habitat layers should be used in the HEA model needs to be independent of political opinions, decisions, and personal interpretations of value.</li> <li>• It was determined that no layer would be ideal for use in each state crossed. Idaho Key Habitat polygons could not be used for this portion of the analysis as they are based largely on expert opinion, informed with various imagery. Sage-map or GAP would be best in Wyoming but would not work as well in Nevada; LANDFIRE or Southwest GAP would likely be best in Nevada but would not work as well in Wyoming; and it is uncertain as to which layer would be best in Idaho.</li> <li>• Idaho expressed concerns that both GAP and LANDFIRE datasets do not accurately capture recent fire data.</li> <li>• Jon noted that a disturbance rate would need to be determined for each stage of the Project (Baseline, Construction, Restoration, and Operation) regarding the extent of impacts that could occur at varying distances from the Project.</li> <li>• Pat Deibert explained that empirical, peer reviewed, quantitative data regarding impacts to greater sage-grouse from tall structures is limited. The Tall Structures Report should be reviewed in order to determine what data is available.</li> <li>• Concerns over the discount rate were raised, including how administrative costs of land management could be included in the calculation.</li> <li>• Jon explained that administrative costs could be dealt with separately from the HEA model, but it should not be included in the HEA's discount rate.</li> </ul>
<b>DECISIONS</b>	<ul style="list-style-type: none"> <li>• A discount rate of 3 percent will be used in the HEA model</li> <li>• The area of analysis for the HEA model will consist of an 18 km (11-mile) area on each side of the Project's centerline.</li> <li>• Tetra Tech will provide a full list of the metrics found in GAP and LANDFIRE to the BLM and State agencies.</li> <li>• Tetra Tech will compare the GAP and LANDFIRE classification in order to determine how well these two datasets overlap. Based on this comparison, Tetra Tech, SWCA, and the agencies will decide whether one dataset should be used instead of the other in the HEA model, or if a combination of each dataset should be used. However, due to the limited amount of time available for this process, the HEA model will move forward using both GAP and LANDFIRE, until a decision has been made.</li> <li>• Tetra Tech will use current literature regarding impacts to greater sage-grouse to develop formulas that predict impacts to habitat by distances from the Project (for all stages of the Project). These formulas will be reviewed by a small group of agency personnel (group members to be determined at a later date).</li> <li>• Tetra Tech will determine what length of time should be used to model the restoration phase of the Project. The time frame will be based on the current literature regarding the time necessary for sagebrush habitats to recover following disturbances.</li> <li>• Idaho and Wyoming State BLM Offices will provide Tetra Tech with fire polygon data that can be used to update the GAP and LANDFIRE datasets. These updated datasets will be used in the HEA model.</li> </ul>

## PIAA APPROACH AND STATUS

<b>REVIEW OF THE PIAA PROCESS</b>	<ul style="list-style-type: none"> <li>• Chris Keefe and Mary Garner presented an example of a Project Impact Analysis Area (PIAA) analysis that was conducted for a portion of the Project.</li> </ul>
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	<ul style="list-style-type: none"> <li>• Chris explained that the 1 disturbance per 640 acre requirement is based on the extent of the entire PIAA, as opposed to individual 640 acre blocks. Therefore, this analysis does not penalize proponents for co-locating disturbances (i.e., you can have more than 1 disturbance in a single 640 acre block, if there is less than 1 disturbance per 640 acres when averages across the entire PIAA polygon).</li> <li>• Paul Makela asked why met-towers are not included as an existing disturbance in the PIAA.</li> <li>• Chris noted that the direct disturbance footprint of most met-towers is very small, and we are uncertain as to the indirect disturbance footprint. If the met-tower disturbs enough land that it can be calculated via an aerial image, or if disturbance polygon data is available, we can certainly include these disturbances; otherwise, there is no available data to indicate what disturbance footprint to include in the PIAA.</li> <li>• Chris suggested that when calculating lek attendance data, use the temporal extent of the dataset (up to 10 years). Include zeros only if they actually indicate that no birds were detected that year, as opposed to a lack of data that year.</li> <li>• Chris suggested that only include leks with an “occupied” status in the PIAA calculation.</li> <li>• Frank Blomquist noted that lek status and attendance numbers are constantly being updated. He asked how we will address this in the PIAA.</li> <li>• Mary explained that we have received lek status and attendance numbers from various BLM Field Offices that contradicts data obtained from the state wildlife agencies.</li> <li>• Chris explained that only the lek layers maintained by the state wildlife agencies will be used in the PIAA. Updates to these layers, created by the various BLM Field Offices, will need to be run by the state wildlife agencies and incorporated into the state’s lek database before they are officially accepted. This should not be a problem for the Project, as long as the analysis clearly states what data layer was used as well as the date of the layer.</li> <li>• Tyler Abbott, Pat Deibert and Clark McCreedy noted that the loss of birds discussion was brief but the framework is set up to inform the informal conferencing for this candidate and assist in qualifying impacts to birds.</li> </ul>
<b>DECISIONS</b>	<ul style="list-style-type: none"> <li>• Tetra Tech will provide a list of the disturbance types that have been delineated during the PIAA process to the Idaho and Wyoming State BLM Field Offices. Based on this list, Idaho may provide Tetra Tech with additional disturbance layers.</li> <li>• Tetra Tech will obtain the most recent lek attendance data from the state wildlife agencies. This data will be used during the PIAA analysis, with lek attendance summarized over a 10 year period (limited to available data).</li> </ul>

### ACTION ITEMS

	ACTION ITEMS	PERSON RESPONSIBLE	DEADLINE	STATUS
1	Tetra Tech will use current literature regarding grouse avoidance of disturbances (specifically tall structures) to develop formulas that predict impacts by distance of disturbance. These formulas will be reviewed by the agencies, and once approved, incorporated into the HEA.	Steve/John	2/4/11	Submitted to Core Team on 2/6/11
2	Tetra Tech will determine the length of the restoration phase of the project. This will be based on the values reported in current literature regarding the time necessary for sagebrush habitats within the project area to restore to pre-disturbance conditions (with and without active restoration).	Steve/John	2/4/11	Submitted to Core Team on 2/6/11

3	Tetra Tech will provide a full list of the metrics found in the GAP and LANDFIRE databases to the BLM and state agencies (specifically those representatives that attended this meeting). A sub-list will also be provided, which lists the metrics that would likely be used during the HEA process. Tetra Tech will also compare the GAP and LANDFIRE classifications, within the project area, in order to determine how well these two datasets overlap. Based on this comparison, Tetra Tech, SWCA, and the agencies will decide whether one database should be used instead of the other in the HEA process, or if a combination of metrics from each database would be used (However, while this is being decided, Tetra Tech or SWCA will move forward by running the HEA using both datasets)	Mary Garner		Ongoing; metrics comparison maps and list will be available prior to meeting
4	Idaho and Wyoming State BLM Offices (Chris Keefe from Wyoming and Paul Makela from Idaho) will provide Tetra Tech (Mary Garner) with fire polygon data that can be used to update the GAP and LANDFIRE database.	Chris Keefe, Paul Makela, Mary Garner		Completed
5	Tetra Tech will provide a list of the disturbance types that have been delineated during the PIAA process to the Idaho and Wyoming State BLM Offices. Based on this list, Idaho may provide Tetra Tech with additional disturbance data layers (i.e., FAA, FCC, and Roads layers for Idaho)	Mary Garner		Completed
6	Tetra Tech will obtain the most recent lek attendance data from the state wildlife agencies. This data will be used during the PIAA analysis, with lek attendance summarized over a 10 year period (limited to the available data).	Mary Garner		Completed
7	Tetra Tech will provide access and logon information for the project's SharePoint site to the attendees of the meeting (specifically Jeri Wood of the USFWS and any other agents that are new to the Project).	Angie Arregui		Completed
8	A small group will be selected to review the formulas that Tetra Tech developed to predict impacts to greater sagegrouse habitats by distance of disturbance. During this meeting, these formulas will either be approved or the group will develop alternative formulas.			
9	Determine the next work group meeting to discuss PIAA and HEA status; propose a 1 hour conference call. This call should provide an update to the work to date and to discuss dates for conducting a workshop on developing the HEA process in more detail.	All		Doodle Poll will be sent out to the group the week of 2/14 and 2/21

**MEETING NOTES - FINAL**  
**Gateway West Transmission Line Project**  
**Greater Sage-grouse HEA Meeting**  
**Denver, CO**

Date: Thursday May 12, 2011  
Time: 9:00 am – 4:00 pm (Mountain)

<b>TYPE OF MEETING</b>	<b>Greater Sage-grouse HEA</b>	
<b>NOTE TAKER</b>	Gina Auriemma	
<b>ATTENDEES</b>	<p><b><u>BLM – Wyoming State Office</u></b>  <input checked="" type="checkbox"/> Tyler Abbott  <input checked="" type="checkbox"/> Walt George  <input checked="" type="checkbox"/> Chris Keefe</p> <p><b><u>BLM – Idaho State Office</u></b>  <input checked="" type="checkbox"/> Tim Carrigan  <input checked="" type="checkbox"/> Paul Makela</p> <p><b><u>State of Wyoming WGFD</u></b>  <input checked="" type="checkbox"/> Matt Fry</p> <p><b><u>State of Idaho IDFG</u></b>  <input checked="" type="checkbox"/> Lance Hebdon  <input checked="" type="checkbox"/> Mike McDonald (phone)</p> <p><b><u>USFWS - Wyoming</u></b>  <input type="checkbox"/> Pat Deibert  <input checked="" type="checkbox"/> Travis Sanderson</p> <p><b><u>USFWS - Idaho</u></b>  <input checked="" type="checkbox"/> Jeri Wood</p>	<p><b><u>Rocky Mountain Power</u></b>  <input checked="" type="checkbox"/> Pam Anderson  <input checked="" type="checkbox"/> Brian King</p> <p><b><u>Idaho Power Company</u></b>  <input checked="" type="checkbox"/> Stacey Baczkowski</p> <p><b><u>Tetra Tech (TT)</u></b>  <input checked="" type="checkbox"/> John Crookston  <input checked="" type="checkbox"/> Mary Garner  <input type="checkbox"/> Joe Iozzi  <input checked="" type="checkbox"/> Steve Negri  <input type="checkbox"/> Jim Nickerson</p> <p><b><u>SWCA</u></b>  <input type="checkbox"/> David Brown  <input checked="" type="checkbox"/> Jon Kehmeier  <input checked="" type="checkbox"/> Cynthia Tyler  <input checked="" type="checkbox"/> Ann Widmer</p> <p><b><u>EnvirolIssues</u></b>  <input checked="" type="checkbox"/> Diane Adams  <input checked="" type="checkbox"/> Gina Auriemma</p>

<b>HANDOUTS / MATERIALS</b>	<ul style="list-style-type: none"> <li>• Agenda</li> <li>• Draft Scope of Work to Establish and Run the Habitat Equivalency Model on Greater Sage-grouse for the Gateway West Transmission Line Project</li> <li>• Framework for Sage-grouse Impacts Analysis for Interstate Transmission Lines</li> <li>• January 19 Meeting Summary</li> <li>• SWCA Gateway West HEA Model – Workshop 1</li> <li>• SWCA Data Table</li> </ul>
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**AGENDA TOPICS**

**INTRODUCTIONS/OBJECTIVES**

	<ul style="list-style-type: none"> <li>• Diane Adams welcomed participants and reviewed meeting objectives.</li> </ul>
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## PROJECT STATUS UPDATE/Framework ANALYSIS

	<ul style="list-style-type: none"><li>• Walt George reviewed the Framework Analysis Document and rationale behind switching to using the Density Disturbance Calculation (DDC) from the Project Impact Analysis Area (PIAA) process. The DDC calculation will not be used until the Final Environmental Impact Statement (FEIS).</li><li>• The Framework is a generic document for interstate transmission planning created by consensus among more than 20 biologists from 5 different states and several agencies. The group discussed adding an addendum to reflect how the Framework applies to the Gateway West project specifically.</li><li>• Tyler Abbott and Paul Makela noted that they would work on a Framework footnote specific to the Gateway West project in order to address Key Areas in Wyoming and Idaho (Wyoming Core Areas according to the Governor's Executive Order, and Areas R1-R3 in Idaho).</li><li>• Chris Keefe and Tyler discussed how the Framework fits into the impact analysis as a whole. Parts 1 through 4 of the Framework Analysis work together to form the impacts analysis and no part serves as the analysis on its own. The DDC is a tool applied in a specific way and is also not an analysis in and of itself.</li><li>• Walt discussed the Draft Environmental Impact Statement (DEIS) as it relates to the sage-grouse analysis. The process will not be complete for the DEIS, but will include full disclosure of the Framework and with assurance to readers that the complete analysis will be included in the FEIS.</li><li>• The DEIS is expected to include an estimate of habitat acreage that will be disturbed by construction of access roads, tower locations, and ancillary facilities. Exact locations are not yet decided, but prospective locations will be used to estimate surface disturbances. The U.S. Fish and Wildlife Service (USFWS) has asked specifically for an estimate of direct loss of birds for Endangered Species Act (ESA) purposes. Partial estimates will be in the DEIS and full estimates will be in the FEIS.</li><li>• Walt noted that the Proponents have made an effort to work with agencies since the beginning of the project to avoid sage-grouse leks as much as possible on all proposed and alternative routes. The applicants have offered a package of measures to help with mitigation. The Framework will be used to identify the full scope of impacts (direct and indirect) to inform the adequacy of the offered mitigation, and agencies will work with applicants to determine scope of the entire mitigation.</li><li>• Walt noted that the analysis is weakest in the area of indirect effects (e.g. behavioral or avoidance changes sage grouse will have to tall structures). This is something that can only be discussed qualitatively as the literature continues to develop.</li><li>• The DEIS is targeted for release by September 30. Opportunities to release it sooner will be supported if possible.</li><li>• Matt Fry asked what criteria will be used in creating estimates and how they will be defined in the National Environmental Policy Act (NEPA) document. Walt noted that estimates will be as accurate as possible, and best used for comparative purposes. Steve Negri noted that for the DEIS, estimates for indirect effects will be less accurate than for direct effects. The assumptions used to develop the estimates will be outlined clearly in the document. Chris noted that as estimates are used for comparative purposes, it is highly important that all estimates are working under the same set of assumptions. Jon Kehmeier noted that SWCA will work with Walt and Steve to ensure the Habitat Equivalency Analysis (HEA) is working under the same set of assumptions as the NEPA document.</li></ul>
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## UPDATE ON SAGE-GROUSE HEA PROGRESS TO DATE

	<ul style="list-style-type: none"><li>• Steve reviewed the meeting notes from the January meeting.</li><li>• Brian King inquired as to whether the group was set on the 3% discount rate and how variations in that rate might affect the model.</li><li>• Jon noted that as long as mitigation is done up front, a different discount rate will likely have a very small impact. SWCA will run a sensitivity analysis to determine how different discount rates may affect the results.</li><li>• The group discussed how undetermined leks will factor into the analysis. Tyler noted the</li></ul>
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	<p>importance of being explicit in acknowledging what types of leks will be included. Chris suggested listing the number of undetermined leks that are not used in the analysis. Lance Hebdon suggested including some undetermined leks (a percentage) in the DDC analysis, and noting how many others exist that were not included.</p> <ul style="list-style-type: none"> <li>• Walt noted that the DEIS will disclose all documented leks and their status. The DDC will disclose how undetermined leks were treated in the analysis and the reasoning for their inclusion or exclusion.</li> <li>• Steve reviewed the Draft Scope of Work for the HEA and pointed out the lack of information concerning indirect effects.</li> <li>• Stacey Baczkowski asked how Idaho Power’s comments on the Draft Scope of Work will be responded to. Walt and Steve agreed that Idaho Power’s comments will be formally responded to in a letter specifically addressing concerns raised.</li> <li>• Paul Makela questioned why the Idaho Bureau of Land Management (BLM) was not included on the list of agency staff on page 5. Steve noted that the Draft should have been updated to include the Idaho BLM and that those changes would be made.</li> <li>• Chris questioned whether there had been agreement that the HEA was going to be used in the Framework.</li> <li>• Tyler noted that the Framework Analysis Parts 1-4 (including the HEA) and the DDC tool have been agreed upon by 20 biologists across 5 states and several agencies. He noted that the discussion needs to be around collaborating to define assumptions, details, and the flexibility the HEA allows.</li> <li>• Steve acknowledged that the HEA is a bit of an unknown without the group having seen its use in the Chokecherry/Sierra Madre project. Walt noted that this meeting should help answer many of the questions surrounding the HEA and its use.</li> <li>• Stacey noted that she didn’t feel the Proponents had been given an opportunity to choose whether to use the Framework and HEA. She noted that she would like details on how SWCA intends to do the HEA. Ann Widmer and Jon (SWCA) delivered a short presentation of how the HEA model will work.</li> <li>• Tyler noted that the Framework and HEA had been agreed upon at the Salt Lake City Meeting on January 19, 2011 to which invitations had been solicited for all parties to attend. Despite some unknowns, without something else to fill the void of what the HEA provides in the Framework, it is the best available tool using the best available science.</li> <li>• Chris noted that a better understanding of the HEA process may help answer some questions and comments that have been raised. This meeting will help determine what assumptions will be made when empirical data does not exist.</li> <li>• Walt noted that the Chokecherry/Sierra Madre HEA will be distributed as soon as they receive it. It is currently proprietary and cannot be released. Chris noted that one of the reasons for withholding the Chokecherry HEA from broad dissemination relates to unresolved site-specific mitigation.</li> <li>• Walt noted that he would follow up on trying to receive and distribute the Chokecherry/Sierra Madre HEA. The DEIS for Chokecherry will be released in the next 2-3 months. If the HEA is part of that analysis, it will be part of public record.</li> </ul>
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**REVIEW POSSIBLE BASELINE HABITAT SERVICE VARIABLES FOR HEA MODEL**

	<ul style="list-style-type: none"> <li>• Jon reviewed the Workshop #1: Baseline Habitat Model Preliminary Variable Set document, highlighting the importance of coming to a general agreement on variables for the baseline model, the data layers to be used, how to resolve issues of inconsistent data or data gaps, and potential places to look for data that hasn’t already been located.</li> <li>• Ann noted that as a result of having a robust data set over a smaller project area, the Chokecherry/Sierra Madre HEA included one model for each of 4 different seasons.</li> <li>• Jon noted that a comprehensive literature review is done when completing models and SWCA will provide a full list of citations for the data being used.</li> <li>• Stacey inquired about sage grouse datasets being put together by the BLM, Idaho Fish and Game (IDFG), and Western Association of Fish and Wildlife Agencies (WAFWA) regarding breeding bird density, lek connectivity, and seasonal habitat and migration. Paul Makela</li> </ul>
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discussed models that the BLM and IDFG are working on for general sage grouse habitat and seasonal habitat that incorporate climate and vegetation inputs. Datasets are in the preliminary stages and are not yet ready for distribution, but should be ready sometime around summer. Separate from that, Don Major (BLM ID) and Paul are modeling core areas and priority areas in both Idaho and WAFWA Zone 4. The datasets are in the draft stages so will not be used for the HEA, but might help show hotspots (places of increased connectivity, increased lek density, and increased population) to help inform the FEIS.

- The group discussed possible variables for inclusion in the HEA Baseline Habitat Model.
- **The group agreed to include the following variables:**
  - Fences;
  - Roads (all 3 types listed) – Walt noted that data used to help inform wilderness characteristics may be useful in filling in gaps for resource/collector road data;
  - Vegetation type – Jon noted that SWCA is looking specifically for what types of habitats are absolutely not suitable. Paul noted that an action item for the January meeting was determining differences between GAP and LANDFIRE data sets. Mary Garner has done some preliminary work in the analysis, but there will be more to come;
  - % slope;
  - % bunchgrass cover;
  - % sagebrush cover;
  - Grass/forb height;
  - Sagebrush canopy height;
  - Sagebrush patch size – Stacey asked whether this variable included landscape matrix and edge effect. Cynthia Tyler noted that landscape segmentation should help identify some of the edge effects and that a literature review would be done to determine how to work this variable into the model. The model will be weighted on distance from leks, which may account for isolated patch concerns. Stacey noted that it is important to look at landscape connectivity and landscape matrix from both loss and mitigation sides. Jon noted that it would be possible to show mitigation in the HEA model to see how it changes results and to identify areas where habitat service could be improved using simpler mitigation measures;
  - Distance to occupied lek – Matt inquired as to whether a site analysis (from grouse perspective) would be included in the analysis. Walt noted that a viewshed analysis had been conducted for the cultural resources analysis, and while it is from human height perspective, could still be applicable. The group discussed how to use lek attendance data in the analysis. Paul suggested the use of the breeding bird density map. The group discussed the idea that lek attendance may be captured in other data (i.e. if vegetation conditions are suitable, lek attendance should be higher). Jon noted that SWCA would run the model both with and without lek size to see if that information is already captured in other layers – the concern for double-counting is a possibility. The group agreed that size of lek is a possible variable for more discussion. Chris suggested that lek size could act as a check of accuracy of vegetative components. Tim Carrigan suggested possible ground checks for supplemental information. Brian King noted that they would prefer to avoid resurveying lands. Cynthia discussed many datasets readily available (e.g. on the ground data that drove GAP analysis) and a large class of literature to fill in any holes. The GAP training data for the SW GAP is readily available;
  - Distance to mesic habitat/wetlands;
  - Distance to shrub habitat;
  - Cheatgrass monocultures – LANDFIRE fire rating will be explored further;
  - Fire perimeters;
  - Disturbed areas.
- **The group agreed to not include the following variables due to the lack of readily available data:**
  - Forb richness;
  - Monocot cover/height;

	<ul style="list-style-type: none"><li>○ Sound.</li><li>• The group discussed checking the results of the model by tying it to actual bird use. Jon noted that SWCA could look at on the ground spatial distributions of sage grouse in relation to model-based habitat quality to ensure baseline variables have been categorized appropriately.</li><li>• Stacey inquired as to whether the disturbed areas variable takes future projects into account.</li><li>• Walt noted that future disturbances should not be applied to the HEA process because of uncertainty in predictability. Matt Fry noted that the PIAA process looks at prospective disturbances.</li><li>• The group discussed including proximity to oil and gas development as a variable. A PIAA-type analysis could be used to determine current spacing orders. Spatial data can be obtained through the Oil and Gas Conservation Commission.</li><li>• The group discussed the use of telemetry data as a check for the model, but not to inform the model itself.</li></ul>
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## REVIEW SPATIAL DATA LAYERS/SOURCES

	<ul style="list-style-type: none"><li>• The group discussed data layer sources to be used in the baseline analysis.</li><li>• The group considered leaving fences out of the baseline analysis based on a lack of data. A recent master's thesis out of the University of Idaho regarding high risk fences in relation to distance to leks was discussed. SWCA will look into a solution for including them in the model specifically for mitigation purposes.</li><li>• The group discussed using TIGER data for all roads.</li></ul>
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- The group discussed whether to use GAP or LANDFIRE data sources for vegetation class. GAP spatial data covers the entire area. To determine vegetation class, just one layer may be needed. For additional variables like vegetation height, canopy cover, and canopy height, LANDFIRE will need to be used. Cynthia noted that she believed GAP would be more suited for this type of analysis as opposed to the LANDFIRE vegetation data. Tyler noted that BLM's ecoregional assessments agreed to use LANDFIRE for landscape on a bigger picture scale and would give Cynthia the names of the BLM GIS people who made that decision.

	<ul style="list-style-type: none"><li>• Mary noted that LANDFIRE is more pixelated than GAP. This could result in drastically different results when paired up next to each other.</li><li>• Cynthia noted that GAP is specifically a vegetation study and thus may be more suited for this type of analysis. She would like more time to investigate the vegetation layers and to look at how vegetation layers for LANDFIRE were created. She also noted that it would be an easy switch if decided one way or the other.</li><li>• SWCA will put together a detailed list of the data they are looking for so agency representatives can put them in touch with the appropriate people.</li><li>• Cynthia noted it would take another two weeks to get all the way through a comprehensive analysis of the data and an evaluation of the inputs.</li><li>• Mary noted that she would supply oil wells data to SWCA.</li><li>• The group discussed timing and scheduled future meetings.</li><li>• SWCA agreed to send out numerical categorizations (value assignments) to the group with a full list of literature citations by May 17. The group agreed to send responses to Jon by May 27 and join in a conference call after May 27 if differences are not resolved. Categorizations are based on the best available science cited in literature reviews and will closely resemble the Chokecherry/Sierra Madre Wind Farm example. Jon will contact Chokecherry representatives to see if Appendix G (rationale behind numerical values) can be sent to the group.</li><li>• The group agreed tentatively to the following schedule:<ul style="list-style-type: none"><li>○ May 17: SWCA will send out numerical categorizations for baseline layer and a full list of literature citations.</li><li>○ May 27: Last day to send questions, comments, or concerns regarding numerical categorizations to Jon Kehmeier (cc Ann Widmer).</li><li>○ If needed: Conference call after May 27 to discuss concerns in numerical categorizations for baseline layer.</li></ul></li></ul>
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- June 15: SWCA will send out a baseline model to be reviewed prior to the next in-person meeting.
- June 21: Sage Grouse HEA Meeting #2 in Denver.
- July 20 and 21: Sage Grouse HEA Meeting (two days) #3 in Boise.
- August 30: Sage Grouse HEA Meeting #4 in Denver.
- The group reviewed action items and discussed the “Distance to lek” variable. Jon suggested having a different range of values for leks that are undetermined (i.e. numerical values 1-3 instead of 1-5 to incorporate a weighted difference).
- The group discussed possible mitigation measures to be included in the analysis. Walt noted that the whole spectrum of potential mitigation is possible for this project.
- The following items were considered:
  - Fence marking
  - Restoring sage brush
  - Conifer removal
  - Conservation easements
  - Research
  - Restoring currently disturbed habitats vs. restoring other habitats (anthropogenic causes, fire causes, invasive species)
  - Removing juniper
  - Sage brush planting – restoration or enhancement
  - Forb undercover – increasing forb diversity
  - Grazing management - focus on localized cases and poor management of grazing. Look at conservation measures put together for CCAA
  - Perennial grasses
  - Restore previous reclamation projects that have failed
  - Reducing predation – may be minimization effort, not mitigation. Anti-perching devices for raptors and/or providing additional nest sites for raptors.
  - Fence modification or removal
  - Burying existing distribution lines to water tanks for livestock (for a private landowner)
- Using research as mitigation was discussed. Walt noted that he would like some confirmation on the ability to use research as mitigation. A former BLM policy did not accept mitigation off site. The group discussed the differences between research informing mitigation and research being mitigation in and of itself.
- Jeri Wood noted that from a Fish and Wildlife Service perspective, research will not count as mitigation
- Tyler noted the importance of putting “avoidance and minimization” first when considering compensation as a form of mitigation. Research is acceptable as long as the value of the research does not equal the value of loss of birds.
- Stacey noted that they consider research to be a very valuable tool for considering indirect effects that aren’t known.
- Jeri noted that if we are going to support research as some sort of mitigation, it has to support some sort of decision related to the project. It can be applicable to other projects, but it has to be for this project in particular.
- Walt noted that if the study doesn’t have direct implications to the project, it will not be considered as a mitigation measure.
- Chris noted the importance of capturing values of conservation actions above and beyond mitigation for both the Proponents and the agencies.

## ACTION ITEMS

ACTION ITEMS	PERSON RESPONSIBLE	DEADLINE	STATUS
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1	EnviroIssues will send out meeting invites for all discussed meeting dates.	Diane/Gina	05/13/2011	Complete
2	Distribute numerical categorizations for baseline layer and a full list of literature citations to the group.	SWCA	05/17/2011	Complete
3	Update Draft Scope of Work (page 5) to include Idaho BLM.	Steve	05/20/2011	
4	Draft a footnote or addendum to the Framework Analysis document to identify key important areas specific to the Gateway West project for Wyoming and Idaho.	Tyler/Paul	05/12/2011	Complete
5	Distribute a list of data needs to the group.	Jon/Cynthia	TBD	
6	Respond in writing to Idaho power's comments on the Draft Scope of Work.	Walt/Steve	ASAP	
7	Access and distribute Chokecherry/Sierra Madre Project HEA.	Walt/Jon	Ongoing	
8	Run a sensitivity analysis to determine how different discount rates may affect results.	Jon/Ann	Ongoing	
9	Lek categorizations (e.g. undetermined, occupied, etc.) will be described in the DEIS. Leks will be enumerated by segment number for identification.	Walt/Steve	DEIS	
10	Provide full explanation of assumptions around determining direct and indirect effects.	Walt/Steve/ SWCA	DEIS/HEA	

**MEETING NOTES - FINAL**  
**Gateway West Transmission Line Project**  
**Greater Sage-grouse HEA Meeting**  
**Denver, CO**

Date: Tuesday June 21, 2011  
Time: 9:00 am – 3:30 pm (Mountain)

<b>TYPE OF MEETING</b>	<b>Greater Sage-grouse HEA</b>	
<b>NOTE TAKER</b>	Gina Auriemma	
<b>ATTENDEES</b>	<p><b><u>BLM – Wyoming State Office</u></b>  <input checked="" type="checkbox"/> Walt George  <input checked="" type="checkbox"/> Chris Keefe</p> <p><b><u>BLM – Idaho State Office</u></b>  <input checked="" type="checkbox"/> Tim Carrigan  <input type="checkbox"/> Paul Makela</p> <p><b><u>State of Wyoming WGFD</u></b>  <input checked="" type="checkbox"/> Matt Fry</p> <p><b><u>State of Idaho IDFG</u></b>  <input type="checkbox"/> Lance Hebdon  <input checked="" type="checkbox"/> Mike McDonald</p> <p><b><u>USFWS – Wyoming</u></b>  <input checked="" type="checkbox"/> Tyler Abbott  <input checked="" type="checkbox"/> Pat Deibert (phone)  <input type="checkbox"/> Travis Sanderson</p> <p><b><u>USFWS - Idaho</u></b>  <input checked="" type="checkbox"/> Jeri Wood (phone)</p>	<p><b><u>Rocky Mountain Power</u></b>  <input type="checkbox"/> Pam Anderson  <input checked="" type="checkbox"/> Brian King</p> <p><b><u>Idaho Power Company</u></b>  <input checked="" type="checkbox"/> Stacey Baczkowski</p> <p><b><u>Tetra Tech (TT)</u></b>  <input checked="" type="checkbox"/> John Crookston  <input checked="" type="checkbox"/> Mary Garner (phone)  <input type="checkbox"/> Joe Iozzi  <input checked="" type="checkbox"/> Steve Negri  <input type="checkbox"/> Jim Nickerson</p> <p><b><u>SWCA</u></b>  <input type="checkbox"/> David Brown  <input checked="" type="checkbox"/> Jon Kehmeier  <input checked="" type="checkbox"/> Cynthia Tyler  <input checked="" type="checkbox"/> Ann Widmer</p> <p><b><u>EnviroIssues</u></b>  <input checked="" type="checkbox"/> Diane Adams  <input checked="" type="checkbox"/> Gina Auriemma</p>

<b>HANDOUTS / MATERIALS</b>	<ul style="list-style-type: none"> <li>• Agenda</li> <li>• May 12 Meeting Summary</li> <li>• SWCA Draft Greater Sage-Grouse Habitat Services Metric for the Gateway West Transmission Line 5/21</li> <li>• SWCA Project Overview Map Book</li> </ul>
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**AGENDA TOPICS**

**INTRODUCTIONS/OBJECTIVES**

	<ul style="list-style-type: none"> <li>• Diane Adams welcomed participants and reviewed meeting objectives and action items from the May 12 meeting.</li> <li>• Steve Negri noted that Tyler Abbott and Paul Makela added a footnote to the Framework Analysis regarding key important areas specific to the Gateway West project for Wyoming and Idaho. The Draft Scope of Work has also been updated to include the Idaho BLM.</li> <li>• Steve will distribute the updated Framework Analysis as well as BLM's responses to Idaho Power's Comments on the Draft Scope of Work to the group.</li> <li>• Cynthia Tyler noted that SWCA had requested data needs informally from agencies since the May 12 meeting. She agreed to compile a list of data received since the last meeting for distribution to the group.</li> </ul>
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	<ul style="list-style-type: none"> <li>• The group briefly discussed the Chokecherry/Sierra Madre Draft Environmental Impact Statement (DEIS). The DEIS is planned for release on July 22 and will likely include the Habitat Equivalency Analysis (HEA). Jon Kehmeier agreed to send a message to the group when the Chokecherry DEIS is released.</li> <li>• Chris Keefe expressed discomfort in the BLM providing a full explanation of assumptions around determining direct and indirect effects for consistency with the HEA. He noted that while the assumptions made can be shared, they should not be soliciting feedback on them for the NEPA process.</li> <li>• The group discussed the difference between assumptions made in the HEA and the DEIS.</li> <li>• Tyler Abbott explained that the HEA, or some other comparable mechanism, is needed to determine the mitigation strategy for the Gateway West project. While the group is willing to discuss modifying the assumptions and data used in the HEA, it is currently the only analysis they have for ultimately determining necessary mitigation.</li> <li>• Stacey Baczkowski noted that Idaho Power and Rocky Mountain Power are working on an alternative strategy for assessing impacts and determining mitigation. While the Proponents would like to maintain their involvement in the HEA process, their participation is not an endorsement of the process.</li> <li>• Walt George explained that the DEIS will lay out the BLM's approach and the Framework for assessing impacts and potential mitigation options. He said the Proponents were invited to be involved in the HEA to help them understand the process, provide data for the analysis, assist in developing the model, and use the model outcomes to develop mitigation proposals. Regardless of whether the Proponents sign off on the process, it is still applicable for the group to work together on developing it.</li> <li>• Walt encouraged the group to be critical of the HEA process as he anticipates additional comments on the HEA during the commenting period. Walt noted that an alternative analysis developed by the Proponents would be welcomed and reviewed as part of the DEIS commenting process.</li> <li>• Stacey asked whether the HEA is considered an analysis used for impacts or for mitigation. Tyler cited the Framework, noting that "The HEA is not meant to be an impacts analysis in and of itself; rather, it is a way to objectively determine quantity of project-related habitat impacts and provides the quantity and type of mitigation necessary to offset loss of habitat services as a form of output."</li> <li>• Walt described how the DEIS will incorporate the Framework and the HEA. The DEIS will present direct loss of habitat from construction (access roads, ancillary facilities, etc.) based on prospective siting done by Tetra Tech. The indirect effects (tall structures, human activity, etc.) will be discussed in a more qualitative way because there is not enough data in the literature to advise the BLM specifically on those effects. The DEIS will also present a list of potential mitigation measures. The direct/indirect impacts and direct loss of birds portions of the Framework will be presented in the DEIS. The HEA modeling and mitigation advised by the HEA modeling will be available in the Final EIS.</li> <li>• Steve noted that the HEA process will be helpful in determining what mitigation may be necessary to help offset impacts. Anything else brought to the table by the Proponents can be folded in as the project moves forward.</li> <li>• Brian King asked for clarification regarding rejection of the Proponents' previously proposed mitigation strategy. Walt explained that since the mitigation in the Proponents' initial proposal was not tied to impact quantity or quality, agency biologists were unable to judge if the proposed mitigation was appropriate or adequate</li> </ul>
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**REVIEW, DISCUSS AND REFINE HEA METRICS**

	<ul style="list-style-type: none"> <li>• Jon explained that scaling the Chokecherry/Sierra Madre HEA to the size of the Gateway West transect would not be possible within the group's time constraints. The model will need to be simplified in order for metrics to be computed in a reasonable amount of time.</li> <li>• Ann Widmer noted that SWCA had received four sets of comments on the habitat metrics document distributed following the May 12 meeting. One of the main comments was that the parameter scoring should be revised to ensure consistency with Stiver et al. 2010, and that the document was not always consistent with the most recent sage grouse literature. SWCA has since reduced the number of categories to be quantified on a 0-3 scale and a few minor</li> </ul>
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changes were made to ensure category breaks are accurate. Due to a lack of data, SWCA has removed grass/forb height from the analysis.

- Cynthia presented a PowerPoint on SWCA's data acquisition, review and model preparation for the baseline habitat layer. The presentation noted SWCA's data acquisition, Pilot Area analysis, calculated variables, imputed variables, anticipated anomalies and limitations, and suggested changes to the metric.
- Chris noted that he would follow up with Cam Aldridge regarding Wyoming sagebrush data needs.
- The group agreed to drop tertiary roads from the model due to misclassification in the data and a relatively minor level of disturbance.
- The group discussed patch size and density per cell calculations as they relate to tertiary roads in the analysis. Ann noted that patch size may help quantify some level of impact limited by the removal of tertiary roads.
- SWCA agreed to further research the patch size metric and make a recommendation to the group regarding its incorporation, taking into account density of other influences on the landscape.
- The group agreed that SWCA should use a 90 meter cell size for the analysis to decrease model processing time, but they would like to see a 30 meter and 90 meter cell size comparison run on a small sub-transect of the Pilot Area to determine data losses created by the 90 meter cell size.
- Cynthia noted that with the exception of tertiary roads, the GAP vegetation layer already takes into account the group's identified disturbance sources. It is important to ensure these disturbances are not double counted.
- The group discussed the distance to fences metric, noting the possibility of using allotments in the baseline to help with an estimate. Another option would be to use a density of fences calculation in place of distance from known fences. The group also discussed using Idaho's relatively reliable fence data to determine ratios from allotments and imputing that data out for use in Wyoming.
- The group discussed whether to use fences in the analysis at all. Jon noted that if fences are not included, the value of some habitats may become overinflated. Tyler explained that only specific fences in specific topography are problematic to habitat value. Tim Carrigan noted that there is a much greater affect when a fence is closer to a lek. SWCA explained that in the HEA model, the only fences that will have an impact on the results are those that are close to leks. SWCA agreed to look more closely into fence data.
- The group agreed that distance of habitat to sage or shrub dominant should stay in the analysis based on its importance for brood rearing habitat and its ability to incorporate edge effects.
- Chris asked that SWCA include citations in a separate column in Table 1. Jon noted that the breaks in category ratings were created based on professional judgment and experience, but citations would be added otherwise.
- **The group discussed and agreed to keep the following variables in the analysis:**
  - Distance to interstate highway;
  - Distance to county/state highway or heavily travelled gravel road (secondary roads);
  - Distance to fence (SWCA will look at options);
  - Vegetation class;
  - % slope;
  - Distance to occupied lek;
  - Sagebrush patch size (SWCA will look at options);
  - % sagebrush cover;
  - Sagebrush canopy height;
  - % bunchgrass cover; and
  - Distance of habitat to sage or shrub dominant.
- **The group agreed to remove tertiary roads from the analysis because of minimal impacts and a lack of consistent data.**

- The group discussed using disturbance density as a surrogate for sagebrush patch size, but agreed that the concept is captured in other variables.

## DISCUSS MEASURES FOR QUANTIFYING DIRECT AND INDIRECT IMPACTS

- Ann discussed the types of impacts to be characterized in the baseline model. She noted that they are looking at direct impacts (defined as those physically changing the environment that tend to be reflected in the habitat metric) and indirect impacts (characterized by those that do not physically change the environment), which tend to be more difficult to quantify.
- Indirect impacts need to be able to be measured and modeled. Tetra Tech has identified noise and avoidance of tall structures as possible sources of indirect impacts, though there is not good data to support tall structure impacts currently.
- The group brainstormed broad categories of indirect impacts to determine which are the most influential and to determine ways to measure them. The following impacts were suggested:
  - Noise;
  - Tall structures;
  - Predation (including poaching);
  - Nest depredation;
  - Invasive species (including noxious weeds);
  - Migration impairment/barriers;
  - Genetic barriers;
  - Human disturbance (additional potential human impacts associated with new roads);
  - Fire (associated with maintenance/construction); and
  - Electromagnetic impacts (EMFs).
- **The group ultimately agreed that indirect impacts need to be robustly and qualitatively addressed in the EIS, but will not be included in the HEA.** The following summarizes discussion leading up to that decision:
- The group discussed including noise as an indirect impact in the assessment and agreed that noise is already mitigated by the Proponents' arrangement to follow traditional seasonal construction restrictions. The group agreed that noise impacts would not be included in the HEA.
- The group discussed tall structures as an indirect impact with regards to barriers (avoidance) and perching sites for predators. Tyler noted that it is important to include tall structures as a component of the DEIS in a qualitative sense. The lack of literature regarding the effects of tall structures may provide an opportunity for research as mitigation, but prevents the evaluation of impacts quantitatively in the HEA.
- The group discussed the option of quantifying tall structure impacts using an exposure probability based on a backwards viewshed analysis calculated using grass and structure heights. Jon cited inconclusive literature regarding sage grouse avoidance of tall structures.
- Stacey noted the importance of disclosing data gaps in the DEIS, but emphasized that not everything has to find a way to fit into the HEA, especially when data does not exist.
- The group discussed not asking for mitigation for tall structures unless it was under an adaptive management approach, which may involve funding for research. Matt Fry noted that he would like to see the impacts addressed by finding out what the impacts are.
- The group discussed incorporating invasive species in the analysis. Jon noted that invasive species are typically already modeled by roads. Walt noted that the applicants have agreed to follow a list of processes that will limit the introduction of invasive species (e.g. washing vehicles, using weed free mixtures, etc.). The introduction of invasive species could potentially be quantified for the model, but the effects will already be offset with the agreement to follow Best Management Practices (BMPs).
- Stacey noted that BMPs have been committed as part of the project and are not considered mitigation. The group agreed that invasive species would not be included in the HEA and BMPs would thus not count as credit for mitigation.

- The group discussed incorporating predation in the analysis. Jon discussed a study that cited predation from polls being mostly from ravens and only for the short term. While the number of birds on the power poles increased over the first few years, those numbers went back to normal levels shortly thereafter. Sage grouse populations are governed mostly by the quality of the habitat and the health of the birds, and less by predator load.
- Steve noted that the addition of any structure generates a hunting radius that predatory species will use.
- Pat Deibert suggested that the group look at an analysis by the Western Association of Fish and Wildlife Agencies (WAFWA) that suggests typical foraging ratios of predators. She also suggested the group consider electromagnetic radiation data in the analysis with regards to reproduction. She noted that while there is no data involving sage grouse, there is literature citing reproductive defects in chickens that are within a half mile of transmission lines. Additionally, Pat emphasized the importance of considering how far the potential is for loss of native understory.
- Pat cited WAFWA's 'Conservation Assessment of Greater Sage-grouse and Sagebrush Habitats' (2004) study, specifically noting page 7-23 on the indirect effects of agricultural development on predation.
- The group agreed that there was no way to quantitatively define predation. While predation can be qualitatively discussed in the EIS, it is not quantifiably supportable in the HEA.
- Pat noted that the only effect with quantifiable information would be the risk of fire associated with construction and operation of the power lines. Chris noted that because we cannot predict fire, it would be difficult to quantify.
- The group briefly discussed direct impacts associated with transmission wires in the air and associated effects on sage grouse with regards to longer distance migration areas. The group agreed that these were issues for discussion in the EIS and in other parts of the Framework, but not as a part of the HEA.
- The group agreed that there were no other direct impacts for consideration in the HEA.
- Jon explained that since indirect impacts would not be included in the analysis, the model area could be reduced significantly and processing time would be much more manageable (\*See Attachment A for further detail regarding reduced area of study).
- Tyler suggested that the group lay out a framework for monitoring and evaluation to incorporate what is learned as the project moves forward. He noted that the group may need to look closer into the unknowns and how that relates to an adaptive management strategy.
- Walt noted that if it is assumed indirect impacts don't have an effect, field monitoring studies may need to be conducted in association with the transmission lines to confirm those assumptions.

## **MEETING WRAP-UP**

- Jon noted that because of the decreased area of study and thus processing time, the model would definitely be ready in time for the August 2/3 meeting.
- The group agreed to hold a conference call in mid-July to assess the status of the model and determine whether one or two days would be needed in August. Envirolssues agreed to send a Doodle poll to gauge availability.
- SWCA will send out a baseline assessment to the group to visually and quantitatively assess the results of the baseline model.
- Steve and Walt noted that they would incorporate more information in the DEIS regarding indirect impacts of predation.
- Chris suggested that the DEIS incorporate Pat Deibert's major concerns expressed during the meeting. This included typical foraging distance of avian predators, distance for potential loss of native understory (from construction and invasive species), and EMFs as they relate to reproductive success in birds.

## ACTION ITEMS

	ACTION ITEMS	PERSON RESPONSIBLE	DEADLINE
1	Send the updated Framework Analysis, the BLM's responses to Idaho Power's Comments on the Draft Scope of Work, and the Spatial Extent of Indirect Impacts to Greater Sage-Grouse Habitat document to the group.	Steve	Complete
2	Send out Doodle poll to the group for a conference call in mid-July.	EnviroIssues	Complete
3	Distribute a list of data acquired since the May 12 meeting.	Cynthia	Complete
4	Send a message to the group when the Chokecherry DEIS is released.	Jon	7/22/2011
5	Send out a baseline model to the group.	SWCA	ASAP
6	Further research the patch size and distance to fence metrics to make a recommendation to the group.	SWCA	ASAP
7	Add a column of citations to Table 1 in the Draft Greater Sage-Grouse Habitat Service Metric for the Gateway West Transmission Line document.	SWCA	ASAP
8	Contact Chris Keefe regarding data needs from Cam Aldridge.	Cynthia	ASAP
9	Include greater detail in the DEIS with regards to indirect impacts, specifically related to predation and EMF.	Tetra Tech	DEIS

-----Original Message-----

From: Chris\_Keefe@blm.gov [mailto:Chris\_Keefe@blm.gov]

Sent: Tuesday, July 05, 2011 3:47 PM

To: pmakela@blm.gov

Cc: 'awidmer@swca.com'; 'brian.king@pacificorp.com'; 'ctyler@swca.com';  
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'wgeorge@blm.gov'; Ara Swanson; Diane Adams; Frank\_Blomquist@blm.gov; Gina  
Auremma

Subject: Re: Gateway West Sage Grouse HEA 06.21.2011 Summary

Paul,

The decision to reduce the distance of influence of the transmission structure on the landscape was about more than computation timeframes.

The influence of transmission lines and other tall structures on the landscape is not clearly understood and is lacking the direct measure of influence we need, or even the kind of scientific literature that supports the use of a specific distance for assumptive purposes.

The 18km distance either side of the line isn't directly attributable to 98% of nesting hens. I'm not sure how this is even an applicable distance at all in this state actually... The pertinent science I am aware of actually revolves around the use of seasonal sagebrush habitats within 18km of leks. This certainly would have a relationship of some sort with project-related disturbances, but it isn't clear what that relationship is in the context of this transmission line. Nor is it going to be meaningful on this scale without a lot more information about the synergistic effects of the other influences of the landscape in the same broad swath of habitats across the landscape and along the 1000 miles of proposed transmission line.

There is no published literature that I am aware of that describes the expected impacts (direct, indirect or cumulative) from a proposed transmission line of this nature and size.

The distance is immaterial in my mind since there is no information providing sufficient reason to presume a certain level of influence that can allow us to model a predicted effect.

I'm sure we can agree anecdotally that the relative impact from the transmission line would tend to decrease over distance from the line (perhaps in a reverse exponential curve?). But, the issue with modeling these thoughts is that it requires some level of literary support for "how much" would the proposed action reduce habitat functionality over these various distances from the project location?

Do you feel comfortable answering this question with what we do and do not know at this time? Pat Diebert was on the phone, and the entire group as a whole was uncomfortable that with trying to estimate the presumed effect for the purposes of the model. Therefore, indirect effects would not be modeled using the HEA. The proper place then to speculate about the potential loss of habitat functionality would be the indirect effects analysis. This will provide the necessary latitude to describe assumptions and potential range of outcomes however we can agree to analyze them...

Because the HEA is centered around the possible mitigation opportunity of the proponent, the popular thought was to limit modeling impacts to those that we could most reasonably describe and measure and expect as a result of published literature.

So long story, just to say, I agree with you that the distances we've determined to "run" the model on need to be well supported as to the rationale leading to the choices. I just wanted to make sure you understand that it wasn't just a timing of computations question, but rather a lack of data and information with which we could reliably predict potential changes in habitat use or functionality.

Thanks,

Chris

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Chris Keefe  
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Fisheries Program Lead  
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Paul Makela/ISO/ID/BLM/DOI To Gina Auriemma 07/05/2011 02:54

[gauriemma@enviroissues.com](mailto:gauriemma@enviroissues.com)>

cc 'awidmer@swca.com' <'awidmer@swca.com'>, 'brian.king@pacificorp.com' <'brian.king@pacificorp.com'>, 'ctyler@swca.com' <'ctyler@swca.com'>, 'dbrown@swca.com' <'dbrown@swca.com'>, 'jeri\_wood@fws.gov' <'jeri\_wood@fws.gov'>, 'Jim.nickerson@tetrattech.com' <'Jim.nickerson@tetrattech.com'>, 'jkehmeier@swca.com' <'jkehmeier@swca.com'>, 'joe.iozzi@tetrattech.com' <'joe.iozzi@tetrattech.com'>, 'john.crookston@tetrattech.com' <'john.crookston@tetrattech.com'>, 'lance.hebdon@idfg.idaho.gov'

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<[Frank Blomquist@blm.gov](mailto:Frank.Blomquist@blm.gov)>, Gina Auriemma <[gauriemma@enviroissues.com](mailto:gauriemma@enviroissues.com)>

Subject Re: Gateway West Sage Grouse HEA 06.21.2011 Summary(Document link:  
Chris Keefe)

Gina

It's not clear from the meeting notes as to the rationale in your email, for changing the analysis buffer from 18 km to 9 km. The last paragraph in the HEA discussion in the analysis framework says "The initial starting point for evaluating direct and indirect impacts to SG habitat will be 18km either side of the proposed transmission line, addressing impacts to roughly 98% of nesting hens according the best available scientific information. Any deviation from this starting point must be supported by scientific literature: agency biologists can direct the project proponent to recently published literature on this topic which the project proponent is encouraged to use."

I understand the rationale, based on discussions with Tim here, (excessive model run times etc.) but I think you need to put that rationale in the meeting notes for the record.

Paul

Paul Makela  
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To  
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Subject Gateway West Sage Grouse HEA 06.21.2011 Summary

Hello all,

Attached is the draft summary from last week's Gateway West Sage Grouse HEA meeting in Denver. Please send any comments or revisions by Monday, July 11 and we will revise and finalize accordingly.

As we discussed for distribution to the group, please also find attached SWCA's PowerPoint presentation (in PDF) from the June 21 meeting and updated spreadsheet of available data. Please note that SWCA will no longer perform a 30m vs. 90m pixel model run for comparison, as dropping the project buffer to 9km from 18km will decrease processing time significantly enough not to model at a 90m resolution. Modeling will proceed with the new 9km buffer with smaller areas at 30m resolution to retain variability in the HEA. Additionally, SWCA will no longer distribute their final model run from last week, which included only 7 of the 13 data metrics. Their efforts have been redirected into the first model of a smaller area with the new 9km buffer which is in process now.

Thank you for your prompt replies to the Doodle poll regarding our mid-July conference call to discuss the HEA model - based on results, we will be holding that call on Wednesday, July 20 from 9:00 a.m. - 11:00 a.m. MDT. I will send out a meeting invite following this email.

As always, please feel free to let Steve Negri ([steve.negri@tetrattech.com](mailto:steve.negri@tetrattech.com), 425.482.7674), Diane Adams ([dadams@enviroissues.com](mailto:dadams@enviroissues.com), 206.269.5041) or myself know if you have any questions.

Have a great holiday weekend!

Thanks,  
Gina

Gina Auriemma | EnviroIssues

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[attachment "2011\_0621\_HEA Baseline Preparation\_SWCA\_ppt.pdf" deleted by Paul Makela/ISO/ID/BLM/DOI] [attachment "2011\_0621\_Sage\_Grouse\_Draft\_Meeting\_Summary.docx" deleted by Paul Makela/ISO/ID/BLM/DOI] [attachment "2011\_0630\_HEA\_DataInventory.xlsx" deleted by Paul Makela/ISO/ID/BLM/DOI]

**MEETING NOTES - FINAL**  
**Gateway West Transmission Line Project**  
**Greater Sage-grouse HEA**  
**Conference Call**

Date: Friday July 29, 2011  
Time: 9:00 am – 11:00 am (Mountain)

<b>TYPE OF MEETING</b>	<b>Greater Sage-grouse HEA</b>	
<b>NOTE TAKER</b>	Gina Auriemma	
<b>ATTENDEES</b>	<p><b><u>BLM – Wyoming</u></b>  <input checked="" type="checkbox"/> Frank Blomquist  <input checked="" type="checkbox"/> Walt George  <input checked="" type="checkbox"/> Chris Keefe</p> <p><b><u>BLM – Idaho</u></b>  <input checked="" type="checkbox"/> Tim Carrigan  <input type="checkbox"/> Paul Makela</p> <p><b><u>State of Wyoming WGFD</u></b>  <input type="checkbox"/> Matt Fry</p> <p><b><u>State of Idaho IDFG</u></b>  <input checked="" type="checkbox"/> Lance Hebdon  <input checked="" type="checkbox"/> Mike McDonald</p> <p><b><u>USFWS – Colorado</u></b>  <input checked="" type="checkbox"/> Terry Ireland</p> <p><b><u>USFWS – Wyoming</u></b>  <input checked="" type="checkbox"/> Tyler Abbott  <input type="checkbox"/> Pat Deibert  <input type="checkbox"/> Travis Sanderson</p> <p><b><u>USFWS - Idaho</u></b>  <input type="checkbox"/> Jeri Wood</p>	<p><b><u>Rocky Mountain Power</u></b>  <input checked="" type="checkbox"/> Pam Anderson  <input type="checkbox"/> Brian King</p> <p><b><u>Idaho Power Company</u></b>  <input checked="" type="checkbox"/> Stacey Baczkowski</p> <p><b><u>Tetra Tech (TT)</u></b>  <input checked="" type="checkbox"/> John Crookston  <input checked="" type="checkbox"/> Mary Garner  <input checked="" type="checkbox"/> Joe Iozzi  <input checked="" type="checkbox"/> Steve Negri  <input type="checkbox"/> Jim Nickerson</p> <p><b><u>SWCA</u></b>  <input type="checkbox"/> David Brown  <input checked="" type="checkbox"/> Jon Kehmeier  <input checked="" type="checkbox"/> Cynthia Tyler  <input checked="" type="checkbox"/> Ann Widmer</p> <p><b><u>Envirolssues</u></b>  <input checked="" type="checkbox"/> Diane Adams  <input checked="" type="checkbox"/> Gina Auriemma</p>

<b>HANDOUTS / MATERIALS</b>	<ul style="list-style-type: none"> <li>• Agenda</li> <li>• June 21 Meeting Summary</li> <li>• SWCA HEA Baseline Conditions</li> <li>• SWCA HEA Baseline Conditions by Variable (1-11)</li> </ul>
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**AGENDA TOPICS**

**INTRODUCTIONS/OBJECTIVES**

	<ul style="list-style-type: none"> <li>• Diane Adams welcomed participants and reviewed meeting objectives. She announced that the Gateway West Draft EIS Notice of Availability was published in the Federal Register on July 29.</li> <li>• Diane noted that Stacey Baczkowski sent an email to the group when the Chokecherry &amp; Sierra Madre Wind Energy Project (Chokecherry) DEIS was published. Her email concerned whether the HEA information was included within</li> </ul>
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	<p>the DEIS.</p> <ul style="list-style-type: none"><li>• Jon Kehmeier explained that he had not seen a reference to the HEA in the Chokecherry DEIS. He indicated that it may not have been used as a decision-making tool for the impacts analysis.</li><li>• Stacey asked how the group can obtain information on the Chokecherry HEA since it was not included in the DEIS. Jon noted that since the HEA is not included in the DEIS, it is not part of the administrative record and he was unsure as to how the group could obtain it.</li><li>• Jon noted that the process for the Gateway West HEA is identical to the Chokecherry HEA with the exception of the mitigation portion.</li><li>• Tyler Abbott noted that if there are numbers in the Chokecherry DEIS that are based on the outcome of the HEA, it is required to be public record. Jon indicated that he did not think the numbers in the DEIS are from the HEA.</li><li>• Walt apologized to the group, noting that he had been under the assumption that the Chokecherry HEA would be in the DEIS. He noted that he has requested permission to distribute the Chokecherry HEA from the BLM Project Manager, who has indicated that she would request permission for its release from the project proponent, Power Company of Wyoming. Walt explained that he and Tyler had been told previously that the HEA would be part of the analysis for the DEIS.</li><li>• Walt indicated that he believes the HEA technique is sound and in the group's best interest to continue pursuing, noting its endorsement by the Fish and Wildlife Service and other agencies.</li><li>• Tyler noted that if the group is not going to be able to see the Chokecherry HEA for guidance, the reference to that HEA specifically in the Framework should be deleted.</li><li>• Chris Keefe explained that the only information the group does not have from the Chokecherry HEA is what has been offered for mitigation by the proponent in the context of the HEA. He noted that Chokecherry is waiting until they have a decision before releasing site-specific mitigation measures.</li></ul>
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## REVIEW JUNE 21 MEETING/ACTION ITEMS

	<ul style="list-style-type: none"><li>• Diane reviewed meeting objectives and major outcomes from the June 21 meeting in Denver. She noted that the group decided to remove indirect impacts from the HEA resulting in a reduced study corridor size.</li><li>• Diane noted that the action items assigned to SWCA had since been completed and would be discussed in today's meeting.</li><li>• Chris noted that Cam Aldridge has been on holiday and he has not been able to contact him regarding Wyoming data needs. Cynthia Tyler noted that SWCA was ready to proceed without Cam's data, but would still like to acquire it if possible.</li><li>• All other action items were completed.</li></ul>
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## MODEL STATUS REPORT

	<ul style="list-style-type: none"><li>• With regards to data needs, Ann Widmer stated that SWCA is well prepared to develop the baseline model. Since the last meeting, they have improved their data by incorporating Tetra Tech's field measurements as training data.</li><li>• Ann presented SWCA's Baseline Conditions document, which includes the baseline calculation within the pilot area for the project.</li><li>• The Baseline Conditions map identifies areas with the lowest quality habitat in red and highest quality habitat in green. Ann noted that SWCA has been able to visually validate agreement between active leks and areas on the map displayed in green (indicating areas of high quality habitat). She noted that they have found</li></ul>
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less agreement for leks that are unknown or inactive.

- Cynthia presented SWCA's Baseline Conditions by Variable maps, noting that the nine kilometer project area was broken into twelve smaller areas to complete calculations.
- Cynthia briefly explained each of the eleven input layers included in the Baseline Conditions by Variable document and the categorizations within each variable. These variables include: distances to interstates/US highways, distance to county/state highways, distance to fences (surrogate for allotments), vegetation class, percent slope, distance to occupied leks, sagebrush patch size, percent sagebrush cover, sagebrush canopy height, percent bunchgrass cover, and distance to sage or shrub dominant.
- John Crookston asked whether any of the included variables were weighted. Cynthia noted that the variables had not been weighted and were treated as equal inputs.
- Chris asked if it would be possible to find something more predictive for sage grouse use (at least in Wyoming) once a more robust baseline calculation across a larger area has been produced. Jon suggested that if any state agencies have telemetry data that they could share, that would be a good way to see if those locations match up with high quality habitat. Chris noted that obtaining telemetry data would be difficult.
- Lance Hebdon asked if the group would be able to obtain the raw GIS layers used in the calculations. Cynthia noted that the layers are still going through a QA process, but could be made available by sometime next week. She noted that SWCA will host a client FTP site and individuals will need space on their network to store large data files if they intend to download them. She suggested that individuals could also mail her an external hard drive for her to download the data on to as well.
- Jon encouraged individuals in the group to experiment with the layers and do their own level of QA on the data based on their knowledge of the areas. This level of QA could result in a discussion of weighting variables to make the model more representative of what is on the ground.

*Additional data collection efforts*

- Ann noted that the largest outstanding data item is the need for a detailed construction schedule. She noted that the schedule they received from Tetra Tech is general and assigns five year blocks of time to each segment. She noted that if that particular construction schedule was used, the Proponents would be responsible for mitigating five straight years of construction. Ann noted that they would like to receive additional construction details before modeling impacts.
- Pam Anderson indicated that construction will be phased and done in different segments depending on when ROW permits are granted. Ann noted that SWCA could work with a theoretical approach and the schedule did not have to be exact.
- Pam agreed to provide SWCA with a more detailed construction schedule.
- Chris expressed concern with a theoretical schedule, noting that it matters whether construction is taking place in a segment area with high quality or low quality habitat.
- Pam noted that the Proponents have committed to certain mitigation measures with regards to seasonal construction timing and distances from leks.
- Chris noted that the distance of construction to a lek does not have a direct relationship to the habitat disturbance for the length of time that there is a full construction impact. He indicated that the construction schedule needs to be fairly specific about how long the construction phase is for each segment.
- Stacey asked how the construction schedule would be used in the model, noting that the HEA is only modeling direct impacts. She explained that once construction is done in a certain area, that particular area has been impacted whether it is driven over once or many times. She asked why it is important whether it is a two year or a three year construction schedule.

- Chris noted that if it takes two years of construction to build a segment, both years are counted as 'year one' for construction and no reclamation will occur in those first two years. The first year of reclamation will not begin and the impact will not begin to reduce until construction is complete for that entire area.
- Jon stated that as long as you have not started the reclamation process, the model considers the area to be a construction site and the Proponents will pay the full price for that amount of time. This may result in the Proponents paying for more disturbance than they have created.
- Stacey noted that the Proponents do not want to be held responsible for over-mitigation as a result of limitations of the model.
- Chris indicated that it is not limitations of the model, but rather limitations of not having a construction schedule for the project that could result in over-mitigation.
- Jon noted that SWCA could make some assumptions with a general construction schedule, but there is less room for error with the more detail that can be provided.
- Jon, Pam, and Stacey, agreed to follow up to discuss construction schedule data needs further.

*Current challenges [see Attachment A for clarification of this issue]*

- Jon discussed some of the challenges that SWCA is facing with regards to tertiary roads
- Jon noted that removing tertiary roads from the analysis (as decided during the June 21 meeting) results in an overvaluation of habitat in Wyoming compared to Idaho. Wyoming does not have any secondary roads identified in their data, and thus patch size and distance to roads become less of a factor in the Wyoming habitat evaluation. Using the current road categorization structure, it appears the segments are proposed through pristine Wyoming habitat, when they are in fact sited through areas of roads and other infrastructure. (*Note: Attachment A clarifies that Wyoming does not have many tertiary roads identified because they are grouped together with secondary roads in the GIS data, thus road impacts are overestimated in the baseline model for Wyoming.*)
- Jon suggested that tertiary roads, described generally as two tracks and unimproved roads, be put back into the analysis so there are comparable habitat values on each side of the state line. Without tertiary roads, the model has a bias.
- Jon noted that Idaho has done a good job of categorizing roads, while in Wyoming, the data shows only primary roads (major highways) and no definition of secondary roads. By adding those back in, we will get impacts of two tracks as well as from major county roads that aren't included in the primary roads layer.
- Chris expressed concern with adding tertiary roads back in, suggesting that it would trade one bias in the data for another and the threats to sage grouse would instead be under-mitigated. Jon agreed that there will still be a bias, but noted that the overall bias in the model would be reduced by adding in tertiary roads since they are currently not included at all. Jon noted that the habitat value in Wyoming would still be overqualified since secondary roads would be treated as tertiary roads.
- Ann suggested that tertiary roads be put back into the model as they were originally proposed in the original Habitat Metrics document.
- Cynthia noted that to get better road data, a last resort may be to call each of the four field offices in Wyoming to see if they are in the process of classifying roads. She noted that the current Wyoming data has attributes for roads, but the classification systems change every time the layer meets a field office boundary. It is preferable that the Wyoming and Idaho data be as equivalent as possible.
- Chris expressed concern with suggesting that one habitat type will appear to be less important to sage grouse because the model erroneously includes two track roads as an influence on the habitat.
- Jon explained that Idaho has many secondary roads and Wyoming has none. If

	<p>tertiary roads are not modeled, Wyoming's data would only include primary roads. As a result, the values in Idaho would not be consistent and the compensation packages would not be reflective of the true quality of habitat.</p> <ul style="list-style-type: none"><li>• Mary Garner asked whether a national road cover data set could be used instead.</li><li>• Cynthia noted that SWCA has looked into using a national data set (i.e., TIGER), but there were inconsistencies in the road classifications between states and among counties within Wyoming that made it not viable for their purposes.</li><li>• Cynthia suggested that she create a visual that demonstrates the discrepancies in road data to clarify the challenges.</li><li>• Chris indicated that the vast majority of roads that will be included for Wyoming are in fact tertiary roads, not secondary.</li><li>• Joe Iozzi noted that Tetra Tech has recently identified road districts for areas that are crossed by route alternatives in Wyoming to identify wilderness characteristics. He agreed to forward that data to SWCA.</li></ul>
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## STRATEGY FOR ANALYZING IMPACTS

	<ul style="list-style-type: none"><li>• Jon explained the challenges in determining a strategy for analyzing impacts. He noted that in an HEA context, modeling the hundreds of permutations that could be calculated based on the various route alternatives would be computationally unfeasible.</li><li>• Jon indicated that his understanding was that the HEA was not being used as an alternatives comparison tool. He noted that SWCA is looking for a better understanding of how the group envisions impacts from the HEA being used as well as which route alternatives to model.</li><li>• Jon stated that the best use of the HEA is to determine the mitigation and compensation package required for the final alternative. There may also be a desire to see what the mitigation and compensation packages will be between alternatives.</li><li>• Chris noted that he viewed the HEA as a way of putting a value on the compensation package for at least the preferred alternative. The mitigation package may look different for different alternatives.</li><li>• Tyler noted that the purpose of the HEA is to have a consistent scientific basis for measuring the mitigation packages needed to compensate impacts. This is applicable for the regulatory agencies to help determine what needs to be compensated and for the Proponents to understand what they are compensating for.</li><li>• Tyler indicated that the Fish and Wildlife Service's role in the framework is to provide guidance to project proponents, consultants, and partners (BLM and state agencies) to help characterize what the impacts will be from this project and what appropriate mitigation will be to offset impacts.</li><li>• Walt suggested that the principle purpose of the HEA is to determine adequate mitigation, not necessarily to identify impacts. He noted that based on the discussion, it may only be efficient to run an HEA model on likely and authorized routes. From a NEPA perspective, the HEA may be used as a decision-making tool based on the cost required for mitigation packages associated with certain route alternatives. That is, the cost for mitigation will be relative to the effects on sage grouse (i.e. low effects will be associated with low mitigation costs and higher effects will be associated with higher mitigation costs). As a result, Walt noted that we may be losing information by not running the model for different alternatives.</li><li>• Walt asked whether there is a reasonable approach for incorporating both the NEPA and mitigation portion of the HEA model. Jon noted that it would be most reasonable to run the whole compensation analysis for only the preferred alternative.</li></ul>
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	<p><i>Suggestions for moving forward</i></p> <ul style="list-style-type: none"><li>• Jon noted that since compensation will be relative to impacts, the group may want to choose 3-4 routes from beginning to end or pick 2-3 segments to analyze in areas of particular concern.</li><li>• Walt noted that because the alternatives are formulated between substations, it would not be necessary to run models on entire routes, but rather to model some route alternatives within segments that are of particular conflict (e.g. Segment 4). This may help simplify the number of alternative model runs required.</li><li>• Jon noted that the information could be presented in terms of ROW services, full buffer services, and final compensation purposes.</li><li>• Walt suggested that the best option would be to provide the baseline scores for each alternative in some sort of comparable format.</li><li>• Stacey asked how baseline information comparing route alternatives would be conveyed to the general public and whether that put the project at risk of having to redo things from a NEPA perspective.</li><li>• Walt indicated that he would need to wait and see what the comments are on the DEIS relative to the adequacy of the sage grouse analysis that is already presented. He encouraged the group to read Appendix J (which includes the Framework Analysis) to ensure that the appendix reflects the actual work that is being done. He suggested that an addendum may need to be added to the document to reflect changes in the Framework as the group moves forward.</li><li>• Jon proposed that for NEPA purposes, SWCA can clip the baseline habitat services for various segments within the ROW. SWCA will provide a summary table for each alternative that demonstrates the baseline habitat services by segment for the purposes of comparing various route permutations.</li><li>• Jon noted that SWCA intends to complete the full baseline calculations for the nine kilometer buffer around all of the various segments by the August 30 meeting.</li><li>• Walt indicated that the new information provided by the HEA would be incorporated into and will help advise the Final EIS.</li><li>• Walt noted that if we had a baseline calculation soon enough for all of the alternatives, it could be mailed out as part of the DEIS. However, the comment period would likely need to be extended an additional 90 days from when it was mailed, which is unreasonable for the current project schedule.</li></ul>
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**NEXT STEPS**

	<ul style="list-style-type: none"><li>• The group agreed that the currently scheduled August 30 meeting in Denver would be necessary and should remain as scheduled.</li><li>• At the August 30 meeting, SWCA will have the baseline model completed and will have discussed the construction schedule with the Proponents. The group will begin discussing how to model mitigation and compensation packages.</li><li>• Walt noted that he would not be available for the August 30 meeting, but would work closely with SWCA to ensure his thoughts are put forward.</li><li>• Jon noted that as models are available, SWCA will put them on their FTP site. The group will be informed as baseline calculations for segments are posted so as to begin the QA/QC process.</li></ul>
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## ACTION ITEMS

	ACTION ITEMS	PERSON RESPONSIBLE	DEADLINE
1	Develop and distribute a visual to show variation in classification of roads	SWCA	Complete
2	Post data files to FTP site and send instructions for access to the group	SWCA	Complete
3	Work with Proponents to determine a more specific construction schedule by segment	SWCA/Pam/Stacey	Complete
4	Follow up with Walt to ensure his thoughts are put forward at August 30 meeting	SWCA	Complete
5	Forward additional roads data to SWCA	Joe Iozzi	Complete
6	Follow up with Chokecherry & Sierra Madre Wind Farm BLM Project Manager for clarification on how and whether HEA data was used in the DEIS	Walt	ASAP
7	Provide completed baseline habitat model	SWCA	8/30/2011
8	Follow up with Cam Aldridge regarding SWCA data needs	Chris	On-going

**MEETING NOTES - FINAL**  
**Gateway West Transmission Line Project**  
**Greater Sage-grouse HEA**  
**Denver, CO**

Date: Tuesday August 30, 2011  
Time: 9:00 am – 4:00 pm (Mountain)

<b>TYPE OF MEETING</b>	<b>Greater Sage-grouse HEA</b>	
<b>NOTE TAKER</b>	Gina Auriemma	
<b>ATTENDEES</b>	<p><b><u>BLM – Wyoming</u></b>  <input checked="" type="checkbox"/> Frank Blomquist (phone)  <input type="checkbox"/> Walt George  <input checked="" type="checkbox"/> Chris Keefe</p> <p><b><u>BLM – Idaho</u></b>  <input checked="" type="checkbox"/> Tim Carrigan  <input checked="" type="checkbox"/> Paul Makela</p> <p><b><u>State of Wyoming WGFD</u></b>  <input checked="" type="checkbox"/> Matt Fry</p> <p><b><u>State of Idaho IDFG</u></b>  <input checked="" type="checkbox"/> Lance Hebdon  <input checked="" type="checkbox"/> Mike McDonald (phone)</p> <p><b><u>USFWS – Colorado</u></b>  <input type="checkbox"/> Terry Ireland</p> <p><b><u>USFWS – Wyoming</u></b>  <input checked="" type="checkbox"/> Tyler Abbott  <input type="checkbox"/> Pat Deibert  <input type="checkbox"/> Travis Sanderson</p> <p><b><u>USFWS - Idaho</u></b>  <input checked="" type="checkbox"/> Jeri Wood</p>	<p><b><u>Rocky Mountain Power</u></b>  <input checked="" type="checkbox"/> Pam Anderson  <input checked="" type="checkbox"/> Brian King</p> <p><b><u>Idaho Power Company</u></b>  <input checked="" type="checkbox"/> Stacey Baczkowski</p> <p><b><u>Tetra Tech (TT)</u></b>  <input checked="" type="checkbox"/> John Crookston  <input checked="" type="checkbox"/> Mary Garner  <input type="checkbox"/> Joe Iozzi  <input checked="" type="checkbox"/> Steve Negri  <input type="checkbox"/> Jim Nickerson</p> <p><b><u>SWCA</u></b>  <input type="checkbox"/> David Brown  <input checked="" type="checkbox"/> Jon Kehmeier  <input checked="" type="checkbox"/> Cynthia Tyler  <input checked="" type="checkbox"/> Ann Widmer</p> <p><b><u>Envirolssues</u></b>  <input checked="" type="checkbox"/> Diane Adams  <input checked="" type="checkbox"/> Gina Auriemma</p>

<b>HANDOUTS / MATERIALS</b>	<ul style="list-style-type: none"> <li>• Agenda</li> <li>• July 29 Meeting Summary</li> <li>• Gateway West Disturbance Schedule</li> <li>• SWCA HEA Mapbook</li> </ul>
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**AGENDA TOPICS**

**INTRODUCTIONS/OBJECTIVES**

	<ul style="list-style-type: none"> <li>• Diane Adams reviewed meeting objectives and July 29 conference call action items.</li> <li>• The group briefly discussed distribution of the Chokecherry HEA. Chris Keefe clarified that the HEA is entirely a product of the Chokecherry proponent and the proponent is not currently willing to disclose that information.</li> <li>• The group agreed that the reference to the Chokecherry HEA needs to be taken</li> </ul>
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out of the Framework. Tyler agreed to remove the reference and distribute the updated Framework to the group.

- Chris indicated that he has not followed up with Cam Aldridge regarding data needs, but will continue to work on obtaining data for this and future analyses.
- Paul Makela noted that the BLM has been finalizing priority areas in Idaho as part of the regional sage-grouse planning effort. He does not anticipate the updated priority areas affecting the Gateway West analysis. He explained that Idaho priority area shapefiles would be completed within the next week and he would share them with the HEA group as soon as he could. Matt Fry indicated that Wyoming's regional planning priority areas are the same as their core areas.
- Paul indicated that interim guidance will be released by the end of September and agreed to distribute regional planning information to the group as it is made available.

#### *Tertiary Roads*

- Ann Widmer described the tertiary roads data issue, noting that SWCA would defer to the group's original decision to remove tertiary roads data from the model. She explained that some tertiary roads in Wyoming are classified as secondary roads in the model (the data does not allow for differentiation of the two), resulting in habitats in Wyoming being devalued slightly more than they should be. She noted that SWCA expects to receive USGS road data in the next couple of months to help correct that issue.
- Chris emphasized that there is no direct science that supports the devaluation of habitat by tertiary roads. He noted that devaluing the habitat results in less required mitigation to offset impacts.
- Ann explained that by familiarity with many of the included areas and by noticeable changes in classifications as roads cross state borders or field office boundaries, they know that some roads classified as secondary are actually tertiary.
- Ann noted that if the group postpones running the impacts analysis until the preferred alternative is chosen, the standardized USGS data could be used in place of TIGER data and could help clear up issues around roads.
- The group expressed concern with the timeliness of receiving USGS data.
- Chris requested that Frank Blomquist work with Cynthia Tyler to ensure SWCA has the most updated field office data from Rawlins. He noted that using USGS data would be acceptable if it is received in a timely manner, but he would like the Rawlins field office data to be incorporated otherwise.

#### *Construction Disturbance Schedule*

- Pam Anderson gave a brief overview of the construction schedule, noting that it is still a work in progress and the next version of the schedule will likely not be complete until a preferred alternative is selected.
- Ann explained that as the construction schedule stands, the model would not account for certain seasonal levels of disturbance. Pam noted that the Proponents have all of the winter range limitations of sage-grouse and could incorporate that into the next version of the schedule so they are not held accountable for disturbance during those times.
- Chris emphasized that if the Proponents are not going to be doing active construction in key nesting habitat areas during nesting periods, it would be a significant discount for the habitat services lost. He suggested that the model be run using the current schedule so the group can see some results, but with the stipulation that the results are a significant overestimate of what the mitigation should be.
- The group discussed whether there would be value in running the model using the current construction schedule. The group ultimately agreed that the model should be run with the state timing stipulations applied to the schedule and run on both the proposed route and a couple of alternatives.

- Ann proposed that where there are colored bars on the disturbance schedule, SWCA treat the ROW as both cleared vegetation, as well as a secondary road (so as to account for indirect impacts). Once the clean up and restoration period begins, there are no more indirect impacts, but vegetation re-growth will need to be accounted for. Some sort of recovery rate for vegetation, which will vary based on what type of vegetation it is and the restoration practices being used, will need to be calculated.
- In terms of the construction schedule, Stacey noted that there should be a difference between substations and the transmission line. For existing substations, the initial disturbance has already happened and there will be active construction in that footprint, but no recovery. Stacey noted that if the existing substations ever had sage-grouse habitat, it no longer exists. She also indicated that there is little operation or maintenance activity at substations. Ann suggested that during operation, substations be treated as vegetation lost, but with no indirect impacts after construction.
- The group discussed capturing noise associated with substations and quantifying it as an indirect impact. Ann suggested that if substation noise is equivalent to the noise of a secondary road, substations could be modeled as such.
- John Crookston noted that the baseline model should already demonstrate decreased quality of habitat around the existing substations and those affects should not be counted twice.
- The group agreed that substations may need to be characterized differently from the transmission line. Matt suggested that they measure the level of noise at substations and determine whether it meets the levels that are noted in the literature. Steve Negri noted that he was unsure if the DEIS includes noise calculations from substations and would research the issue further.

#### *Recovery Rates*

- Ann asked the group how to best define recovery rates of sites once they are reseeded. Pam noted that some of that information is described in the DEIS.
- The group discussed recovery rates of sage brush. Steve noted that it takes approximately 100 years for sage brush recovery to take place, but depending on the type of sage and location, the recovery rates will differ. Jon agreed to research recovery rates and distribute his findings to the group for their approval.
- The group agreed that any reseeded vegetation could be different from what is in place currently and when on private land, may be dependent on specific landowner requests.
- Pam asked what proportion of the ROW will actually be modeled as disturbed. Jon explained that the only disturbance applied will be to the pieces of land that will actually be scraped. He noted that because we are working in a raster environment, there may be some constraints in the level of detail. Between the towers, only the road is considered disturbed.
- Pam and Steve noted that a conceptual design model, including distances between towers, has only been created for the proposed route. SWCA suggested that because of this constraint in information availability, only the proposed route may be able to be modeled (no range of alternatives).
- For the groups review and comment, Ann agreed to summarize which types of impacts SWCA proposes to use as surrogates for each type of disturbance.
- Pam noted that the Gateway West website ([gatewaywestproject.com](http://gatewaywestproject.com)) has a video that could be beneficial for better understanding the construction process.

## MITIGATION OPTIONS

	<ul style="list-style-type: none"><li>• The group discussed mitigation options, specifically discussing whether research can be included within a broader mitigation package.</li><li>• With regards to research, Tyler emphasized interest in determining the specific impacts resulting in a loss of birds. He noted it is not suggested that research is a good mitigation tool, but if it pertains to a specific biological need, research may be a smaller part of a larger mitigation plan. Any research would need to be well-defined, valuable, agreed upon by all parties, and explicitly help determine impacts to birds and populations.</li><li>• Chris indicated that there is a fear associated with the term “research as mitigation.” He noted that describing the larger plan as a “conservation and mitigation plan” may help with its acceptance.</li><li>• Brian King stated that all proposed research would be supported by the Western Association of Fish and Wildlife Agencies (WAFWA).</li><li>• The group discussed whether research can be counted as mitigation if it does not lead to some sort of resolution in the project at hand. Jeri Wood noted that if the research indicates that some aspect of the transmission line is impacting sage-grouse in a way that was unanticipated, the research can be considered part of mitigation only if there is some actual mitigation done for the current project based on the results. She offered to share an example of a mitigation plan with Tyler, and possibly to the whole group, that includes a research component.</li><li>• The group discussed the BLM’s authority to require offsite mitigation. Chris noted that the BLM cannot require offsite mitigation on their end, it has to instead be offered as a component of the Proponents’ proposed action.</li><li>• Stacey noted that if research is an addition to the overall mitigation package, it will not be funded and would be irresponsible to rate-payers. She expressed concern with funding research that includes a contingency for increased mitigation for the project in the future..</li><li>• Tyler noted that overall project approval would not be based on an open-ended research question and any expected actions by the Proponents based on research outcomes would be well defined and determined ahead of time.</li><li>• Lance Hebdon and Stacey suggested that the group look at the Utah Wildlife in Need (UWIN) protocols, which were created specifically for transmission.</li><li>• Matt asked whether the Proponents would need to be reimbursed for mitigation if research proved that there was less impact than originally believed.</li><li>• Tyler cited the “Addressing Direct Loss of Birds” portion of the Framework, which notes, <i>“FWS is actively working on this issue as it relates to rangewide SG conservation. There are two ways that the project proponent is expected to help resolve this concern:</i><ul style="list-style-type: none"><li>a) <i>Work closely with FWS and State Agency Biologists to develop an approach to address loss of birds from project-related impacts and their replacement;</i></li><li>b) <i>Contribute financially to research projects that have been designed specifically to address this issue”</i></li></ul></li><li>• Ann noted that the group will need to determine the value of research in terms of service acres in order to incorporate it into the model. Brian noted that because the HEA looks at direct impacts and the DEIS discusses indirect impacts, using research as mitigation (which would be used more for indirect impacts), may not fall into the realm of the HEA.</li><li>• The group discussed estimating the applied costs of mitigation and then</li></ul>
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	<p>determining how to apply them. Lance noted that the Idaho sage-grouse subcommittee may be putting together a list of costs of different mitigation types. Jon noted that they have previously used a mitigation cost-list from Wyoming, which uses actual project costs determined by cost/acre analyses of habitat related projects.</p> <ul style="list-style-type: none"><li>• The group agreed that research could play a role in the mitigation package, but it would need to be tied to the project in the future.</li><li>• Jon expressed SWCA's need for the Proponents to develop a menu of mitigation options available for modeling and an estimate of relative costs for each option presented, acknowledging that the cost of mitigation can be dependent on density, location, and other variables.</li><li>• Stacey asked whether the HEA considers the value of mitigation options on a landscape scale (e.g. whether juniper removal could be more beneficial in one location versus another). Lance noted that it does not matter to the Proponents where mitigation occurs, it matters whether or not they get credit for it. It is the job of the management agencies to determine where the mitigation should occur.</li><li>• Jon noted that another way to determine a mitigation package is to calculate the loss of service acres, assign a mitigation ratio (service acres per acre disturbed), and determine the number of acres needed to replace those service acres based on fair market value. He noted that this method is less scientific and may not satisfy the NGO community the same way the originally proposed method does.</li><li>• Ann noted that SWCA will put together a table that ties habitat improvements to the metric. She noted that habitat improvements cannot be directly modeled unless they relate specifically to a metric in the model.</li></ul>
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## REVIEW BASELINE MODEL

	<ul style="list-style-type: none"><li>• Jon noted that SWCA would like the group to provide preliminary feedback on the base layers maps and discuss inconsistencies based on their ground knowledge of the areas mapped.</li><li>• The group briefly discussed active and unknown sage-grouse leks. Chris expressed concern with the number of unknown leks and asked whether both states use the same definition to classify leks. Lance noted that the definitions of each lek category can be found in the database.</li><li>• Cynthia Tyler reviewed the Baseline Conditions_HEA PDF maps. She pointed out the higher road density in Wyoming based on road classification issues. She also noted that allotment boundaries in Wyoming used to replicate fences created relatively good consistency between the two states for that particular layer.</li><li>• Cynthia noted that SWCA can provide the steps that were taken to produce each variable. She also noted that while there are GIS tools that can be used to extrapolate data to areas where sampling locations do not coincide with the project area, SWCA is still seeking vegetation sampling data for Wyoming.</li><li>• Tyler asked at what point SWCA will decide to no longer pursue obtaining sampling data. He noted that it would be helpful to determine deadlines at which time they will stop waiting for data and explore other options to keep the process moving forward.</li><li>• Paul indicated that the baseline model matches up well with his knowledge of the Idaho landscape.</li><li>• Cynthia agreed to post layers used to create the baseline model to the SWCA FTP site for the group to review. She noted that she would create a PDF presentation that displays how each variable affects specific locations in the baseline model to help inform the group's review of the data layers. The group agreed that a 2 week comment period to review QA/QC locations and suggest revisions based on that review would be adequate.</li><li>• The group discussed collecting additional sampling data in areas that it is still needed. Tyler indicated that it is too late to collect new data from the field,</li></ul>
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	<p>emphasizing that the DEIS has already been released and most agencies do not have the time for additional fieldwork.</p> <ul style="list-style-type: none"> <li>• Cynthia noted that she would provide a list of data that is still needed, which will include allotment names. She specifically noted the sparse datasets in Wyoming. She stated that if SWCA cannot obtain the necessary sampling data, they will take a statistical approach (define a relationship or rule) at a nearby area and apply it to the desired location.</li> <li>• Matt and Chris agreed to obtain any data they could from their agencies by September 15 and September 21, respectively.</li> <li>• The group agreed that if the USGS roads data does not come in, the roads data should remain as is with the exception of substituting in the Rawlins field office area.</li> <li>• Cynthia emphasized the importance of letting her know if there are technical difficulties in downloading GIS data from the FTP site.</li> <li>• Jon noted that an email will be sent to the group every time something new is uploaded to the FTP site. He stated that SWCA will upload the current data layers to the FTP site no later than September 9. The group agreed to the following schedule moving forward: <ul style="list-style-type: none"> <li>○ October 6: Updated data layers posted to FTP site following any new data acquisition.</li> <li>○ October 10 (or the week of): Conference call for SWCA to answer questions about updated data layers. The group will also determine whether the November 15 meeting should be in person or via webinar.</li> <li>○ October 21: Send comments to SWCA regarding updated data layers.</li> <li>○ November 15: Webinar or in-person meeting in Boise to work through revised model and discuss Proponents' mitigation package.</li> </ul> </li> </ul>
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### ACTION ITEMS

	ACTION ITEMS	PERSON RESPONSIBLE	DEADLINE
1	Delete the Chokecherry HEA reference from the Framework and distribute to the group	Tyler	Complete
2	Distribute Utah research protocols to the group	Stacey	Complete
3	Follow up with Cam Aldridge regarding SWCA data needs	Chris	Complete
4	Send Chris a list of data needs, including allotments and the metrics that need to be measured	SWCA	Complete
5	Post current data layers to FTP site	SWCA	Complete
6	Provide a presentation of random locations and leks (drill down) and distribute to the group	SWCA	Complete
7	Send requested data to SWCA	Matt	Complete
8	Send requested data to SWCA	Chris	Complete
9	Post revised data layers to FTP site following new data acquisition and incorporation into the model	SWCA	10/6/2011
10	Send comments on 10/6 revised data layers to SWCA	All	10/21/2011
11	Research noise information on substations and send to Jon	Steve	ASAP
12	Prepare a summary of what is needed relative to mitigation options and costs	SWCA	ASAP

13	Develop a document tying mitigation options to the metrics	SWCA	ASAP
14	Prepare a memo on surrogates used in the model and distribute to the group	SWCA	ASAP
15	Share Idaho BLM priority areas and interim sage-grouse guidance with the group when available	Paul	On-going
16	Ensure agendas relate specifically to how meeting objectives are achieved	SWCA/EnviroIssues	On-going

**MEETING NOTES - FINAL**  
**Gateway West Transmission Line Project**  
**Greater Sage-grouse HEA**  
**Conference Call**

Date: Monday, October 31, 2011  
Time: 1:00 pm – 3:00 pm (Mountain)

<b>TYPE OF MEETING</b>	<b>Greater Sage-grouse HEA</b>	
<b>NOTE TAKER</b>	Gina Auriemma	
<b>ATTENDEES</b>	<p><b><u>BLM – Wyoming</u></b>  <input checked="" type="checkbox"/> Frank Blomquist  <input checked="" type="checkbox"/> Walt George  <input checked="" type="checkbox"/> Chris Keefe</p> <p><b><u>BLM – Idaho</u></b>  <input checked="" type="checkbox"/> Tim Carrigan  <input checked="" type="checkbox"/> Paul Makela</p> <p><b><u>State of Wyoming WGFD</u></b>  <input checked="" type="checkbox"/> Matt Fry</p> <p><b><u>State of Idaho IDFG</u></b>  <input checked="" type="checkbox"/> Lance Hebdon  <input checked="" type="checkbox"/> Mike McDonald</p> <p><b><u>USFWS – Colorado</u></b>  <input type="checkbox"/> Terry Ireland</p> <p><b><u>USFWS – Wyoming</u></b>  <input checked="" type="checkbox"/> Tyler Abbott  <input checked="" type="checkbox"/> Lynn Gemlo  <input type="checkbox"/> Travis Sanderson</p> <p><b><u>USFWS - Idaho</u></b>  <input checked="" type="checkbox"/> Jeri Wood</p>	<p><b><u>Rocky Mountain Power</u></b>  <input checked="" type="checkbox"/> Pam Anderson  <input checked="" type="checkbox"/> Brian King</p> <p><b><u>Idaho Power Company</u></b>  <input type="checkbox"/> Stacey Baczkowski</p> <p><b><u>Tetra Tech (TT)</u></b>  <input checked="" type="checkbox"/> John Crookston  <input checked="" type="checkbox"/> Mary Garner  <input type="checkbox"/> Joe Iozzi  <input checked="" type="checkbox"/> Steve Negri  <input type="checkbox"/> Jim Nickerson</p> <p><b><u>SWCA</u></b>  <input type="checkbox"/> David Brown  <input checked="" type="checkbox"/> Jon Kehmeier  <input checked="" type="checkbox"/> Cynthia Tyler  <input type="checkbox"/> Ann Widmer</p> <p><b><u>EnviroIssues</u></b>  <input checked="" type="checkbox"/> Diane Adams  <input checked="" type="checkbox"/> Gina Auriemma</p>

<b>HANDOUTS / MATERIALS</b>	<ul style="list-style-type: none"> <li>• Agenda</li> <li>• Data posted to <a href="https://enviroissues.basecampHQ.com">https://enviroissues.basecampHQ.com</a></li> </ul>
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**AGENDA TOPICS**

**INTRODUCTIONS, DEIS COMMENT UPDATE**

	<ul style="list-style-type: none"> <li>• Diane Adams welcomed participants and reviewed meeting objectives.</li> <li>• Walt George announced that the Gateway West 90-day DEIS comment period closed on October 28. He noted that among all comments related to resource issues, those concerning sage-grouse have been most frequent.</li> <li>• As expected, comments regarding the Framework Analysis generally denote that the analysis is inadequate and raise concerns with the HEA not yet being completed or provided. Some comments have noted that certain sage-grouse lek locations were not accurately displayed. The BLM will work with Tetra Tech and</li> </ul>
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state fish and game agencies in those areas to correct any misinformation related to lek locations.

- Walt noted that many environmental groups have provided comments on the HEA, among them are Western Watersheds, Idaho Conservation League, and The Nature Conservancy. Idaho Conservation League and others sent a joint letter requesting a supplemental EIS (SEIS) regarding the HEA specifically.
  - Based on a meeting with state directors, the tentative response from the BLM will be to not release an SEIS related to the HEA. The issue does not rise to the Council of Environmental Quality (CEQ) regulatory level needed to support the release of an SEIS.
  - Walt intends to extend an invitation to concerned groups for an informational meeting with the BLM and members of the HEA team. The meeting would present how the Framework was developed, how it has evolved, and the current status of work relative to the HEA.
- Walt suggested that when the HEA is complete, Tetra Tech will revise the sage-grouse portion of the EIS. The administrative record detailing the development of the Framework and summaries from HEA meetings, the revised sage-grouse portion of the DEIS, and HEA modeling and the related mitigation package will be made publicly available for a 30-day comment period. The comment period would likely not begin until spring or early summer.
- Walt noted that this process is similar to what has been done to share air quality modeling for oil and gas company projects in the past. Additionally, the release of the FEIS will be followed by a 60-day comment period for the public to provide further comments.
- Walt explained that he would like to meet with interested groups as soon as possible, but likely not until the first quarter of 2012 due to holidays and DEIS comment wrap up. He noted that he will send a letter in the next couple of weeks to invite interested groups to meet. Any meetings would be independent of the FEIS.
- Lance Hebdon inquired as to what being put on the fast track means for the Gateway West project. Walt explained that he has had only one meeting with the Rapid Response Team for Transmission (RRTT). His impression is that they are interested in learning lessons from the successes and difficulties of the pilot projects chosen. Additionally, if there are areas that these projects are still having difficulties, the RRTT will try to provide assistance where possible. Walt will suggest that the Framework Analysis be followed where transmission lines are proposed through sage-grouse habitat.
- Tyler Abbott included that the seven selected projects are also being recognized for their coordination efforts among many agencies.
- Walt noted that he is meeting with the RRTT the week of November 14. They have hired a consultant to hold week-long interviews with parties to each project, which have not yet been scheduled. Walt may be extending an invitation to some of the HEA participants to share how the Framework was developed and experiences working through it.
- Walt explained that while the project is under some additional pressure to move forward, they will still be thorough in all analyses and considering comments. He also noted that in the first quarter of the year, the BLM will be scheduling issue resolution meetings with local governments in areas where there is large disagreement.
- The tentative plan for sharing HEA information with the public will be as follows:
  - Last quarter of 2011: Walt will extend an invitation to interested NGOs to schedule a meeting for the first quarter of 2012;
  - First quarter of 2012: Meeting with interested NGOs to share what has been done with regards to the Framework, why, and what is coming;
  - Sage-grouse DEIS section will be updated by Tetra Tech and reviewed internally by agencies involved in the Framework;
  - Second or Third quarter of 2012: Sage-grouse analysis (updated DEIS

	<p>section, Framework administrative record, HEA model and mitigation package) released for a 30 day public comment period (not an SEIS).</p> <ul style="list-style-type: none"> <li>• Diane stated that the group will need to determine what routes need to be analyzed in the model.</li> <li>• Walt noted that he is preparing a document that identifies segments of the route where there appears to be siting controversy based on comments. This documentation could be used to advise SWCA on which segments should be modeled and which should be postponed from modeling. Walt emphasized the importance of remembering that the HEA is not used as a comparison of impacts, but a method of determining mitigation.</li> </ul>
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**REVIEW BASELINE MODEL**

	<ul style="list-style-type: none"> <li>• Cynthia Tyler thanked participants who have provided data to update and fill in previous data gaps in the model. She noted that she had not received the updated Idaho lek data.</li> <li>• Paul Makela noted that there appeared to be a lot of unknown leks in the Shoshone Basin and South Hills area. Lanced explained that the updated Idaho lek data that Cynthia is still waiting on would fill in many of those gaps.</li> <li>• Mary Garner pointed out that the vegetation class variables only show a 1 and zero. Cynthia explained that the HEA is a multiplicative overlay analysis and each variable score at a specific point is multiplied together. When a variable has a score of zero, it will nullify all variables at that point. Zero values are only scored in the vegetation layer and are used in areas of non sage-grouse habitat (e.g. urban areas). The vegetation layer is the only layer that does not include scores of 2 or 3.</li> <li>• John Crookston pointed out an active lek on the map that was located in an area of non- habitat.</li> <li>• Chris Keefe asked if it would be possible to compare the Wyoming baseline model to the USGS ongoing seasonal habitat modeling effort in Wyoming. He noted that he would send Gina the names and email addresses of USGS specialists that will need access to Basecamp to download the HEA data.</li> <li>• Cynthia, Matt Fry, and Frank Blomquist discussed acquiring data from Jeff Beck (University of Wyoming). Frank agreed to contact Jeff to discuss obtaining the necessary data.</li> <li>• Cynthia recommended that the group determine when they should stop collecting data. Walt suggested that the group stop collecting data no later than the end of the year, but preferably much sooner.</li> <li>• Paul pointed out an inconsistency in the Table 1 habitat variables document regarding Variable 3 (distance to fences). Cynthia agreed to discuss with Ann and distribute a new metric document.</li> <li>• Cynthia explained the results of the baseline map, noting that red represents lower quality habitat, blue displays higher quality habitat, and dark gray shows areas of zero, or non-habitat. Dark gray areas could be disturbance, urban areas, heavily forested areas, areas of too great a slope, etc.</li> <li>• Tyler Abbott raised concern with the metrics used for patch size scoring, referencing comments made by Pat Deibert recommending a size of 25 hectares as opposed to 10 (see Pyke 2011).</li> <li>• Chris indicated that Pat’s suggestion of increasing patch size may have unintended effects of devaluing habitat. He raised concern with the model not accounting for the causes of fragmentation (patches that are a result of a relatively natural fragmentation versus human influence). Chris noted that he preferred to leave patch size at 10 hectares. Tyler and Matt agreed.</li> <li>• Chris noted that there are some limitations of the model (e.g. patch size/fragmentation driven by natural fragmentation, allotment boundaries as a surrogate for fences, etc.) inherent in running a model at the landscape scale that</li> </ul>
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	<p>the group should be aware of as they move forward.</p> <ul style="list-style-type: none"><li>• Cynthia noted that she would include a source for each dataset in a final column of the next version of the habitat metric document.</li><li>• The group reviewed the baseline map, keying in on individual points to determine which layers determine certain outputs.</li><li>• The group discussed fire and burned areas. Paul suggested differentiating between severe burns and light burns using data from mtbs.gov (Monitoring Trends in Burn Severity). He suggested that severe burns be scored as a 1 instead of a zero, as grouse will still use the edges of those areas.</li><li>• Mary Garner asked whether the model would show fire recovery over time.</li><li>• Cynthia explained that the model is not set up to model over time, so burn areas would not show recovery. If the group decides that intensity and time period of recovery are important, adjustments could be made.</li><li>• John Crookston noted that if the burn areas are modeled to show recovery, than it will not account for future fire probability. From a modeling standpoint, leaving areas as burned would account for modeling continued fire probability. If the model allows burned areas to recover, we end up with a model with no areas burned.</li><li>• Cynthia explained that one limitation of the model is that it is static and shows only a snapshot of the inputs that it is fed. Cynthia will follow up with Jon Kehmeier regarding how the burn area issue feeds into mitigation as it changes over time.</li><li>• Cynthia will look into modeling fire at intensity levels, as opposed to simply presence and absence. She clarified that she would only be looking into changing fire severity, not adding a time component. Paul suggested that SWCA consult with BLM Fire Ecologist, Don Major.</li><li>• The group discussed lek status definitions used in the model. Chris noted that there is new 2011 lek information in Wyoming posted to the Wyoming Game and Fish FTP site that Matt could provide Cynthia with.</li><li>• Cynthia explained that Variable 6 (distance to occupied lek) only takes into account leks with an occupied status.</li><li>• The group agreed to convene a subgroup to establish a final recommendation on lek data. Envirolssues agreed to help arrange a meeting among Paul, Mary, Chris, Matt and Cynthia.</li><li>• Diane indicated that Envirolssues will pull together a summary of public comments received on the DEIS regarding sage-grouse once the comment database is complete.</li><li>• Chris noted that he has received phone calls from the Audubon Society and others regarding the sage-grouse analysis. Walt noted that if he has time, he will try to prepare talking points regarding the issue. Until then, he suggested that anyone from the group that is contacted regarding Gateway West or the HEA forward them on to Walt.</li><li>• Paul explained that he has been asked why the Proponents are not funding surveys to determine undetermined leks in the project area like the proponents of wind farm projects have been. Walt noted that the Proponents have agreed to complete lek and raptor studies one year before construction on the approved route.</li></ul>
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## NEXT STEPS

	<ul style="list-style-type: none"><li>• Diane reviewed action items and reminded the group that the next meeting would be held in Boise over December 7 and 8. She included that the meeting would present output from the baseline model and associated service values of a portion of the route, incorporation of mitigation options in the model, discussion regarding DEIS comments related to sage-grouse and the HEA, and an update on communication with interested NGOs.</li></ul>
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	<ul style="list-style-type: none"> <li>• Paul noted that he would miss part of the morning on the 7<sup>th</sup>, but could attend mid-day.</li> <li>• Matt requested that the information regarding meeting dates and times be distributed close to a month before the meeting in order to coordinate travel arrangements.</li> </ul>
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### **ACTION ITEMS**

	ACTION ITEMS	PERSON RESPONSIBLE	DEADLINE
1	Send Gina names and emails of USGS specialists who need access to Basecamp.	Chris Keefe	11/14/11
2	Contact Jeff Beck at the University of Wyoming regarding data needs.	Frank Blomquist	11/14/11
3	Update habitat metric document to include source for each dataset included.	SWCA	11/14/11
4	Convene subgroup to discuss classification of leks and updated datasets.	Envirolssues	11/14/11
5	Send meeting invite for December 7/8 meeting and prepare agenda.	Envirolssues	Complete
6	Develop recommendation for incorporating burn severity into the model.	SWCA	12/2/11
7	Compile DEIS comments regarding sage-grouse and the Framework for review at the December 7/8 meeting.	Envirolssues	12/2/11
8	Prepare letter to invite NGOs to meet with the BLM and members of the HEA team regarding status of the Framework and HEA.	Walt George	12/7/11

**MEETING NOTES - FINAL**  
**Gateway West Transmission Line Project**  
**Greater Sage-grouse HEA Meeting**  
**Boise, Idaho**

Date: December 7-8, 2011

<b>TYPE OF MEETING</b>	<b>Greater Sage-grouse HEA</b>	
<b>NOTE TAKER</b>	Gina Auriemma	
<b>ATTENDEES</b>	<p><b><u>BLM – Wyoming</u></b>  <input type="checkbox"/> Frank Blomquist  <input checked="" type="checkbox"/> Walt George  <input checked="" type="checkbox"/> Chris Keefe</p> <p><b><u>BLM – Idaho</u></b>  <input checked="" type="checkbox"/> Tim Carrigan  <input checked="" type="checkbox"/> Paul Makela</p> <p><b><u>State of Wyoming WGFD</u></b>  <input checked="" type="checkbox"/> Matt Fry</p> <p><b><u>State of Idaho IDFG</u></b>  <input checked="" type="checkbox"/> Lance Hebdon (Day 1 only)  <input checked="" type="checkbox"/> Mike McDonald</p> <p><b><u>USFWS – Colorado</u></b>  <input type="checkbox"/> Terry Ireland</p> <p><b><u>USFWS – Wyoming</u></b>  <input type="checkbox"/> Tyler Abbott  <input checked="" type="checkbox"/> Lynn Gemlo  <input type="checkbox"/> Julie Proell</p> <p><b><u>USFWS - Idaho</u></b>  <input checked="" type="checkbox"/> Jeri Wood</p>	<p><b><u>Rocky Mountain Power</u></b>  <input checked="" type="checkbox"/> Pam Anderson  <input checked="" type="checkbox"/> Brian King</p> <p><b><u>Idaho Power Company</u></b>  <input checked="" type="checkbox"/> Stacey Baczkowski</p> <p><b><u>Tetra Tech (TT)</u></b>  <input checked="" type="checkbox"/> John Crookston  <input checked="" type="checkbox"/> Mary Garner  <input type="checkbox"/> Joe Iozzi  <input checked="" type="checkbox"/> Steve Negri  <input type="checkbox"/> Jim Nickerson</p> <p><b><u>SWCA</u></b>  <input type="checkbox"/> David Brown  <input checked="" type="checkbox"/> Jon Kehmeier  <input checked="" type="checkbox"/> Cynthia Tyler  <input checked="" type="checkbox"/> Ann Widmer (part-time, phone)</p> <p><b><u>EnviroIssues</u></b>  <input checked="" type="checkbox"/> Diane Adams  <input checked="" type="checkbox"/> Gina Auriemma</p>

<b>HANDOUTS / MATERIALS</b>	<ul style="list-style-type: none"> <li>• Agenda</li> <li>• DEIS Sage-Grouse Comment Summary</li> <li>• DEIS Sage-Grouse Comments &amp; Submissions (CD)</li> <li>• Mitigation Table 1</li> </ul>
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## AGENDA TOPICS

### INTRODUCTIONS, PROJECT STATUS UPDATE

	<ul style="list-style-type: none"> <li>• Diane Adams welcomed participants and reviewed meeting objectives. She noted that the intention of the meeting would be to discuss DEIS comments related to the HEA, reach a group consensus on acceptability of the baseline model and approach to the impacts analysis, and to discuss mitigation strategy and implementation.</li> <li>• Walt George updated the group on the Rapid Response Team for Transmission (RRTT) process. He emphasized that while the project is under some additional pressure to move forward, they will still be thorough in all analyses. Walt noted that certain</li> </ul>
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information regarding the RRTT process is posted to the e-trans website ([www.doe-etrans.us](http://www.doe-etrans.us)). Gateway West RRTT meetings will occur in January.

- Walt described some additional sage-grouse and project related developments, including potential changes to the Applicant's proposal, a BLM national policy on sage-grouse, and two BLM regional plan amendments. Chris Keefe noted that efforts in the sage-grouse national planning effort are highly coordinated and being accomplished by multiple EISs.
- Walt noted his satisfaction with the group's progress on the HEA, emphasizing that the group was working through the process the best that they could with the information and data available to them.
- Paul Makela suggested that the group give further consideration to avian predation and new raven nests tied to transmission line towers. He noted that the analysis places considerable emphasis on leks, while recent research efforts regarding raven predation is indisputable.
  - Walt stated that the group needs to be thorough in collecting research up until the end of the year, at which point there is not enough time to incorporate new research into the analysis. He noted that there will be an opportunity in the Record of Decision (ROD) to incorporate new data and respond to comments from the FEIS. If new and significant research is released between the end of 2011 and the release of the ROD, there will be an opportunity to incorporate it into the Framework.
  - Paul suggested that new research could be incorporated into a qualitative analysis, not necessarily quantitatively in the model.
- Walt noted that by March he would like SWCA to produce a report presenting the baseline, the direct impacts modeled, identification of which mitigation measures in the DEIS can and cannot be modeled, and additional mitigation measures that can be modeled that are not included in the DEIS.
- Stacey Baczkowski asked how the Idaho BLM's identified Priority Areas and General Areas correlate with habitat quality presented in the HEA baseline model. She also asked how conflicts between the designations would be addressed.
  - Jon Kehmeier explained that after a thorough review by BLM-Idaho and Idaho Fish and Game (IDFG), some areas stood out as having high quality habitat, but are known to not have any sage-grouse. Based on the recommendation of those agencies, the boundary of the HEA will be clipped to remove areas where grouse are known to no longer exist.
  - Lance Hebdon explained that the Idaho Priority and General Areas are a tool to implement policy, not a map for habitat quality.
  - Paul explained that the key habitat map has been used for 10 years in Idaho and is the vegetation component for sage-grouse in the state. The Priority Areas analysis is the population side of where lek density is high and thus areas are important for sage-grouse. The two maps are used together to make decisions and are not mutually exclusive.
- Stacey asked if the HEA is correctly characterizing sage-grouse habitat if there are areas where habitat is displayed as being high quality, but the birds do not exist. She emphasized the importance of ensuring that other sage-grouse efforts are consistent with the HEA model.
  - Paul explained that a meeting among agency biologists in Idaho concluded that the HEA was consistent with the Priority Areas. The IDFG and Idaho BLM review resulted in clipping out areas with good habitat for sage-grouse, but where sage-grouse no longer exist (e.g. Birds of Prey). The Birds of Prey area in particular used to be good sage-grouse habitat, but due to anthropogenic changes, sage-grouse cannot move to it. In some of the isolated patches of high quality habitat, sage-grouse are responding to a behavioral issue, not a habitat issue.
  - Jon noted that the HEA baseline model is consistent with all habitat frameworks that have been built over the last 5 years.

## DEIS COMMENTS UPDATE, HEA RELEASE

- EnviroIssues briefly described how to read the DEIS Sage-Grouse Comment report and relate it to the CD of all DEIS Sage-Grouse related submissions.
- Steve Negri reviewed the DEIS Sage-Grouse Comment Summary, noting that any sage-grouse related DEIS comments that are of concern to the group have been summarized in the document.
  - Matt Fry noted that he and Chris Keefe will write a response to the DEIS comment concerning the Density Disturbance Calculation (DDC) driving siting towards pristine landscapes.
- The group agreed that as Tetra Tech identifies comments that they would like help drafting responses for, comments should be sent to the appropriate individuals as soon as possible. Steve agreed to set up a schedule and expectations for responses to DEIS comments.
- Walt explained that while there are some groups that have raised concerns with the sage-grouse analysis, there seems to be very little opposition to the process. He noted that most comments on the HEA are simply concerns that the HEA was not provided in the DEIS. Additionally, some members of the public are interested understanding the analysis so they can assist in the implementation of any compensatory mitigation or conservation easements that result (e.g. The Nature Conservancy).
- Walt reviewed the plan for explaining the HEA to interested NGOs. Informational meetings will be planned for sometime in February.
  - Based on a meeting with both state directors, the response from the BLM will be to not release an SEIS related to the HEA. The issue does not rise to the Council of Environmental Quality (CEQ) regulatory level needed to support the release of an SEIS.
  - Walt intends to extend an invitation to concerned groups for an informational meeting with the BLM and members of the HEA team. The meeting would present how the Framework was developed, how it has evolved, and the current status of work relative to the HEA.
- Walt suggested that when the HEA is complete, Tetra Tech will revise the sage-grouse portion of the EIS. The administrative record detailing the development of the Framework and summaries from HEA meetings, the original sage-grouse portion of the DEIS, and HEA modeling and the related mitigation package will be made publicly available for a 30-day comment period. The target date for the beginning of the comment period will be early May.
- Walt noted that this process is similar to what has been done to share air quality modeling for oil and gas company projects in the past. Additionally, the release of the FEIS will be followed by a 60-day comment period for the public to provide further comments.
- Diane emphasized that Walt and EnviroIssues will be open to suggestions for the format of the informational meeting(s).
- Pam Anderson suggested that the BLM hold two meetings (one in each state) as to not weaken the collaborative process between both states and to address the differences in sage-grouse concerns between states.
  - The group agreed. The BLM will host two informational meetings in February. Invitations will go to specific parties that showed interest in the HEA via DEIS comments, but it will be open to the public. The meeting will consist of a presentation on the HEA process thus far and a subsequent question and answer session.
- Following the informational meetings in February, SWCA will complete their analysis in March for the group's review. Following the HEA group's review and agreement, the analysis will be distributed to the public for a 30-day public comment period in early May.
- Walt explained that everyone on the mailing list will receive the 30-day comment period packet and it will be available for download on the project website. Similar to the Draft EIS comment period, the public will be able to mail, email, or submit comments online.

	<p>He emphasized that the meetings in February will be informational meetings, not public meetings (no comments will be solicited at that time). Nothing will require publishing in the federal register regarding this process. He added that both state directors have concurred with the proposed approach.</p> <ul style="list-style-type: none"><li>• Chris suggested that the BLM set up a backup plan for each of those meetings because of weather issues in February. It may also be thorough to record the meetings and post them to the website.</li><li>• Pam asked whether the state agencies and the BLM are on the same page regarding transmission corridors and the impacts allowed to sage-grouse within those areas.<ul style="list-style-type: none"><li>○ Chris explained that from a mitigation standpoint, the BLM supports the management strategy of the state agencies as it relates to the transmission corridors. There will be no additional mitigation required for impacted leks in those corridors because the state's management strategy serves as the mitigation itself. However, because there is still an impact to leks in those corridors, the impacts will still be described in the EIS.</li></ul></li><li>• Paul shared that the Governor's Office hosted a meeting regarding species conservation with the idea of exploring the Wyoming Core Areas strategy in Idaho. Governor Mead is going to take that initiative to a forum of the Western Governors Association.</li><li>• Walt explained that concurrent with HEA informational meetings, the BLM will be holding siting issue resolution meetings in February or March of 2012. He is preparing a memo for BLM and Forest Service managers to outline which segments and/or portions of segments currently have consensus to be included as part of the preferred route.</li></ul>
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## REVIEW BASELINE MAP, IMPACTS ANALYSIS

	<ul style="list-style-type: none"><li>• Jon Kehmeier gave a PowerPoint presentation titled "Overview of Gateway West Habitat Equivalency Analysis" to provide an overview of where the group is now and where they are heading with regard to the baseline model, assigning impacts, and establishing mitigation.</li></ul> <p><i>Overview</i></p> <ul style="list-style-type: none"><li>• Jon noted that SWCA is looking for approval on the baseline model and approach to assigning impacts.</li><li>• Jon explained that the baseline model is the most difficult and most important part of the HEA to develop. In order to assign impacts, there needs to be a method of quantifying each impact.<ul style="list-style-type: none"><li>○ Chris noted that a key point of the February public meetings should be that any impacts that have not been captured are left out because we could not determine a suitable surrogate. This helps explain why the HEA is just one piece of the overall Framework.</li></ul></li><li>• Jon described how services are returned over time based on a vegetation recovery curve. The faster the service value returns to baseline, the lower the mitigation obligation is. The discount rate provides motivation to do mitigation early and close to the time of disturbance. The longer the recovery rate, the more expensive mitigation becomes.</li><li>• Brian King asked if a mitigation fund doesn't spend money for 10 years, whether the discount rate is applied over 10 years, or if the mitigation is considered implemented when the money is paid into a fund.<ul style="list-style-type: none"><li>○ Jon explained that once money is paid into a fund, the Proponents have completed their mitigation responsibility. The Proponents are generally not required to monitor whether the mitigation takes place.</li></ul></li><li>• Mike McDonald raised concern that the mitigation currency in the HEA model becomes dollars instead of actually making sure that the mitigation is completed. He noted that there does not appear to be success criteria or an adaptive approach to make sure mitigation measures are successful.<ul style="list-style-type: none"><li>○ Paul noted that a struggle in creating the Idaho mitigation strategy has been determining how to incorporate uncertainties. It is easy to come up with a cost</li></ul></li></ul>
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estimate for a certain type of mitigation project, but it is difficult to include the uncertainty variable.

- Jon explained that the general framework of the HEA assumes success and does not provide the ability to go back and ask for more from the Proponents. You cannot plan for the uncertainty of drought, but you can put restoration on a trajectory that only offers maximum credit for that mitigation once it reaches its full effect. The model takes into account the amount of time that it will take for the restoration to have fully taken place.
- Chris explained that part of the importance of not having an overly prescriptive mitigation plan is that it creates flexibility in maximizing the plan for success. Mitigation measures need to be planned carefully to provide maximum opportunity for success, with the understanding that some percentage of the projects will fail.
- Lynn Gemlo asked where compensation dollars go specifically.
  - Brian explained that there are organizations who manage these types of funds like WLCI and The Nature Conservancy.

*Baseline Model: Data acquisition and review*

- Jon explained changes made to the Baseline model since the last data post to Basecamp. As a result of consultation with Idaho and Wyoming's state agencies, the following alterations were made:
  - Lek definitions were changed to classify occupied and undetermined leks as occupied leks;
  - The Idaho layer was clipped to remove high quality habitat that leks no longer occupy; and
  - Burned areas were changed to incorporate a level of habitat service on the edge.
- Paul noted that it would be important to capture why the group chose to only consider impacts out to 9 km, as opposed to 18 km (as originally stated in the Framework). The project area was reduced because indirect impacts were removed for a lack of data and seasonal lek restrictions were put in place, retracting the necessity of modeling impacts out to 18 km in the project area. Paul added that a new study specifies impacts out to only 8.5 km. SWCA confirmed that no new access roads will fall outside of the 9 km buffer of any one segment.
- Paul noted that one of the universal concerns with the HEA is that there is no weighting.
  - Jon explained that sage brush is weighted higher than other variables because there are four variables associated with sage brush (7,8,9,11). Otherwise, weighting is not in the nature of an HEA.
  - Chris emphasized that it is important to understand that the model is relative only to itself.
- **The group unanimously agreed to support the 11 variables and associated metric included in the Table 1 Metric and the associated baseline model.** Chris added the caveat that there may be additional variables that come up through the 30-day public comment period, which will be considered if there is data to support them.

*Assigning impacts*

- Jon discussed the following items with regards to assigning impacts:
  - An attribute field in the GIS shapefile will change timing based on quarter. If the construction schedule changes, it would just be a matter of changing that one attribute field to reflect the change in impacts.
  - A literature search of noise related to substations was equivalent to secondary roads. The model will use secondary roads as a permanent surrogate for the noise associated with each substation.
  - Because the road built underneath the transmission line will be a two track, it will not be assigned any impacts. The group had previously agreed to treat two tracks as tertiary roads and also agreed to not assign any impacts to tertiary roads.

- In the HEA, reclamation can become mitigation when you return what was once low quality habitat to high quality habitat (e.g. replanting an area that was once cheatgrass with sage brush).
- SWCA is currently modeling the worst case scenario construction cycle because of a lack of more detailed data on start and stop times. As long as timing stipulations are consistent between years, indirect effects related to construction (like noise) can be turned on and off over time.
- Pam noted that the plan is to begin reclamation right after construction is finished and the plan of development is currently being drafted. More detailed information will be available in early 2012.
- Because of the time constraint in delivering HEA information to the public, Walt recommended that SWCA model the worst case scenario construction schedule in the time that they have and note that the final analysis will likely have less impacts because of it.
  - Chris agreed that for time and defensibility, the conservative effort is best.
- Pam suggested that Jon join her and Dale in Salt Lake City for a meeting to discuss the level of detail needed for a more accurate impacts model. Pam agreed to schedule that meeting.
- The group discussed the length of time for the recovery curve of any individual vegetation variable. The sage brush curve may need to be changed from 50 years to something longer to incorporate the probability of not immediately having success.
- Jon noted that in the past they have applied recovery curves out to 100 years depending on the types of sage brush common in the areas being modeled. He explained that if that level of detail exists in their data, a different curve could be applied to the different types of sage species.
- Chris expressed concern with the 50 year recovery curve and suggested that SWCA look at the different species of sage grouse that occur in the project area and find an average recovery time between all of them.
- Jeri expressed concern with the probability of reclamation success (e.g. if an area is reseeded and a fire destroys the work that was just done).
  - Chris noted that if a fire is going to occur either way, project money cannot be used to fix acts out of the Proponents' control. The only way to account for those concerns is by adding additional time to the recovery curve.
- Brian noted that he would be less comfortable adding years to the recovery curve based on a concern for natural occurrences, but would be more likely to consider an extension based on recovery characteristics of different species.
  - Chris noted that there is an associated invasive species impact that comes from this type of project that creates a higher likelihood of fire, but his recommendation will also be to increase recovery curves based on species characteristics only.
- SWCA agreed to develop a recommendation for sage brush recovery time. For review, they will also provide a table of all vegetation recovery curves of interest.
- Chris added that he anticipates receiving comments on the indirect impacts issue, but that it is unreasonable to ask for specific mitigation for issues that are not yet understood.
  - Walt noted that mitigation package negotiations will deal with indirect impacts
  - Paul suggested the possibility of setting up a research project to monitor indirect impacts over 5-10 years. He emphasized his concern with each project wanting to address indirect impacts differently. A rigorous process might be developed for monitoring indirect impacts and collision impacts over a certain number of years and mitigation for those indirect effects would be based on the results of those studies.
- **The group unanimously agreed to accept the list of direct impacts and the approach to modeling impacts presented by SWCA.**

*Mitigation*

- Jon explained that it would be possible to simulate conservation easements and

	<p>improved grazing management techniques. Additionally, the cost of the NEPA process for projects on BLM land can be built into the mitigation costs, and has been done for previous projects.</p> <ul style="list-style-type: none"><li>• Jon explained that the next step in the mitigation process will be to find projects that have been implemented in each state, how much they cost, and what they were intended to do. This information will provide a cost per service acre returned in the model and determine the cost of the final mitigation package.<ul style="list-style-type: none"><li>○ Lance noted that in Idaho, sites of future projects have already been determined in key habitat areas.</li><li>○ Chris emphasized that this exercise does not require the Proponents to implement the listed mitigation and would instead provide multiple simulations for each mitigation type.</li><li>○ Jon noted that the only mitigation measure that is currently prescribed (as specified in the DEIS) is fence marking in Kemmerer, WY.</li></ul></li><li>• The Final EIS will include simulations that demonstrate the relative examples of mitigation types and services that might be restored, but will not prescribe exactly how the mitigation will take place. The mitigation portion of the FEIS will demonstrate that there is a pathway and a way to gauge the accountability of the Proponents, but will not be overly prescriptive to preclude the flexibility of mitigation actions.</li></ul>
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**DAY 2  
DECEMBER 8, 2011**

## **MITIGATION**

	<p><i>Mitigation</i></p> <ul style="list-style-type: none"><li>• Jon presented Mitigation Table 1, which shows the mitigation suggestions that the group discussed at the May 12, 2011 meeting and how each of those measures would be treated in the model. He stated that most of the items are valid mitigation measures and the types of measures that SWCA envisions modeling for the mitigation package.<ul style="list-style-type: none"><li>○ Jeri noted that the term perennial grasses should be changed to native grasses</li><li>○ Jon added that conservation easements can be modeled if we know the exact location of the conservation easement. A site specific HEA model would be built to measure the additional service values that each easement is worth.</li></ul></li><li>• Walt asked if the entire service value of a conservation easement would be credited in the model.<ul style="list-style-type: none"><li>○ Chris explained that this could be a negotiation point with the Proponents. Since the easement is already protected, it might depend on how much service value the easement provides.</li><li>○ Jon will add detail to the explanation on conservation easements for the group to discuss.</li></ul></li><li>• Jon presented the document titled "Habitat Improvements." The document provides an example from a different project of the cost per unit of various mitigation measures.<ul style="list-style-type: none"><li>○ The group agreed to nominate a subgroup to work on a Habitat Improvement document specific to Gateway West. The group agreed that Chris Keefe, Matt Fry, Paul Makela, Tim Carrigan, Brian King and SWCA would hold a conference call next week.</li><li>○ SWCA will need a list of mitigation measures (e.g. Idaho juniper thinning), potential regions for those measures (relative segment numbers), and project costs based on past projects.</li></ul></li><li>• Paul expressed concern with the difficulties associated with using compensatory mitigation money towards projects at a landscape level (as opposed to many</li></ul>
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postage stamp projects that cumulatively are less effective than landscape level planning).

- Matt explained that the mitigation measures inform the model, but do not prescribe or limit the final mitigation package.
- Brian asked for clarification regarding cost outputs. Specifically, if the mitigation modeling is based on certain projects in certain places, there would be different cost outputs depending on the simulated mitigation type and location.
  - Jon explained that cost outputs have been presented as a range for past projects (using the average cost per service level return to determine the necessary payment) by simulating 3-5 projects per mitigation measure category.
- Jon noted that the project area corridor appears to be sufficiently large and include enough areas of diverse habitat characteristics to simulate all of the listed mitigation measures.
- Paul commented that a lot of NGO concerns are directed toward the ability to mitigate indirect impacts.
  - Steve noted that indirect impacts cannot be modeled within the limits of the HEA, but they can be addressed through the NEPA process and may need to be tied into a research component.
  - Walt added that the second part of the mitigation package will be to address indirect impacts with the expectation that it will be under the advisement of the Fish and Wildlife Service.
  - Walt explained that it is Tetra Tech's responsibility to qualitatively discuss and categorize indirect impacts. Each indirect impact category may have a different type of associated mitigation strategy (e.g. perch deterrents used for predation impacts). Because the avoidance of tall structures category does not have apparent mitigation opportunities, this may be available for a research component in the package. The group that would help inform a research component would be different from the group participating in the HEA process (may include academics, Pat Deibert, UWIN research protocols, etc.)
  - Diane explained that the work of this group is to discuss the HEA specifically and associated direct impacts.
- Steve noted that the 30-day public review period is specifically in response to the request for a Supplemental EIS (SEIS). The baseline model, impacts analysis, mitigation approach, meeting summaries from this process, and DEIS sage-grouse chapter will be included in the 30-day review period. Direct loss of birds, indirect effects, and other parts of the Framework are already included in DEIS. What is distributed to the public will not be responses to comments made on the DEIS, but rather the information (i.e. the HEA) that those who requested an SEIS said was missing.
- Jon explained that SWCA will help identify what the costs of types of projects will be based on service acres returned. It will be the job of the Proponent to create a mitigation package based on those costs. Because the Proponents' mitigation package will be based on the preferred route (which will not be decided until the release of the FEIS), the 30-day review packet might simply state that the intent of the mitigation package will be to fund the service acres required based on the complete HEA analysis. In the 30-day package, it will be important to emphasize that the public will have an opportunity to comment on the Proponents' mitigation plan in the FEIS.
- Paul noted that attorneys in the BLM State Office have suggested that case law increasingly pushes for mitigation packages to be more explicit.
  - Jon suggested that if the mitigation package is based on a list of projects, you can allow maximum flexibility for higher priority projects, should they arise.
  - Tim suggested that the Proponents present 1-3 mitigation scenarios for what could be expected based on the service value that must be returned.
- Ann Widmer noted that for modeling purposes, the mitigation portion of the HEA is limited to the 9km buffer. For the actual implementation, mitigation is not limited to

	<p>the 9 km project area only.</p> <ul style="list-style-type: none"><li>○ Jon added that the HEA can be used for offsite mitigation as long as it is clear what population is being affected and the scale of the mitigation.</li><li>○ Walt noted that the first preference is that the Proponents implement mitigation measures that are within the 9 km project area, but if there is a project or area with suitable justification, it would be reasonable to implement mitigation outside of the 9 km buffer.</li><li>○ Chris added that utilizing funds for projects directly underneath the power line might not be where we are most interested in recovering habitat. In a hierarchy of preferential projects, it would likely be the best choice to use funds in the core areas that are most impacted.</li></ul>
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## PREFERRED ROUTES FOR MODELING

	<ul style="list-style-type: none"><li>• Walt outlined which segments and/or portions of segments have consensus to be included as part of the preferred route for SWCA to begin modeling impacts. The group ultimately agreed that the Proposed route should be modeled for any segments with controversy. For comparative purposes, the outputs of impacts from the identified segments will be posted to Basecamp at scales of 3 km, 6 km, and 9 km.<ul style="list-style-type: none"><li>○ Model 1W-A and 1W-C</li><li>○ 1E is controversial, but should be modeled</li><li>○ Model Proposed 2 until it splits into 2A and 2C (at which point model 2C)</li><li>○ Model all of Proposed 3</li><li>○ Model Proposed 4 with substitution of 4A</li><li>○ Model all of Proposed 5<ul style="list-style-type: none"><li>▪ The environmentally preferred route crosses the Indian reservation.</li><li>▪ The Pocatello BLM Field Office prefers the southern route.</li></ul></li><li>○ Model all of Proposed 7<ul style="list-style-type: none"><li>▪ 7I and 7J cross some of the best sage grouse habitat in the state.</li><li>▪ A new route may be proposed that runs east of Sawtooth National Forest.</li><li>▪ The big objection for Route 7 comes from private landowners, however it was suggested in some of the DEIS comments that there may be private landowners in the area that are willing to negotiate.</li><li>▪ The group agreed that if there is no new Proposed route for Segments 5 and 7 by the time of the 30-day review period, it would make the most sense to model the Proposed routes for both of those segments in the impacts analysis. Walt noted that Segments 5 and 7 are the ones that the BLM is most unsure about. The BLM is prepared to issue ROW grants for those routes without consensus from all agencies.</li></ul></li><li>○ Model all of Proposed 8<ul style="list-style-type: none"><li>▪ There are currently some issues that need to be resolved with the military training area.</li></ul></li><li>○ Model all of Proposed 9 (plus 9D)<ul style="list-style-type: none"><li>▪ Jeri noted that Idaho Power has a wildlife mitigation site under 9D as part of a hydro-license.</li><li>▪ Stacey noted that the line cannot be in the FERC boundary.</li><li>▪ Walt agreed to contact the field offices in the 9D area for more information.</li></ul></li><li>○ Model all of Proposed 10</li></ul></li><li>• The lowest priority routes for modeling (i.e. those with the most controversy) are 5, 7, and 1E.</li></ul>
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**SCHEDULE AND DELIVERABLES**

<p><b>The group discussed the future HEA schedule and associated deliverables.</b></p> <p>Based on discussion during the December 8 meeting and in conjunction with further preparation between EnviroIssues and Tetra Tech, the following schedule was developed:</p>	
<b>Thurs, Dec. 15</b>	Subgroup conference call to discuss SWCA's mitigation information (Complete)
<b>Tues, Dec. 20</b>	Draft mitigation packet/list distributed to the group for review (Complete)
<b>Tues, Dec. 20-27</b>	Impacts analysis data posted to Basecamp for the group to review (impacts approach approved by group on December 7 in Boise)
<b>Fri, Jan. 13</b>	Comments due back on mitigation list from the group; Comments due back on impacts analysis from the group
<b>Wed, Jan. 18</b>	Conference call (two hour) to review updated mitigation list and impacts analysis data
<b>Wed, Feb. 15 and Fri, Feb. 17</b>	Two informational public meetings (one in Cheyenne, one in Boise) with NGOs/public to explain HEA process
<b>Mon, Mar. 5</b>	SWCA deliverable to group: Report of baseline model, impacts analysis, mitigation approach
<b>Mar. 19 and 20</b>	Two-day full group meeting (in Denver) Day 1: Review and discuss SWCA report Day 2 (half day): Talk through mitigation package with Proponents
<b>Fri, Mar. 30</b>	SWCA finalizes report for incorporation into Tetra Tech/comment period package
<b>Mon, Apr. 23</b>	Tetra Tech completes sage-grouse material for public comment period. Will include: - SWCA HEA analysis report (summary of process, baseline model, impacts analysis, mitigation approach including list of measures and representative reference types of projects and modeling) - Documentation of process to get to HEA (Framework, etc.) - Meeting summaries - DEIS section on sage-grouse (will not yet be updated for FEIS)
<b>May 1 – May 31</b>	Public comment period on HEA
<b>Fri, June 8</b>	In-person meeting (or conference call) to discuss public comments and discuss mitigation package negotiations
<b>Mon, July 9</b>	Proponents' proposed mitigation package to Tetra Tech
<b>Mon, July 30</b>	Complete internal review of Proponents' proposed mitigation package
<b>Wed, Aug. 1</b>	Begin internal review of Administrative FEIS (will include complete HEA and complete Proponents mitigation package)
<p><b>Holidays:</b> Monday, January 16: MLK Jr. Day Monday, February 20: Presidents Day Monday, May 28: Memorial Day</p>	

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### ACTION ITEMS

	ACTION ITEMS	PERSON RESPONSIBLE	DEADLINE
1	Schedule upcoming meetings/conference calls and send meeting invites.	EnviroIssues	Ongoing
2	Convene subgroup to discuss SWCA's mitigation list.	EnviroIssues	Complete
3	Schedule a meeting between Jon Kehmeier and Rocky Mountain Power (Dale Raugutt) regarding construction schedule and engineering updates.	Pam Anderson	Complete
4	Send Cynthia milepost GIS layer.	Mary Garner	Complete
5	Develop overall HEA schedule and integrate with NEPA schedule.	Tetra Tech EnviroIssues	Complete
6	Complete impacts model and post to Basecamp.	SWCA	Complete
7	Complete mitigation table and distribute to group for comment. Comments due 1/4/11.	SWCA	Complete
8	Prepare letter to invite NGOs to meet with the BLM and members of the HEA team regarding status of the Framework and HEA.	Walt George EnviroIssues	Complete
9	Propose a structure and format for informational meetings in February (Cheyenne and Boise).	BLM EnviroIssues	1/3/11
10	Set expectations for DEIS comment response development and send comments to team members as needed.	Steve Negri	1/3/11
11	Develop response to DEIS comment regarding DDC as it relates to siting towards pristine landscapes.	Matt Fry Chris Keefe	
12	Send Stacey and Chris DVDs of any large file uploads as they are available.	SWCA	Ongoing

**MEETING NOTES - FINAL**  
**Gateway West Transmission Line Project**  
**Greater Sage-grouse HEA**  
**Conference Call**

Date: January 18, 2012  
Time: 1:00 pm - 3:00 pm (Mountain)

<b>TYPE OF MEETING</b>	<b>Greater Sage-grouse HEA</b>	
<b>NOTE TAKER</b>	Gina Auriemma	
<b>ATTENDEES</b>	<p><b><u>BLM – Wyoming</u></b>  <input type="checkbox"/> Frank Blomquist  <input checked="" type="checkbox"/> Walt George  <input type="checkbox"/> Chris Keefe</p> <p><b><u>BLM – Idaho</u></b>  <input checked="" type="checkbox"/> Tim Carrigan  <input type="checkbox"/> Paul Makela</p> <p><b><u>State of Wyoming WGFD</u></b>  <input checked="" type="checkbox"/> Matt Fry</p> <p><b><u>State of Idaho IDFG</u></b>  <input type="checkbox"/> Lance Hebdon  <input checked="" type="checkbox"/> Sharon Kiefer  <input checked="" type="checkbox"/> Mike McDonald</p> <p><b><u>USFWS – Colorado</u></b>  <input checked="" type="checkbox"/> Terry Ireland</p> <p><b><u>USFWS – Wyoming</u></b>  <input checked="" type="checkbox"/> Tyler Abbott  <input checked="" type="checkbox"/> Lynn Gemlo  <input type="checkbox"/> Julie Proell</p> <p><b><u>USFWS - Idaho</u></b>  <input checked="" type="checkbox"/> Jeri Wood</p>	<p><b><u>Rocky Mountain Power</u></b>  <input checked="" type="checkbox"/> Pam Anderson  <input checked="" type="checkbox"/> Brian King</p> <p><b><u>Idaho Power Company</u></b>  <input checked="" type="checkbox"/> Stacey Baczkowski</p> <p><b><u>Tetra Tech (TT)</u></b>  <input checked="" type="checkbox"/> John Crookston  <input checked="" type="checkbox"/> Mary Garner  <input type="checkbox"/> Joe Iozzi  <input checked="" type="checkbox"/> Steve Negri  <input type="checkbox"/> Jim Nickerson</p> <p><b><u>SWCA</u></b>  <input type="checkbox"/> David Brown  <input type="checkbox"/> Jon Kehmeier  <input checked="" type="checkbox"/> Cynthia Tyler  <input checked="" type="checkbox"/> Ann Widmer (part-time, phone)</p> <p><b><u>Envirolssues</u></b>  <input checked="" type="checkbox"/> Diane Adams  <input checked="" type="checkbox"/> Gina Auriemma</p>

<b>HANDOUTS / MATERIALS</b>	<ul style="list-style-type: none"> <li>• Summary of Comments by SWCA on draft Habitat Enhancement Costs</li> </ul>
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**AGENDA TOPICS**

**INTRODUCTIONS, MEETING OBJECTIVES**

	<ul style="list-style-type: none"> <li>• Diane Adams welcomed participants and reviewed meeting objectives. She noted that the intention of the meeting would be to review and update the full group on the work done by the mitigation subgroup to develop potential mitigation options. The group will also review the comments received on the draft Habitat Enhancement Costs document and discuss SWCA's approach to modeling mitigation options as they move forward in the process.</li> <li>• Diane noted that the group would also briefly discuss the HEA public information</li> </ul>
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meetings scheduled for February 15 in Cheyenne, Wyoming and February 17 in Boise, Idaho.

## UPDATE ON MITIGATION AND HABITAT ENHANCEMENT COSTS

- Since the December 7/8 meeting in Boise, a subgroup was formed to review a list of potential mitigation project types to be modeled in the HEA. SWCA updated the resulting list to include metrics and it was distributed to the working group for review and comment. SWCA was also interested in whether the group would allow credit for measures that would decrease potential habitat destruction in the future (e.g. fire breaks and conservation easements).
- Ann noted that the conference call today would be to describe how the mitigation list will be used in the model and to discuss the comments that were received. Once SWCA has a comprehensive list and an idea of what types of areas these projects are most effective in, they will use patches in the project area to model the benefit that each project type will hypothetically have. An average cost of the habitat service value gained will be determined for each type of project. Ann noted that they would like to model hypothetical projects in both states to come up with a representative average across the project area.
- Ann explained that it is the resulting change in vegetation type or structure of patches of land that will be modeled, not necessarily the specific technique used to obtain that change. While the specific technique is important to include in the write-up, it is not necessarily what will be modeled.
- Fence marking and modification, sage brush restoration, conifer and juniper removal, and grass and forb enhancement comprise the four habitat improvement measures currently agreed to by the group for modeling in the HEA. For each of these, SWCA is looking for input on what types of landscape characteristics indicate an appropriate site for this type of mitigation.
- Ann noted that two additional categories, fire breaks and conservation easements, can be modeled with exact proposed locations and upon agreement from the group that some sort of mitigation credit could be associated with these types of measures.
- Ann reviewed the Summary of Comments Received by SWCA on Draft Habitat Enhancement Costs document. The following summarizes conversation from the meeting in each section of that document:

### *General Comments*

- Many people had concerns regarding who, what, and when these mitigation actions will be implemented. Walt explained that a Plan of Development will accompany the EIS, laying out various aspects of developing the project. The project website currently has a Plan of Development posted, albeit incomplete, as there has not yet been agreement on where the line will be constructed. Without knowing what lands will be affected, the specifics of how each aspect will be implemented are yet to be developed.
- With regard to monitoring, Walt noted that there are many options that will evolve as specific mitigation negotiations occur. Some options may include having monitoring be a proponent responsibility (i.e. self-reporting to the agencies, as used in some oil and gas field projects), an agency responsibility, or the responsibility of a third party (e.g. The Nature Conservancy).

### *Fence Marking/Modification*

- Many of the comments received regarding fence marking and modification noted the difference that would occur in habitat improvement if a fence was marked rather than removed entirely. For the purposes of the model, SWCA proposes to model marking a fence and removing a fence as the same, unless the group has ideas as to how to treat them differently.
- Walt suggested that if possible, it seems as though removing an obstruction should

score higher than simply marking it, as marking would not eliminate mortality entirely. He added that some types of fences may have greater effects on grouse than others. In a final application, it may be beneficial to look at both distance to fence and fence types. Modifying fence types may be another type of mitigation for discussion at the March meeting in Denver.

- Ann explained that 'distance to fence' is the metric currently used in the model. The model does not include a mechanism to apply a weight to the type of removal. Matt agreed that while removing a fence would be better than marking it, if there is no ability to quantify the distinction in the model then it is something to simply have noted as a limitation in the report.
- Tyler Abbott noted that this discussion points out the site-specific nature of mitigation measures. While the group can provide conceptual ideas for mitigation, it becomes hard to engage in specific discussions without an understanding of the opportunities on the ground. Walt added that the HEA modeling effort in particular is not for use at the site-specific level.
- **SWCA will continue to model fence marking and fence removal as contributing the same level of habitat service improvement. They will point out in the report that these measures likely provide different levels of benefit, but the model limits the ability to weigh these measures independently.**

#### *Sage and Other Restoration/Reclamation*

- The group had no additional questions or comments regarding sagebrush restoration.

#### *Conifer/Juniper Removal*

- Tim Carrigan noted that habitat restoration by conifer/juniper removal should not be focused solely on Phase I juniper, as SWCA originally proposed. Removal of Phase I juniper may not create new sage-grouse habitat, because sage-grouse may already use it. Thus, removal of Phase I juniper stands would result in a fairly short term and relatively small pay off. If juniper in a Phase III or thick Phase II stand is removed, while the benefits won't be as immediate, you will actually be creating entirely new habitat for sage-grouse. As a result, removing a Phase III stand will have a greater benefit for the bird, though the impacts may not be felt as immediately. **The group agreed and SWCA will model juniper removal separately in Phase I, Phase II, and Phase III stands of juniper based on Tim's comments.**

#### *Grass/Forb Enhancement*

- The group discussed a comment from the BLM Rawlins field office regarding the opportunity to incorporate grazing allotments that have failed BLM's Standards and Guidelines Assessments. Ann noted that in order to be modeled, SWCA would need information on where those allotments are and how their improvement would change things in the model. Mike McDonald asked how a failing allotment would fit into a mitigation measure discussion if it is already the BLM's responsibility to ensure each allotment rises to their own standards and guidelines.
  - Tyler noted that if a grazing allotment is not meeting standards and guidelines, then it is the responsibility of the BLM to ensure that it does so. It would not be appropriate to include this as part of a mitigation package funded by a project proponent.
  - Walt explained that a grazing allotment not meeting standards and guidelines can have a wide variety of meanings and the resulting solutions, treatments, and grazing management adjustments can also be varied. While the BLM does have a responsibility with the grazing lessee to meet its own standards and guidelines, an allotment that does not meet these guidelines would likely be of low habitat quality for sage-grouse. Such an allotment could have high potential as a habitat recovery area. He added that if the habitat is improved, and done so better than it would have been otherwise, it may be of great benefit to have the Proponents help fund an already existing plan.
  - Walt suggested that if possible, to look first at allotments that do not meet standards and guidelines for purposes regarding sage-grouse. This could be done

with a data call to all field offices, and might be considered at the March meeting. The group would also need to know why the allotment failed.

- **Walt and Ann agreed to further discuss the idea of incorporating grazing allotments that have failed Standards and Guidelines with Frank Blomquist prior to the March meeting.** Because standards and guidelines are developed independently between states, the policies of BLM-WY and BLM-ID may have some key differences.

#### *Conservation Easements*

- Ann noted that there was less consensus among the group with regard to incorporating conservation easements as potential mitigation measures in the model.
- Tyler emphasized that while there is value in conservation easements, they need to be well-focused and done strictly on a case-by-case basis.
- Tim noted that conservation easements can mean many things, including keeping land from turning into other uses or affecting the treatments occurring on the land. These differences will likely need to be taken into consideration when determining the appropriateness of incorporating conservation easements into the model.
- Matt added that conservation easements are a good idea, but it is important to keep in mind that they are hardly ever a onetime cost. Ann noted that a dollar amount can be incorporated into every year for the lifetime of the improvement.
- Brian King noted that he supports keeping conservation easements in the toolkit of potential mitigation measures. In general, it is the position of the Proponents to prefer to have as broad of a toolbox as possible from which they can select from. Stacey Baczkowski emphasized the importance of recognizing what the HEA can and cannot model and keeping valid mitigation measures that cannot be modeled in the conversation.
- Ann clarified that the mitigation options identified in the document are only those that can be modeled. Additionally, conservation easements and fire breaks can be modeled only if SWCA receives site-specific locations and agreement from the group on providing mitigation credit for those types of measures. On other projects, the service acres protected within easements are treated as if they are new acres.
- Steve suggested that easements that actively improve habitat for sage-grouse in areas near leks or areas of importance to grouse should be suitable to include as mitigation in the model. Ann noted that habitat improvement can be modeled, but simply modeling ownership would mean giving credit for the habitat service that is already there.
- Walt suggested that SWCA do two conservation easement model runs for the purposes of comparison. One run may give credit in areas selected as if it were newly created habitat (as done in other studies) and another may only give 50% service value credit. The results of the comparison could be discussed at the March meeting.
- **Ann noted that SWCA will need potential future conservation easement locations or past locations within the project area that can be modeled so that habitat service values are meaningful. Matt Fry agreed to look for examples of easements from past projects that are within the project area in Wyoming.**

#### *Fire Reduction*

- Ann asked the group whether fire reduction measures should be kept in the mitigation toolkit despite being a relatively unproven technique for preserving sage-grouse habitat.
- Tim noted that fire reduction will likely have higher value in Idaho than in Wyoming and has been used in SE Idaho. Mike McDonald indicated that IDFG is in the process of working with the BLM to determine if, where, and how fuel breaks could be implemented throughout southern Idaho.
- Tyler noted that fire reduction measures are only used in site-specific problem areas where you can clearly see the value. These areas tend to be rare and with little evidence of demonstrating true value. Walt added that building fire breaks in unburned areas also creates fragmentation and establishes non-native vegetation.
- **The group agreed that they did not have site-specific examples that SWCA could**

	<p><b>reasonably model. As a result, fire reduction measures will be recognized only as an additional mitigation idea.</b></p> <p><i>Additional Mitigation Ideas</i></p> <ul style="list-style-type: none"><li>• The group agreed that additional mitigation ideas will be held on to, but cannot be reasonably modeled in the HEA.</li><li>• Ann noted that prescribed burning could be modeled with a specific area of where it would be needed and how the vegetation type and structure would be improved. Tyler stated that prescribed burning can only be done on a very careful and site-specific basis. He added that in most cases, it is a relatively ineffective habitat enhancement measure.</li><li>• <b>Ann indicated that her review of prescribed burning literature concluded that the measure does little to improve sage-grouse habitat. The group agreed to remove the measure from the list.</b></li></ul>
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### MITIGATION NEXT STEPS/MARCH MEETING

	<ul style="list-style-type: none"><li>• For the March 19 and 20 meeting in Denver, SWCA will have completed the majority of the draft report including HEA methodology, relative values of habitat improvement projects, and service acre years that will need to be restored. Further discussion will be necessary during the March meeting to determine how heavily to weigh certain habitat improvement projects over others and to determine how each technique will be implemented to come to a final mitigation dollar amount.</li><li>• The first day of the meeting will be reserved to review SWCA's draft report and will likely run between 9:30 a.m. and 4:00 p.m. The second day, tentatively a half day from 8:00 a.m. - 12:00 p.m., will be to hold an informative discussion between the agencies and project Proponents regarding the components of the mitigation plan.</li></ul>
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### HEA PUBLIC INFORMATION MEETINGS

	<ul style="list-style-type: none"><li>• Diane briefly reviewed the plan for the February HEA Public Information Meetings in Boise and Cheyenne. The meetings will be held from 12:00 p.m. - 4:00 p.m. on February 15<sup>th</sup> in Cheyenne, WY and on February 17<sup>th</sup> in Boise, ID. EnviroIssues is working with Walt to notify interested parties.</li><li>• With regard to notification, a letter will be sent to everyone who provided comments on sage-grouse during the DEIS comment period and a postcard will be sent to anyone who received a copy of, or submitted comments on the DEIS. The BLM will also be issuing a press release to notify the public generally.</li><li>• The public meetings will include a short introduction presentation to the Framework Analysis process by Walt and/or Tyler and a presentation by SWCA on the HEA process. Cumulatively, both presentations will take approximately two hours. After the presentations, there will be a short break, rearrangement of the room, and an opportunity for questions and answers. The meetings are intended to be as informal as possible.</li><li>• Walt emphasized that the public meetings are being held specifically in response to requests to prepare a Supplemental Draft EIS because of incomplete sage-grouse information in the DEIS. They are intended to be purely informational as to help the public understand the HEA process. A one-page handout will be provided to guide attendees to the existing components of the Framework Analysis and direct and indirect impact analyses located in the DEIS. A list of where to find these references will demonstrate that all components of the Framework Analysis, with the exception of the complete HEA and the mitigation package, can be found in the document.</li></ul>
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## ACTION ITEMS

	ACTION ITEMS	PERSON RESPONSIBLE	DEADLINE
1	Look for examples of conservation easements from past or potential future projects that are within the project area to incorporate into the model.	Matt Fry, All	ASAP
2	Provide SWCA with input on what types of landscape characteristics indicate an appropriate site for each type of mitigation project that will be modeled.	All	On-going

**MEETING NOTES - FINAL**  
**Gateway West Transmission Line Project**  
**Greater Sage-grouse HEA**  
**Denver, CO**

Date: March 19-20, 2012

<b>TYPE OF MEETING</b>	<b>Greater Sage-grouse HEA</b>	
<b>NOTE TAKER</b>	Gina Auriemma	
<b>ATTENDEES</b>	<p><b><u>BLM – Wyoming</u></b>  <input checked="" type="checkbox"/> Frank Blomquist (phone)  <input checked="" type="checkbox"/> Walt George  <input checked="" type="checkbox"/> Chris Keefe (Day 1 only)</p> <p><b><u>BLM – Idaho</u></b>  <input type="checkbox"/> Tim Carrigan  <input checked="" type="checkbox"/> Paul Makela</p> <p><b><u>State of Wyoming WGFD</u></b>  <input checked="" type="checkbox"/> Matt Fry (phone)</p> <p><b><u>State of Idaho IDFG</u></b>  <input type="checkbox"/> Mike McDonald</p> <p><b><u>USFWS – Colorado</u></b>  <input type="checkbox"/> Terry Ireland</p> <p><b><u>USFWS – Wyoming</u></b>  <input checked="" type="checkbox"/> Tyler Abbott (Day 1 only)  <input type="checkbox"/> Lynn Gemlo</p> <p><b><u>USFWS - Idaho</u></b>  <input checked="" type="checkbox"/> Jeri Wood</p>	<p><b><u>Rocky Mountain Power</u></b>  <input checked="" type="checkbox"/> Pam Anderson  <input checked="" type="checkbox"/> Brian King</p> <p><b><u>Tetra Tech</u></b>  <input checked="" type="checkbox"/> John Crookston  <input checked="" type="checkbox"/> Mary Garner  <input type="checkbox"/> Joe Iozzi  <input checked="" type="checkbox"/> Steve Negri  <input type="checkbox"/> Jim Nickerson</p> <p><b><u>SWCA</u></b>  <input checked="" type="checkbox"/> Jon Kehmeier  <input type="checkbox"/> Cynthia Tyler  <input checked="" type="checkbox"/> Ann Widmer</p> <p><b><u>Envirolssues</u></b>  <input checked="" type="checkbox"/> Diane Adams  <input checked="" type="checkbox"/> Gina Auriemma</p>

<b>HANDOUTS / MATERIALS</b>	<ul style="list-style-type: none"> <li>• U.S. Fish and Wildlife Service Recommendations on Mitigation for Impacts to Greater Sage-grouse Associated With the Gateway West Interstate Transmission Line (Draft, 02/07/2012)</li> <li>• Schedule and Deliverables (Adapted from Gateway West HEA December 7/8 Meeting Summary)</li> <li>• Draft Habitat Equivalency Analysis for Gateway West Transmission Line (thru Appendix E, developed by SWCA)</li> <li>• Draft Gateway West Sage-Grouse Public Information Meeting Summaries</li> </ul>
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## AGENDA TOPICS

### INTRODUCTIONS/OBJECTIVES

	<ul style="list-style-type: none"> <li>• Diane Adams welcomed participants and reviewed meeting objectives. She noted that the intention of the two-day meeting would be to review the habitat equivalency analysis (HEA) report developed by SWCA, discuss the Proponents' sage-grouse mitigation package, and to strategize the deliverables and schedule for the sage-grouse public comment period in May.</li> <li>• Walt George presented a brief Gateway West project update.</li> </ul>
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	<ul style="list-style-type: none"><li>○ Bureau of Land Management (BLM) managers held a conference call on March 2 to tentatively identify preferred alternatives for 75% of the route. Those alternatives will be kept confidential, but verbally discussed with the applicants in order to complete engineering with a higher degree of certainty. 25% of the route contains outstanding issues on segments where a preferred alternative has not yet been identified.</li><li>○ The BLM High Desert District Office will meet in the beginning of April for a project briefing and to come to tentative determinations on Segment 4.</li><li>○ Walt will brief agency staff and management in Washington, DC on the project the week of April 23.</li><li>● Walt described challenges the BLM is facing in determining a preferred alternative in the 25% of the project with outstanding issues.<ul style="list-style-type: none"><li>○ Segment 4 in the Kemmerer/Lincoln County area: The possibilities have been narrowed to two routes. Among other effects, one route is generally better for sage-grouse and one for national historic trails.</li><li>○ Segment 5 (Populus to Borah): The BLM would like the Proponents to pursue Alternative 5C through the Fort Hall Indian Reservation. Walt will be meeting with the Fort Hall Business Council to discuss further.</li><li>○ Segment 7 (Populus to Cedar Hill): The counties in the vicinity of Segment 7 are opposed to siting the transmission line on private lands. The counties' alternative (7I), which they have stated is the only route that they will approve, runs through sage-grouse habitat. The BLM Burley Field Office has worked with the counties to modify 7I to route it west of Goose Creek.</li></ul></li></ul>
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## HEA PUBLIC MEETINGS, HEA RELEASE

	<ul style="list-style-type: none"><li>● Walt stated that comments received during the May 2012 sage-grouse review period will be incorporated into the Final EIS. If additional data becomes available based on comments (e.g., seasonal habitat data), it may be necessary to re-run the model to incorporate that data between May and the release of the FEIS.</li></ul> <p><b>HEA February Public Meetings</b></p> <ul style="list-style-type: none"><li>● Walt noted that the public HEA informational meetings in February were well attended. The HEA team fielded many questions from those in attendance. He noted that SWCA did a great job explaining what an HEA is and many of the environmental groups seem to be more comfortable in their understanding of the concept.</li><li>● Walt explained that one of the major outstanding questions on sage-grouse is with regard to what the specific mitigation plan will look like. Environmental groups would like to review the proposed mitigation package and understand what will happen if the mitigation is not successful. While certain groups may never accept the HEA as a guidance tool, the HEA team has worked hard to use the best science available.</li><li>● Modeling experts from The Nature Conservancy (TNC) in attendance at the meetings asked critical questions about the model itself, but are in fact supportive of the process and HEA concept. Pam Anderson agreed, noting that Rocky Mountain Power has met with TNC regarding the topic. Chris Keefe noted that he met with Wyoming Audubon Society representatives following the meeting to help them further understand the components of the model.<ul style="list-style-type: none"><li>○ Chris noted that Audubon representatives were concerned with the lack of grazing data incorporated into the model.</li><li>○ Jon Kehmeier explained that the model takes grazing into account to a certain degree within the vegetation category, which captures how previous land management activities have influenced the current status of the habitat. Chris added that the Audubon concerns are mostly about residual cover from year to year.</li></ul></li><li>● Paul Makela discussed Western Watersheds' concern that seasonal habitats are not a component of the model. He noted that the lack of seasonal habitat mapping across either state limits the ability to incorporate that as a variable.</li></ul>
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- Paul added that he is on a committee, along with TNC, that has discussed the HEA as one way of looking at sage-grouse methodology in Idaho. He indicated that TNC and Will Whelan seem to be on board with the process.

#### **HEA Ownership**

- Chris stated that he has been asked periodically who the HEA belongs to. His understanding is that the HEA belongs to the Proponents, but is unsure who has the authority to release all of the information and data of the model.
- Pam indicated that the model belongs to the Proponents, since they have been prescribed to do the HEA as part of the Framework for Sage-grouse Impacts Analysis for Interstate Transmission Lines (Framework).
- Tyler Abbott noted that when federal agencies receive Freedom of Information Act (FOIA) requests, the data often resides in state agency files or private industry files. The FOIA requester is directed to request the data directly from the entity that owns it. The raw data for the HEA is the property of the entity that collated those data, which in this case ranges from government agencies to academics to private industry.
- Jeri Wood noted that under a FOIA request, the analysis is not the agency's to give and would have to be requested from Rocky Mountain Power or SWCA. Pam and Jon agreed that SWCA would not be providing data without agreement from Rocky Mountain Power.
- Chris noted that SWCA, not the BLM, is building the HEA as part of the Proponent's mitigation package. Chris, Tyler, and Walt agreed that messaging in the public comment period and the FEIS should in no way indicate that the HEA is a BLM product. It should also clarify that the HEA is a mitigation tool, not an impact analysis tool.
- Walt explained that he would like to release as much information to the public as is practical and reasonable. The data layers used in the analysis are owned by other groups and thus cannot be released, but all sources can and should be identified in the report.

#### **HEA Package Contents**

- The group agreed that it will be important to explain how certain components of the HEA were determined (e.g., modeling to 9 km not 18 km). Walt suggested that the best way to describe that may be to release the minutes of the HEA meetings.
  - The reference material on sage-grouse from the DEIS that is currently posted on the project website, the HEA report, and Tetra Tech's revised impacts analysis will all be elements of the final package released for public comment. Walt added that it would be ideal to release the Proponent's mitigation proposal as well, noting the importance of providing as much specific and detail in the package as possible.
- If included, the meeting summaries will not be open to public comment, but referenced as explanation for decisions made on the HEA. Summaries may be referenced in the text of SWCA or Tetra Tech's report(s).
- Diane noted that the group had agreed during the December meeting in Boise that the Proponents' mitigation package would not be available until after the May comment period. Pam agreed.
- The group agreed that it will be important use the term "HEA model results" rather than "impacts analysis" in any description of the HEA. "Impacts analysis" has been used to describe the measured habitat services lost when the impacts of construction are applied to baseline, but using the term may create confusion about the purpose of the HEA.
- The group discussed incorporating the most recent sage-grouse policies and mapping efforts from each state in Tetra Tech's revised impacts analysis report.
  - Paul noted that Idaho's Preliminary Priority Habitat (PPH) guidance posted in December has been recently refined. The final PPH version will be released in April, which Tetra Tech will need to obtain as soon as possible for incorporation into the package. Additionally, the Idaho Governor recently released information with regard to formulating a core area strategy team similar to that in Wyoming.
  - Walt questioned whether the group should worry about moving targets for the May comment period or wait to implement the new PPH information in the FEIS. John Crookston noted that if the information is not in the May package, the public will ask

	<p>about it. It will be important to identify a date on the sage-grouse package with a disclaimer.</p> <ul style="list-style-type: none"><li>○ A decision will be made during the group's review of the May package prior to its release to determine which document versions will be used in the revised analysis.</li></ul>
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## DRAFT HEA REPORT REVIEW

	<ul style="list-style-type: none"><li>• Ann Widmer and Jon Kehmeier presented the components of SWCA's Draft HEA Report.</li><li>• The group discussed the BLM's ownership of the Framework as it relates to SWCA's report. Tyler noted that the goal of the Framework is to provide recommendations and guidance on the approach to assist the Proponents in coming to a mitigation proposal, not for the agencies to force any particular method.<ul style="list-style-type: none"><li>○ Walt agreed, noting that the HEA report could denote that the HEA was prepared as a component of the Framework as developed collaboratively by the agencies and the Proponents.</li></ul></li><li>• Pam asked whether the Proponents' ownership needs to be mentioned in the document. The outcomes of the model itself could be subject to a FOIA request if the model informs the Proponents' mitigation plan, but the raw data used to develop the variables cannot be. Walt noted that FOIA requests will be dealt with as they come and language should not be added in expectation of such a request.</li><li>• Chris asked whether mitigation funds would be separated between Wyoming and Idaho based on the habitat services lost in each state. In instances of offsite mitigation, the mitigation should occur relative to that state's population.</li><li>• The group requested that the following areas of the report be clarified or further developed:<ul style="list-style-type: none"><li>○ Update the title page to denote ownership of the HEA (i.e., "prepared for Rocky Mountain Power and Idaho Power in cooperation with the BLM, U.S. Fish and Wildlife Service, etc.").</li><li>○ Clarify that the analysis is an "HEA for Mitigation Associated with Gateway West."</li><li>○ Address the variables not included in baseline, indirect impacts, and rationale for changing the project area from 18 km to 9 km in the introduction.</li><li>○ Replace "impacts" with "habitat services lost" throughout the document.</li><li>○ Provide an explanation of the 3% discount rate so as to not seem arbitrary.</li><li>○ Emphasize where the HEA team is aware of the limitations of the model (e.g., forb data unavailable) to be clear that they were not oversights. Jon noted that while forbs are very important, there is already high correlation between many of the variables included (e.g., where there is good sagebrush and bunchgrass cover, there is also likely good forb coverage).</li><li>○ Provide a clear message as to why new data was not collected.</li><li>○ Denote the QA/QC process by state and federal agency representatives that affirmed that the model is predictive and accurate relative to itself.</li><li>○ Add the sources of data layers (another column in Table 1 citing the source of each layer).</li><li>○ Explain that the group considered over twenty variables for the baseline model and decided on eleven, and provide an explanation for choosing or not choosing each of them (specifically for indirect impacts).</li><li>○ Emphasize that the HEA is a decision support tool to help inform the mitigation process as a component of the Framework.</li><li>○ Reference a list of mitigation projects that were considered, but not able to be modeled to be clear that they were not oversights.</li></ul></li><li>• Chris noted that there was a question during the Cheyenne public information meeting regarding the equal value of all variables in the model. Jon explained that because we do not have literature to support how to weigh each variable, it would not be defensible</li></ul>
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to apply a relative ranking. Some sage-grouse may avoid roads more than others, and some may avoid fences more than others.

- Jon noted that one of the biggest concerns at the Boise public meeting from TNC was why a continuous ranking was not used. He added that because there is no literature to support a continuous ranking, developing that function is not very different from putting the variables in ranking categories. Though the model is not continuous, it is very similar to habitat suitability models and the group's consensus on break points in each variable is supported by the literature.
- The group briefly discussed the discount rate concept.
  - If mitigation funds are available before the project is built, that is considered more valuable than if it is supplied after construction.
  - Ann noted that any construction that is pushed off into the future requires less mitigation because of the discount rate. The model is currently set up to assume that mitigation is paid up-front in project year one, but that can be changed easily.
- The group discussed the length of time necessary for sagebrush recovery. The model currently assumes a 100 year recovery. The group ultimately agreed to maintain the 100 year recovery curve.
  - Paul noted that it would not take 100 years for a small patch of sagebrush used for construction to recover, but in the context of a landscape, 100 years is a realistic estimate. He noted that he is comfortable with the 100 year curve, but that everyone should be aware of the differences in context.
  - Steve Negri noted that restoration is assumed to be passive on the "habitat services lost" side of the equation. If an area is enhanced with active restoration, that would be stipulated on the mitigation side of the equation. Jon added that 100 years assumes that the Proponent does what is normally expected in terms of restoration. In this case, seeding sagebrush is the normal expectation.
  - Jon noted that because of the discount rate, years 50-100 of the recovery curve contribute little to habitat services lost.
  - Ann noted that only the sagebrush vegetation variable incorporates risk into recovery. Chris indicated that this assumption is appropriate, as sagebrush is of greater concern for failure than the other listed habitat types (e.g., riparian, shrub).
  - Chris raised concern with using a linear curve for sagebrush recovery, which assumes that one percent would be recovered in the first year. Jon noted that the type of curve could be changed if there was scientific literature or evidence to do so.
- Ann explained that mitigation project costs were analyzed based on whether or not overhead or administrative costs were included. SWCA determined that in general, administrative costs accounted for roughly 50% of the overall cost. That amount was added to mitigation project costs where overhead was not included.
- Mary Garner raised concern with overlap in habitat services lost in Segment 1 because of the dual lines. Jon noted that another year of construction may need to be added to account for the re-purposing.

**Mitigation**

- Chris asked whether there is an overlap issue if a fence removal or marking location is within 2 km of multiple leks. Jon noted that there is no double counting regardless of the number of leks within 2 km of fence locations.
- Mary asked whether conservation measures need to be balanced between segments. Ann explained that prescribing the location of mitigation projects are outside the realm of the HEA and are decisions that will be made as part of writing the mitigation plan. The report will not specify where mitigation projects were modeled. Multiple projects were picked to develop an average cost and estimate for habitat services recovered.
- Ann requested that the group provide her with the costs of maintenance, if necessary, for any of the modeled mitigation projects.
- The group discussed costs associated with conservation easements.
  - Matt Fry noted that \$2,500 was added to the conservation easement cost for maintaining public access to each easement, but only if there was access previously. Easements will not necessarily have public access and because public

	<p>use for conservation easements is a separate issue from protecting sage-grouse habitat, that figure may need to be modified or removed.</p> <ul style="list-style-type: none"><li>○ Jeri added that a conservation easement could have a project on it that would already receive monitoring based on a vegetation plan. Ann noted that vegetation monitoring is included in the 50% markup of mitigation project costs.</li><li>○ Jon agreed to change the \$2,500 per year to be allotted for monitoring and maintenance.</li><li>● Jeri noted that she would check whether the \$580/acre cost for easements, determined by Wyoming data, is relatively accurate with the data for past projects in Idaho.</li><li>● The Proponents will need to determine what percentage of each project will occur in each one of the segments. Based on an extrapolation from the initial outputs of Segments 4 and 7, the cost of the mitigation package could be between \$600,000 and \$6 million depending on the percentages of each project type chosen across the line.</li></ul>
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**REVIEW U.S. FISH AND WILDLIFE SERVICE RECOMMENDATIONS ON MITIGATION (DRAFT, 02/07/2012)**

	<ul style="list-style-type: none"><li>● Tyler gave an overview of the Draft U.S. Fish and Wildlife Service (USFWS) Recommendations on Mitigation document compiled to provide guidelines to the Proponents for their mitigation package proposal approach. He noted that the document was distributed to USFWS representatives across multiple states and represents service-wide recommendations for the Gateway West project.</li><li>● The group discussed the idea of having an “oversight committee” as part of the Proponents’ mitigation proposal to help develop the mitigation and monitoring plan. The committee may also help determine the most appropriate targets of opportunity for the use of mitigation funds.<ul style="list-style-type: none"><li>○ Tyler suggested that the oversight committee be a relatively objective group. Chris and Tyler agreed that while an established group like Wyoming Landscape Conservation Initiative (WLCI) can provide a nice pot for restoration projects, it has complicated projects in the past and would not be a good option.</li><li>○ Brian explained that the Proponents have had conversations with Bob Budd and the Wyoming Wildlife and Natural Resource Trust, which seems like a viable option.</li></ul></li><li>● Brian noted that he has discussed mitigation banking options with Pat Deibert, USFWS, and she indicated that USFWS is in the preliminary stages of discussing mitigation banking for sage-grouse.</li><li>● Chris noted that the BLM has been approached many times about mitigation banking and has been reserved about getting involved because of uncertain value in banking. Additionally, there is an inherent difficulty in tying a dollar amount to the habitat. An HEA type of analysis, however, may be able to bridge that gap.</li><li>● In response to the draft USFWS mitigation recommendations, Paul discussed some discrepancy in the idea that conifer removal and fence marking have little scientific evidence showing benefit. This may be true on the population level, but there is good evidence that juniper has displaced sagebrush habitats, especially on a local scale, over the last 100 years. He added that he did not want to discount the benefits of juniper control projects too much, especially in areas where there is great potential for opportunity.</li><li>● Chris noted that there is recognition that all of the listed mitigation projects are feasible options as long as they are sited thoughtfully and with attention to detail. Tyler agreed, noting that one function of the oversight committee could be to help advise on those details.</li><li>● Paul stated that even though NEPA allows the agencies to be generic within the context of an EIS, the BLM is increasingly receiving direction through court precedence to be moving toward more specificity in environmental impact statements. It would not be sufficient to state that the Proponents will fund a certain number of dollars to do an unknown compilation of 20 activities. To the extent that the proposal can be specific about the number of acres of juniper removal or miles of fence to be marked, the better.</li></ul>
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- Tyler suggested that the Proponents start with percentages (e.g., 80-90% habitat based mitigation projects, of which 30% are conservation easements, 20% high quality are conifer and juniper removal, etc.) to allow some flexibility. He suggested the Proponents work with local working groups to find projects in each state.

DAY 2  
MARCH 20, 2012

## PREFERRED ROUTES FOR MODELING

- Walt presented an overview of the changes in routing for each segment with regard to the Proponents' SF299. He also noted the challenges associated with choosing a preferred route in some of the outstanding segments. He provided an overview of which segments should be presented in the HEA report.
- Jon noted that a concern with modeling anything other than the Proponents' proposed route is that it creates a situation where the results could be considered an impacts analysis, not a tool for determining mitigation. The group has consistently agreed that the HEA is not intended to be used as an impacts analysis.
- Tyler noted that the BLM has been challenged in the past on having more than one impacts analysis. It has been the intention from the start that the HEA should not drive the alternatives selection, which is why the HEA has not been applied for every single alternative.
- Walt explained that the decision in determining a preferred route in Segment 7 will come down to the cost of mitigating impacts on farmlands versus the cost of mitigating for sage-grouse.
- Pam questioned why the Proponents would fund the analysis to be run on Segment 71 when it is not a route that they prefer, nor would modeling it be consistent with the plan to only model the proposed route. The Proponents do not support 71 and the National Parks Service has indicated that 71 is in the viewshed of the National Reserve and affects Granite Pass.
- **The group agreed that the proposed route, including those areas formally changed to the proposed route by the Proponents in their SF299, should be modeled and presented in the report.** Formal changes to the originally proposed route include:
  - Segment 1: Between the Windstar and Aeolus substations, the eastern 230 kV segment (known as Segment 1E) of the project has been removed from the proposal. Segment 1W as currently proposed will remain in the proposed project.
    - Model 1W(a) and 1W(c). The Proponents plan to build 1W(a) and then tear down 1W(c) and rebuild it in the same ROW. There will be 1,500 ft separation between the two lines.
  - Segment 2: Alternative 2C is now the Proponents' proposed route. SWCA has already modeled this route.
  - Segment 4: Alternative 4A is now the Proponents' proposed route. SWCA has already modeled this route.
- The group discussed potential changes made to Segment 8, including what may become the BLM's preferred alternative. Walt noted that Idaho Power has proposed to relocate their existing 345 kV transmission line to the 8D alternative alignment. Gateway West would follow where the existing transmission line alignment is currently as to not cross the existing transmission line. BLM's preferred alternative will likely be that option.
  - SWCA will model Segment 8 proposed.
- The only exception to modeling the proposed route will be in Segment 9. Proposed Segment 9 will be modeled with the substitution of 9D.
  - Pam noted that the Proponents will support the Idaho Army National Guard and Idaho Department of Parks and Recreation office decisions in Segment 9 in choosing 9G.

	<ul style="list-style-type: none"><li>○ Steve and John noted that they would call this out as an exception to the rule for which routes are presented in SWCA's report.</li><li>○ SWCA has already modeled 9D, which is very close to 9G and has little sage-grouse habitat. SWCA will not model 9G and will use the 9D results as a surrogate.</li></ul>
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## TETRA TECH QUESTIONS AND CONCERNS

	<ul style="list-style-type: none"><li>• John Crookston and Steve Negri presented questions to the group regarding the revised sage-grouse section to be presented during the May comment period.</li></ul> <p><b>Data and routes used in sage-grouse material for May comment period</b></p> <ul style="list-style-type: none"><li>• The group agreed that any changes that have been made formally by the applicants (i.e., changes in the proposed route via SF299, dropping double circuit in Segments 2-4, reducing 300 ft right of way to 250 ft) should be reflected in the updated sage-grouse material released for public comment.</li></ul> <p><b>Estimating direct loss of birds</b></p> <ul style="list-style-type: none"><li>• The Framework indicates a need to determine an estimation of the number of direct loss of birds from the project. John explained that because there is little literature on the topic, there is an inherent risk in choosing a number that is or appears to be arbitrary. He added that because the species is not listed, there would be no take permit based on the estimation of loss of birds.</li><li>• John noted that Tyler Abbott has informally indicated that there is likely no loss of birds during construction, but some during operation.</li><li>• Brian noted that Rocky Mountain Power has done surveys of its existing lines since 2001 on avian collisions and predation, much of which is within sage-grouse habitat. Brian agreed to send that data to John.</li><li>• Paul suggested that Tetra Tech could extrapolate data from research on falcons to help determine an estimate of direct loss of birds.</li><li>• Walt noted that from a NEPA perspective, the FEIS will provide an overview of the literature, cite how take during construction would be avoided, and stipulate that any numbers included are only estimates based on the best available data.</li><li>• Jeri agreed to discuss this issue further with Tyler in order to provide a recommendation to Tetra Tech. Tetra Tech agreed to draft language and distribute it to the group for review.</li></ul> <p><b>Buffer required for seasonal habitat restrictions</b></p> <ul style="list-style-type: none"><li>• Based on ADEIS comments submitted by the BLM Idaho State Office, the DEIS reflects the requirement from a Idaho BLM 2010 Informational Bulletin (IB) to extend seasonal habitat restrictions to within four miles of leks.</li><li>• Various comments had conflicting opinions regarding the four mile buffer. Environmental groups requested that the buffer be extended up to 11 miles, USFWS requested that the buffer apply to private lands as well, and developers commented that the buffer was arbitrary and the restrictions should be held to only to the standards of BLM resource management plans (RMPs) and U.S. Forest Service (USFS) plans.</li><li>• Paul noted that the 2010 IB stipulates that the four mile buffer could be increased or decreased if justified with a scientific basis in a NEPA document. He added that IBs do not expire and are advisory, not mandatory.</li><li>• Walt noted that plan amendments will change again and suggested that Tetra Tech find a minimum, using four miles for Idaho and looking at RMPs in Wyoming. If a local plan has something more restrictive, that should become the minimum.</li><li>• Brian emphasized that using the four mile buffer affects the feasibility of constructing the project.</li><li>• Steve noted that Tetra Tech will look at the four RMPs in Wyoming and find the most conservative buffer, noting that there may be exceptions for feasibility.</li></ul>
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- Paul requested that this topic be discussed further by a subgroup on a conference call. Tetra Tech agreed to set up a conference call with Frank Blomquist, Paul Makela, Tim Carrigan, Mike McDonald, Chris Keefe and Brian King to discuss this issue.

## MITIGATION DISCUSSION, CONTINUED FROM DAY 1

- The group discussed expectations of the Proponents' mitigation proposal included in the 30-day review. The proposal should include:
  - The percentage of habitat related projects and other projects proposed, including where the landscape within each segment provides opportunity for those types of projects.
  - The roles and responsibilities of those monitoring the mitigation, perhaps as part of an oversight committee.
  - The group agreed that the mitigation proposal included in the May comment period will be a framework proposal, but will include as much detail as feasible in the time frame allowed. The group agreed that calling it a "detailed mitigation outline" acknowledges that the proposal will likely be somewhat deficient, in particular with regard to where specifically the projects will be applied.
- The group discussed mitigating for indirect effects as part of the mitigation proposal. Brian explained that while there is clarity regarding mitigating direct effects with the use of the HEA, mitigating for indirect effects is a gray area. He noted that based on previous conversations with Tyler, indirect effects could be mitigated by doing more of the same mitigation done for direct effects.
  - Paul explained that there is a similar discussion occurring with the MSTI project and he emphasized the importance of ensuring that things are done relatively consistently between the projects to be fair. The MSTI group has agreed that because of the uncertainty of the science associated with transmission lines, mitigating for indirect effects is difficult to quantify. The MSTI project currently has a research project tentatively proposed to investigate movement and monitoring once the line is constructed. At this time, no decisions have been made with regard to adaptive management based on the research conducted.
  - Walt indicated that research should be a component of the mitigation package for indirect effects, but should not solely be the mitigation for indirect effects and should not be a component of mitigating direct effects. Research may fall under either behavioral effects (e.g., how tall structures affect behavior of sage-grouse) or predation.
  - Brian noted that if research was accepted as a form of mitigation for indirect effects, the Proponents would use the UWIN protocols to help develop such a project. These protocols were developed specifically to address the aforementioned types of research projects for sage-grouse. He noted that there needs to be a decision made about what sort of mitigation credit the Proponents will receive for research.
  - Paul suggested that there may be a possibility for expanding the currently proposed MSTI research project. He added that retrofitting existing H-frame towers with perch deterrents could potentially be an addition to the indirect effects mitigation proposal.
  - The group discussed conducting a research project through the Governor's core areas as a parameter. Thought would be given to where existing effects from current lines in the core areas already exist, but Segment 2 could provide suitable habitat for such a study.
- The group discussed onsite versus offsite mitigation and the potential for proposing projects outside of the project area.
  - Frank Blomquist expressed concern with locating mitigation projects outside of the 9 km buffer, specifically if projects were to be sited as far away as the Lander BLM Field Office. The BLM offsite mitigation policy indicates that offsite mitigation will only occur when impacts cannot be mitigated on the project. He emphasized the importance of mitigating in core areas in Wyoming where possible.
  - Brian explained that the Proponents are interested in focusing on areas as close to

	<p>the project footprint as possible. However, some projects may be identified that are extremely beneficial to sage-grouse further away from the project. The proposal will likely have a good mix of onsite and offsite mitigation, but would like assurance that offsite mitigation will substantively be given credit for mitigation.</p> <ul style="list-style-type: none"><li>○ Walt noted that presenting a robust variety of mitigation categories both onsite and offsite will likely have the most potential to be accepted. It would be advisable to start as close as possible to the impact, but important to not bind ourselves into an inability to complete a project that would be very important to the population. He added that a strict interpretation of onsite is the right of way, which is currently 250 ft, but 9 to 18 km could potentially be considered onsite as well. The BLM expects mitigation through reclamation, primarily for onsite impacts.</li><li>○ Jeri added that if there is an area within core that would benefit greatly, while it may be offsite of the line, it would still be benefiting the same population.</li><li>● The group discussed the benefits of the Proponents contacting local working groups for site-specific reclamation recommendations.<ul style="list-style-type: none"><li>○ Paul listed the following potential mitigation opportunities in Idaho: Murphy Complex Fire ongoing need for restoration (Jarbidge Field Office); Shovel-ready juniper removal projects (Burley and Owyhee County Offices); Idaho Watershed Initiative project for shrub-steppe restoration (Idaho Fish and Game).</li><li>○ Jeri agreed to contact representatives working with private landowners with a focus on sage-grouse.</li></ul></li><li>● Brian agreed to send out an email to the HEA group requesting information on potential mitigation project types and locations, as well as recommendations for agencies that may be most appropriate to include as part of the oversight committee.<ul style="list-style-type: none"><li>○ Paul expressed some concern in the ability to turn a list of hundreds of potential projects into a landscape scale effort.</li><li>○ Walt explained that it could be the job of the oversight committee to validate those projects and help modify them to have more of a landscape approach. The mitigation proposal should include how the oversight committee would work, what outcomes they would have, payment for time and administrative costs of the committee, and how projects will be implemented.</li></ul></li><li>● The group agreed that the primary functions of the oversight committee would be to:<ul style="list-style-type: none"><li>○ Validate projects and ensure their effectiveness at the local and landscape scale; and for</li><li>○ Technical monitoring/oversight of implementing projects and/or the data collection for those projects.</li></ul></li><li>● The group discussed potential representation on the oversight committee.<ul style="list-style-type: none"><li>○ Both local and landscape level representation would help ensure projects are effective on both scales. Paul suggested that if the oversight committee extends beyond agency members, the Proponents might consider including Will Whelan (TNC) and Tom Robinson (Idaho Conservation League). Don Kemner from Idaho Fish and Game is the best contact for working groups. He added that including non-governmental organizations (NGOs) on the oversight committee may create a Federal Advisory Committee Act (FACA) issue.</li><li>○ Jeri suggested that the oversight committee be defined as the Proponents and federal and state agencies, but could invite NGOs with projects as necessary. When decisions need to be made, NGOs would not be included. The group agreed, noting that the major issue with FACA is allowing decision-making authority.</li><li>○ Frank indicated that Tom Fisher with Wyoming Game and Fish Department is the best contact for Wyoming working groups.</li></ul></li><li>● Brian asked what type of mitigation would be required, if any, in designated corridors.<ul style="list-style-type: none"><li>○ Walt explained that direct impacts to sage-grouse resources on public lands in the Governor's designated corridors will require the same direct mitigation as lands outside of the corridors. BLM's required mitigation will be reclamation, at the least. With regard to private versus public land, Walt presumes that the USFWS will take the stance that impacts and mitigation are blind to land ownership. However, it is</li></ul></li></ul>
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	important to take into account the period of time the mitigation would be done, and the idea that the Proponents will likely have more assurance that mitigation efforts would not be affected on public rather than private land.
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**SCHEDULE AND DELIVERABLES**

	<ul style="list-style-type: none"> <li>• The group agreed to the following schedule in preparation for the May comment period:</li> <li>• <b>Friday, April 6:</b> SWCA finalizes report and distributes to HEA advisory committee and Tetra Tech (SWCA report includes methodology and results of HEA).             <ul style="list-style-type: none"> <li>○ April 6 – April 23: Tetra Tech incorporates SWCA report into full package, HEA committee may comment on report at this time or wait until Tetra Tech incorporates it into their draft package.</li> </ul> </li> <li>• <b>Monday, April 23:</b> HEA advisory committee review of Tetra Tech package begins (includes SWCA HEA report, documentation of process to get to HEA and Framework, updated DEIS section on sage-grouse, Proponent’s detailed outline for mitigation).</li> <li>• <b>Friday, May 4:</b> Internal HEA advisory committee review of Tetra Tech package ends.             <ul style="list-style-type: none"> <li>○ May 4 – May 14: Tetra Tech incorporates comments from HEA committee into package.</li> </ul> </li> <li>• <b>Monday, May 14:</b> Tetra Tech finalizes package.</li> <li>• <b>Tuesday, May 15:</b> Notification in the mail to full mailing list.</li> <li>• <b>Monday, May 21:</b> Beginning of 30 day comment period.</li> <li>• <b>Tuesday, June 19:</b> Close of 30 day comment period.</li> <li>• The conference call currently scheduled for June 8 to discuss what was heard during the comment period will be rescheduled for a date following the close of the comment period.</li> </ul>
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**ACTION ITEMS**

	ACTION ITEMS	PERSON RESPONSIBLE	DEADLINE
1	Revise the cover of the report relative to attribution and reflect new content of report as discussed, including defensible rationale as to how decisions were made.	SWCA	4/6/12
2	Run the model based on discussed formal route updates submitted by Rocky Mountain Power.	SWCA	4/6/12
3	Send Brian King contacts, potential project opportunities and membership on oversight committee recommendations.	All	4/11/12
4	Provide Tetra Tech with information on addressing loss of birds in EIS.	Jeri Wood Tyler Abbott	4/16/12
5	Determine appropriate mix of projects by state based on habitat service values.	SWCA/ Brian King	4/16/12
6	Revise DEIS sage-grouse analysis for public comment period with Proponents’ formal changes to routes.	Tetra Tech	4/23/12
7	Update DEIS language based on input by Jeri and Tyler regarding direct loss of birds.	Steve Negri Tetra Tech	4/23/12
8	Send comments on high level summaries from public meetings to EnviroIssues.	All	4/23/12

9	Schedule conference call to discuss 4 mile seasonal habitat buffer (include Paul Makela, Tim Carrigan, Chris Keefe, Frank Blomquist, Mike McDonald, Jeri Wood and Brian King).	Tetra Tech	Complete
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