
Appendix L

VDDT Methodology

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GREATER SAGE-GROUSE HABITAT CHARACTERIZATION FOR USE IN NON-SPATIAL VEGETATION MODELING ACROSS THE GREAT BASIN

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Introduction

Numerous factors influence sagebrush dynamics in the Great Basin. Each year acres of sagebrush increase in density, or are burned, grazed, converted to invasive annual grass, damaged by insects and disease, encroached by conifers, or altered by various management treatments. Due to the importance of sagebrush cover for greater sage-grouse, a process to account for all of these changes in sagebrush communities is important in evaluating trends of greater sage-grouse habitat. The greater sage-grouse land use plan amendments being developed and analyzed in each sub-regional EIS in the Great Basin each have different alternative approaches to management of greater sage-grouse habitat. Alternatives propose actions that will influence the extent and distribution of sagebrush. In order to evaluate and compare the estimated effects of each alternative, a team of vegetation ecologists representing each sub-regional EIS in the Great Basin was assembled. The team used the Vegetation Dynamics Development Tool (VDDT, copyright 1995-2003, ESSA Technologies, Vancouver, BC) to accomplish this task. This modeling effort does not include changes in habitat conditions associated with permitted activities such as infrastructure development, travel management, or mineral development.

Vegetation Data

We evaluated available vegetation information developed for the Greater Sage-grouse Regional and Sub-regional efforts to identify the sagebrush habitat types and associated vegetation cover classes required in our modeling effort. We determined the most effective approach would incorporate the following criteria: 1) dataset covers the entire western region, 2) the vegetation data has an associated accuracy assessment, and 3) data provides appropriate resolution of sagebrush habitat types and associated cover classes for the VDDT models. The baseline vegetation data sets developed for the region-wide

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Disturbance Monitoring and Vegetation Basemap Team (***) met these criteria. The datasets were developed using Landfire v12 (updated through 2010) data products and consisted of 1) existing sagebrush base, 2) conifer base, 3) potential sagebrush base (for details on methodology see Appendix – Vegetation Basemap in Disturbance Monitoring Report). In addition, we used Landfire v12 Existing Vegetation Type to identify Invasive Annual grass and Introduced Crested Seedings. Existing Vegetation Cover was used to identify sage-grouse cover class characteristics required for the modeling effort. The above datasets were combined and clipped to BLM and USFS ownership within each Sub-regional Area (Oregon, Idaho/Montana, Utah, Nevada/California) to serve as our sagebrush modeling basemaps for subsequent analysis.

GSG Habitat Characterization for Vegetation Models

We modified the sagebrush modeling basemap to facilitate characterization of sage-grouse habitat and associated development classes identified in our models. We modified the Soil Moisture and Temperature Regime data (Chambers et al 2014, Fire and Invasives Team Report, 2014) to identify 4 Vegetation Model Types – Warm/Dry sagebrush, Mixed sagebrush, Mountain sagebrush w/conifer, and Mountain sagebrush no conifer (Table 1). In addition we identified the need for a Low Sagebrush Group. We used the Landfire v12 Biophysical Settings dataset and selected low sagebrush vegetation groups (Table 2). The resulting Model Group raster was combined (raster calculator) with the Landfire Existing Vegetation Cover data to categorize the following cover classes within the Low sage [LOW], Warm/Dry Sage[WARM/DRY], Mixed Sage[MIX], Mountain Sage w/ conifer[MTN7], and Mountain sage no conifer[MTN8] (Class A = herbaceous cover 0-100%; Class B = shrub cover 10 – 30%; Class C = shrub cover >30%). To identify Annual Grass and Crested Seeding, we assigned any Landfire Introduced Upland Vegetation -Annual Grassland (evt code 3181) or – Perennial Grassland Forbland (evt code 3182) that had a sagebrush site potential to Class Invasive Annual and Class CWG Seeding, respectively. Conifer encroachment (Class D = tree cover >10%) was determined using the Conifer base dataset subset to areas with sagebrush site potential. The resulting rasters were combined, reclassified and added back to the base Model Group raster.

Soil Moisture Temperature information was limited in some higher elevation areas or shrubland-forest transitional areas. Therefore we incorporated 30 year average annual precipitation data (PRISM ppt 30yr normal 800m2 annual) to inform any unclassified sagebrush pixels in our Model Group dataset. Specifically, we set the following criteria: Average annual precipitation 14 – 28 inches = MTN7; Average annual precipitation \geq 28 inches = MTN8. Results were reclassified and added back to the base Model Group raster.

Additional Filters

To provide a biologically meaningful geographic extent, we filtered the final sagebrush modeling basemap to Greater sage-grouse population Areas and associated Priority Areas for Conservation (PACs) from the Conservation Objectives Team Report (USFWS, 2014). The above datasets were combined and clipped to BLM and USFS ownership within each Sub-regional Area (Oregon, Idaho/Montana, Utah, Nevada/California) to serve as our sagebrush modeling basemaps for subsequent acreage reporting and analysis.

Literature Cited

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- Greater Sage-grouse Disturbance Monitoring and Vegetation Basemap Assessment Team Report. 2014 Greater Sage-grouse Wildfire, Invasive Annual Grasses and Conifer Expansion Assessment FIAT Report. 2014.
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- U.S. Geological Survey (USGS). 2013: LANDFIRE 1.2.0 Existing Vegetation Type layer. Updated 3/13/2013. Washington, DC: U.S. Department of the Interior, Geological Survey. Online: <http://landfire.cr.usgs.gov/viewer/>. [Accessed 10 July 2014].

Table 1 – VDDT Model Groups associated with predominant sagebrush ecological types in Sage-Grouse Management Zones III, IV, V, and VI based on soil temperature and soil moisture regimes, typical characteristics, and resilience to disturbance and resistance to invasive annual grasses (modified from Chambers et al. 2014, Miller et al. 2014 a,b).

Ecological Type	Characteristics	VDDT Model
Cold and Moist (Cryic/Xeric)	Ppt: 14 inches + Typical shrubs: <i>Mountain big sagebrush, snowfield sagebrush, snowberry, serviceberry, silver sagebrush, and/or low sagebrushes</i>	MTN8, LOW
Cool and Moist (Frigid/Xeric)	Ppt: 12-22 inches Typical shrubs: <i>Mountain big sagebrush, antelope bitterbrush, snowberry, and/or low sagebrushes</i> Piñon pine and juniper potential in some areas	MTN7, LOW
Warm and Moist (Mesic/Xeric)	Ppt: 12-16 inches Typical shrubs: <i>Wyoming big sagebrush, mountain big sagebrush, Bonneville big sagebrush, and/or low sagebrushes</i> Piñon pine and juniper potential in some areas	MIX, LOW
Cool and Dry (Frigid/Aridic)	Ppt: 6-12 inches Typical shrubs: <i>Wyoming big sagebrush, black sagebrush, and/or low sagebrushes</i>	WARM/DRY, LOW
Warm and Dry (Mesic/Aridic, bordering on Xeric)	Precipitation: 8-12 inches Typical shrubs: <i>Wyoming big sagebrush, black sagebrush and/or low sagebrushes</i>	WARM/DRY, LOW

Table 2 – Landfire 120 Potential Vegetation Types identified for the Greater Sage-grouse LOW Sagebrush model.

BPS Value	Landfire Potential Vegetation Type
10640	Colorado Plateau Mixed Low Sagebrush Shrubland
10650	Columbia Plateau Scabland Shrubland
10790	Great Basin Xeric Mixed Sagebrush Steppe
11240	Columbia Plateau Low Sagebrush Steppe
11262	Inter-Mountain Basins Montane Sagebrush Steppe - Low

Datasets Used in the Vegetation Analysis

From Disturbance Monitoring and Baseline Vegetation Teams (Spring 2014)

Landfire 18 Class EVT (Current) related to sagebrush systems [dataset: lf_evt_v12_sagebrush_recode]

Landfire BPS (Potential) Associated with the 18 Class EVT above [dataset: lf_bps_v12_sagebrush_recode]

Binary Landfire 18 Class informed w Dev/Ag/Fires/Conif-sage [dataset: 2010_existing_sagebrush_base]

Binary Conifer in Sage (near neighbor analysis w/ State bio acceptance) [dataset: lf_evt_v12_conifers_binary]

Data from Fire/Invasives (FIAT) Team

SSURGO Soil Temperature/Moisture Regimes (Chambers et al 2014)

[dataset: SGMZ_SSURGO_temp_moist_regimes_v2.gdb]

Additional Spatial Data

Landfire Annual Grass Only [dataset:]

Landfire EVC (Cover) associated w/ the above Landfire Binary Sagebrush Basemap [dataset: US_120_EVC]

PRISM [dataset: PRISM_ppt_30yr_normal_800mM2_annual_bil]

Management Scale Information Filters

GSG PAC Boundaries [dataset: GSGCOT_ALL_PAC_Atts_Albers_Dis_2014]

GSG Population boundaries [dataset: COT_SG_Populations_2014_WAFWA_UT]

Subregional EIS Boundaries [dataset: EISSubmittedBoundaries_mrg_dis]

State Boundaries [dataset: States5_ESRI_2008_Albers]

Surface Mgmt Boundaries (including FS Forests/Districts; BLM District/Field Offices) [dataset: SMA_Dec2013_Monitoring_AOI_cli]

BLM – Subset: Agency: BLM, DOE, DOI, OTHFE

USFS – Subset: Agency: FS, USDA

USFS – For USFS Forest Name [dataset: USFS_GRSG_FS_Boundaries_Aug262013_Dissolved]

Utah specific to inform COT PAC and COT POP [dataset: UT_AltF_VDDT]

COT Population Unit Number - (ver. 07232014) for GSG VDDT Analysis

