CHD Geospatial Model Overview

February 1, 2018

Background/Overview

The purpose of this document is to provide a high-level document that outlines (not in full detail) the structure and composition of how this REA was completed. This document serves as a 'cliff notes' version for a GIS person to re-trace steps taken by the REA contractor and reviewed by BLM. Further documentation will be released when it becomes available during a full and detailed models QC by the BLM National Operations Center (NOC) REA data team.

Note: All data, maps, and models were published using Esri's ArcGIS version 10.4.1.

This document contains bookmark headings that are accessible through the PDF tools to easily navigate through the document. These bookmarks give a good overview of the structure and components of the REA.

CHD Models Quality Control: Each model within each toolbox was delivered to the BLM from Sound Science LLC who was the primary investigator for the REA. Each model was re-sourced to data/output directories within the BLM network and re-ran by the BLM REA data team in the summer and fall of 2017. Results were compared and issues worked thru to completion. Each model within the CHD REA has been re-sourced, re-ran and results evaluated against delivered products. All models passed this review. For both BLM and external clients who plan to reuse the geospatial models and scripts within these modeling packages, know that the data, maps, and models produced within the REA (with the exception of some restricted data) are publically available through the BLM's Landscape Approach Geoportal. For questions or more information, see the contacts section of this document.

Reference

A single spatial model that generates the boundary for the Chihuahuan Desert REA Analysis Extent, including state boundaries and ten-digit hydrological units within the REA analysis extent.

Change Agents

The Chihuahuan Desert REA addresses six Change Agents. These include the four overarching Change Agents addressed by all REAs: climate change, development, invasive species, and wildfire. Wildfire *per se* is a type of natural disturbance that can affect most – if not all – of the fourteen CEs selected for the Chihuahuan Desert REA. However, alterations to the natural fire regime that result in *unusual* fire patterns do constitute a Change Agent. The present REA therefore includes "uncharacteristic wildfire" as a Change Agent. The "development" CA for the present REA includes crop production, various types of commercial and industrial development including oil and gas production, and urban and suburban growth. The two additional Change Agents addressed by the present REA concern excessive domestic

grazing and landscape restoration. Landscape restoration is not a stressor but an intentional counter-measure against some stressors that can bring about significant changes of interest to the BLM.

Change Agents

A collection of spatial models that analyzes the current development for the Chihuahuan Desert REA, extracts "developed" land cover types from forecasted (2050 & 2070) and current (2010) development rasters provided by ICLUS for the Chihuahuan Desert REA, combines fire perimeter data from multiple sources to create a "burned area" footprint (1984-2016), then uses this footprint to identify areas of the Terrestrial Ecological Systems that have been "burned" for the Chihuahuan Desert REA, identifies watersheds (HUC10) that are more susceptible to erosion by water, using Kfactor soil data from USDA-NRCS, and have high Wildfire Hazard Potential. Finally, a model creates a raster that illustrates the extent of BLM and US Forest Service grazing allotments in the Chihuahuan Desert REA.

Conservation Elements

The Chihuahuan Desert REA selected fourteen (14) Conservation Elements for assessment. These consist of three dry (terrestrial) ecological system types, five wet (aquatic-wetland) ecological system types, four individual species, and two assemblages of species of management concern associated with terrestrial ecological systems. One of the aquatic-wetland CEs, “Playas and Playa Lakes,” has both wet (inundated) and dry phases, and thus shares features with both wet and dry system types.

Terrestrial Ecological System

A collection of spatial models that analyze the current distribution of Terrestrial Ecological Systems using National GAP Land Cover Data and assesses the current & historic distribution of these Systems using LANDFIRE Data, that summarizes the distribution of the Grassland Bird Assemblage for the Chihuahuan Desert REA, that calculates the distribution of the Grassland Small Mammal Assemblage for the Chihuahuan Desert REA, identifies areas of potential Black-tailed Prairie Dog habitat for restoration for the Chihuahuan Desert REA, and estimates the current distribution of Banner-tailed Kangaroo Rat, Mule Deer, and Pronghorn in the Chihuahuan Desert REA.

Aquatic-Wetland Ecological System

A group of spatial models that combines National Hydrography Datasets (flowlines and waterbodies) for NM and TX and extracts data for the Chihuahuan Desert REA Analysis Extent, calculates the current distribution of Large River-Floodplain Systems for the Chihuahuan Desert REA, assesses the current distribution of Lowland- and Montane-Headwater Stream Systems for the Chihuahuan Desert REA, analyzes the current distribution of Playa and Playa Lakes for the Chihuahuan Desert REA, estimates the current distribution of Springs and Emergent Wetlands for the Chihuahuan Desert REA, evaluates the current distribution of Springs and Emergent Wetlands for the Chihuahuan Desert REA, and determines the distribution of mountain and riparian recharge zones for the Chihuahuan Desert REA.

Attribute Indicators

A series of spatial models that estimates the distribution of a Chihuahuan Desert amphibian assemblage, compares the historic and current distribution of native fish assemblages, calculates the distribution of

gypsum impacts, and assesses the species richness in the AZ & NM portion of the Chihuahuan Desert REA Analysis Extent. Select species include Terrestrial Species, grassland birds, grassland small mammals, and amphibians.

Table 1. CHD 2012 Management Questions

MQ #	Question	CE(s)	CA(s)
A	What is the geographic distribution of each CE?	All	n/a
B	What is the current condition of each CE across its geographic distribution?	All	n/a
C	What is the current geographic distribution of the impacts of each CA, both general and in relation to each CE?	All	All except Climate Change, for which "current distribution" is the baseline for MQ #D.
D	What are the forecasted geographic distributions of development and climate change impacts in relation to each CE?	All	Climate Change, Development
1	Where have restoration treatments been applied to dry-system CEs, and what is the status (e.g., success rate) of those treatments?	All Dry-System CEs	Landscape Restoration
2	What is the geographic distribution of the Chihuahuan desert amphibian assemblage?	All Dry- and Wet-System CEs	n/a
3	Where would uncharacteristic wildfire likely increase sedimentation and loss of habitat among wet systems?	All Wet Systems	Uncharacteristic Wildfire
4	What areas of potential black-tailed prairie dog habitat would support restoration?	Black-tailed Prairie Dog	Landscape Restoration
5	Where are the areas if greatest faunal species biodiversity among the species and species assemblage CEs taken together?	All Species and Species Assemblage CEs	n/a
6	Where will urban and industrial growth impact intact grasslands or impede their recovery?	Chihuahuan Desert Grasslands CE	Development, Landscape Restoration
7	How do the current and historic geographic distributions of the dry-system CEs differ?	All Dry-System CEs	n/a
8	How will urban and industrial growth alter the geographic distribution of the grassland bird assemblage?	Grassland Bird Assemblage CE	Development
9	What and where are the aquifers and their recharge zones that support the wet systems?	All Wet-System CEs	Development
10	How do the current and historic geographic distributions of the Pecos River and Gila River fish assemblages differ?	All Wet-System CEs except Playas	n/a
11	Where are the breeding, winter, and year-around habitats for pronghorn and mule deer?	Pronghorn; Mule Deer	n/a

12	Are there areas where invasive plants are being killed on a broad scale (e.g., by tamarisk leaf-eating beetle) where managers need to focus on restoration or controlling succession?	All Wet-System CEs	Invasive Species, Landscape Restoration
13	What is the current geographic distribution of the impacts of gypsum in the soil and water, in general and in relation to each CE and CA?	All	All except Climate Change

Contacts:

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