Environmental Data Products

Users' Manual

December, 2014

155 North 400 West, Suite 200

Salt Lake City, Utah 84103-1114

Contents

1. Overview of Manual Contents

The Western Electricity Coordinating Council (WECC), through the work of its Environmental Data Task Force (EDTF), has developed a number of data products that are available for use in transmission planning. This document (referred to here as the "Manual") describes two of WECC's primary environmental data products:

1. The **Environmental Risk Classification Data Layer** (referred to here as the "Environmental Data Layer") is a geospatial representation of planning-level risks to the development and expansion of the Western Interconnection electrical network[1] based on environmental features of the landscape. This Manual details the process used to create the Environmental Data Layer, its potential uses and limitations, and recent and planned updates.
2. The **Environmental Data Viewer v2.0** (referred to here as the "Environmental Data Viewer") allows interested publics to access and interact with this data through an Internet browser. Proceeding sections of this Manual describe the contents of the Environmental Data Viewer.

Click here to access the WECC Environmental Data Viewer and the Environmental Data Layer.

For the convenience of stakeholders interested in downloading and using the Environmental Data Layer directly in their own geographic information system (GIS) software, this Manual also provides suggestions on understanding and working with the Environmental Data Layer.

Several detailed attachments appended to this Manual provide background information on the development of WECC's environmental data products:

- **Attachment A – Preferred Data Set Inventory** lists the various discrete data sources from which the Area Types and Environmental Data Layer were assembled. The list of Preferred Data is a subset of all the environmental data reviewed by WECC during the process of identifying the most appropriate data to inform regional transmission planning. For a complete list of all environmental data reviewed by WECC, please see the *Data Inventory Spreadsheet* available on WECC's website.
- **Attachment B – Methodology for Assembling the Environmental Data Layer** describes the geoprocessing procedures used to create the Environmental Data Layer.
- **Attachment C – Environmental and Cultural Area Type Summary** describes the discrete Area Types that comprise the Environmental Data Layer.

[1] The Western Interconnection is one of two major alternative current power grids in North America. It encompasses a geographic area that extends from Canada to Mexico and includes the provinces of Alberta and British Columbia, the northern portion of Baja California, Mexico, and all or portions of the 14 western states between. Please see the WECC Transmission Planning documents for additional information.

- **Attachment D – Environmental Data Viewer v2.0: Quick Start Guide** provides instructions to acquaint users with the application's functions and capabilities.
- **Attachment E – Cultural Resources Data Analysis Approach** explains the process currently under review by WECC to represent risk to transmission development from cultural features on the landscape using data from State Historic Preservation Offices and federal agencies.
- **Attachment F – Ocean and Coastal Data and Area Types** provides a list of environmental features WECC recommends for assessing planning level risk to subsea electrical cable development (*NOTE: Attachment E is anticipated for release in early 2015, pending approval by the Scenario Planning Steering Group*).

This Manual is subject to revision as WECC identifies new Preferred Data Sets and refines Area Type risk classifications.

2. Role of the Environmental Data Task Force

WECC's Scenario Planning Steering Group (SPSG) formed the EDTF in June 2010 to develop recommendations on the type, quality, and sources of data on land, wildlife, cultural, historical, archaeological, and water resources (i.e., environmental resources), and exploring ways to synthesize and incorporate that data into WECC's study cases and 10-year and long-term planning models. The EDTF provides recommendations to the SPSG for their review and consideration.

The EDTF's work benefits WECC and its stakeholders in the identification and use of environmental and cultural data in the following ways:

- WECC's preferred environmental data sets (referred to here as "Preferred Data Sets") provide access to current (updated on a biennial basis) data for use in planning.
- WECC applies a classification system to the Preferred Data Sets to create an Environmental Data Layer for the Western Interconnection, which identifies planning-level risks to the development of the Western Interconnection electrical network based on environmental features of the landscape.

These data products facilitate knowledge transfer within planning organizations and are currently in use within WECC and outside of WECC by industry, regulators, and other stakeholders. The Environmental Data Layer is available to view and download from the Environmental Data Viewer.

3. Environmental Risk Classification Data Layer

The Environmental Data Layer is a single GIS layer that identifies planning-level risk to transmission development based on environmental sensitivities and constraints, as defined by four risk categories:

Category 1 **Least Risk of Environmental or Cultural Resource Sensitivities and Constraints:** Areas with minimal identified environmental or cultural resource constraints and/or with existing land uses or designations that are compatible with or encourage transmission development. These areas would present few or minimal environmental and cultural mitigation requirements and are least likely to result in project delays.

Category 2 **Low to Moderate Risk of Environmental or Cultural Resource Sensitivities and Constraints:** Areas where development may encounter one or more environmental or cultural resource sensitivity areas or constraints that would require low to moderate permit complexity or mitigation costs. This category also includes areas in the Protected Areas Database of the United States (PAD-US) dataset that have an unknown land use designation or degree of restriction to transmission development.

Category 3 **High Risk of Environmental or Cultural Resource Sensitivities and Constraints:** Transmission development is likely to encounter one or more environmental or cultural resource sensitivities or constraints that would substantially increase permitting complexity and could result in project delays and high mitigation costs.

Category 4 **Areas Presently Precluded by Law or Regulation:** Areas where transmission development is presently precluded by federal, state, or provincial law, policy, or regulation, as well as areas where development would represent a "fatal flaw" likely to preclude successful project completion (e.g., identified Native American Traditional Cultural Properties and sacred sites).

Development of the Environmental Data Layer

Development of the Environmental Data Layer began with the identification, acquisition, and review of environmental geospatial data sets published by governmental, non-governmental, and proprietary entities and covering various geographies within the Western Interconnection. Preferred Data Sets, those data sets that were deemed suitable for use in landscape-scale transmission planning through a WECC review process, were then geoprocessed using ESRI ArcGIS software to create unique "Area Types." Area Types represent discrete lands with similar environmental features and risk classifications. **Attachment A** and **Attachment C** contain complete lists of Preferred Data Sets and Area Types, respectively. **Attachment B** summarizes the geoprocessing steps used to transform the Preferred Data Sets into Area Types that may be viewed/downloaded as GIS data.

The complete assemblage of Area Types was grouped to form a single layer for each of the four risk categories. These four layers were then overlaid to form a single Environmental Data Layer for the Western Interconnection. **Figure 1** provides a graphic representation of the Environmental Data Layer development process.

Because the Environmental Data Layer is built from multiple GIS data sets, many locations across the Western Interconnection are overlapped by two or more data sets that represent different Area Types. In these areas of overlap, the Area Type with the highest risk category supersedes the lower risk category. The exception to this rule is that the two Risk Category 1 Area Types, which represent transmission rights-of-way/corridors (i.e., Areas Following Existing Linear Corridor and Designated Federal Energy Corridors), supersede risk categories 2 and 3. **Figure 2** contains an illustrative example of how overlapping Area Types are processed in the Environmental Data Layer. In this example, a Wilderness Area polygon (Risk Category 4) in one Area Type overlaps polygons representing Critical Habitat (Risk Category 3) and National Historic Trail (Risk Category 2) Area Types; therefore, the output for the Environmental Data Layer will represent the area of overlap as Risk Category 4, Wilderness Area. Similarly, the area of overlap between the Critical Habitat polygon and the National Historic Trail polygon will be represented as Risk Category 3, Critical Habitat. Note that the polygon representing a Designated Federal Energy Corridor (Risk Category 1) supersedes risk categories 2 and 3, but not risk Risk Category 4.

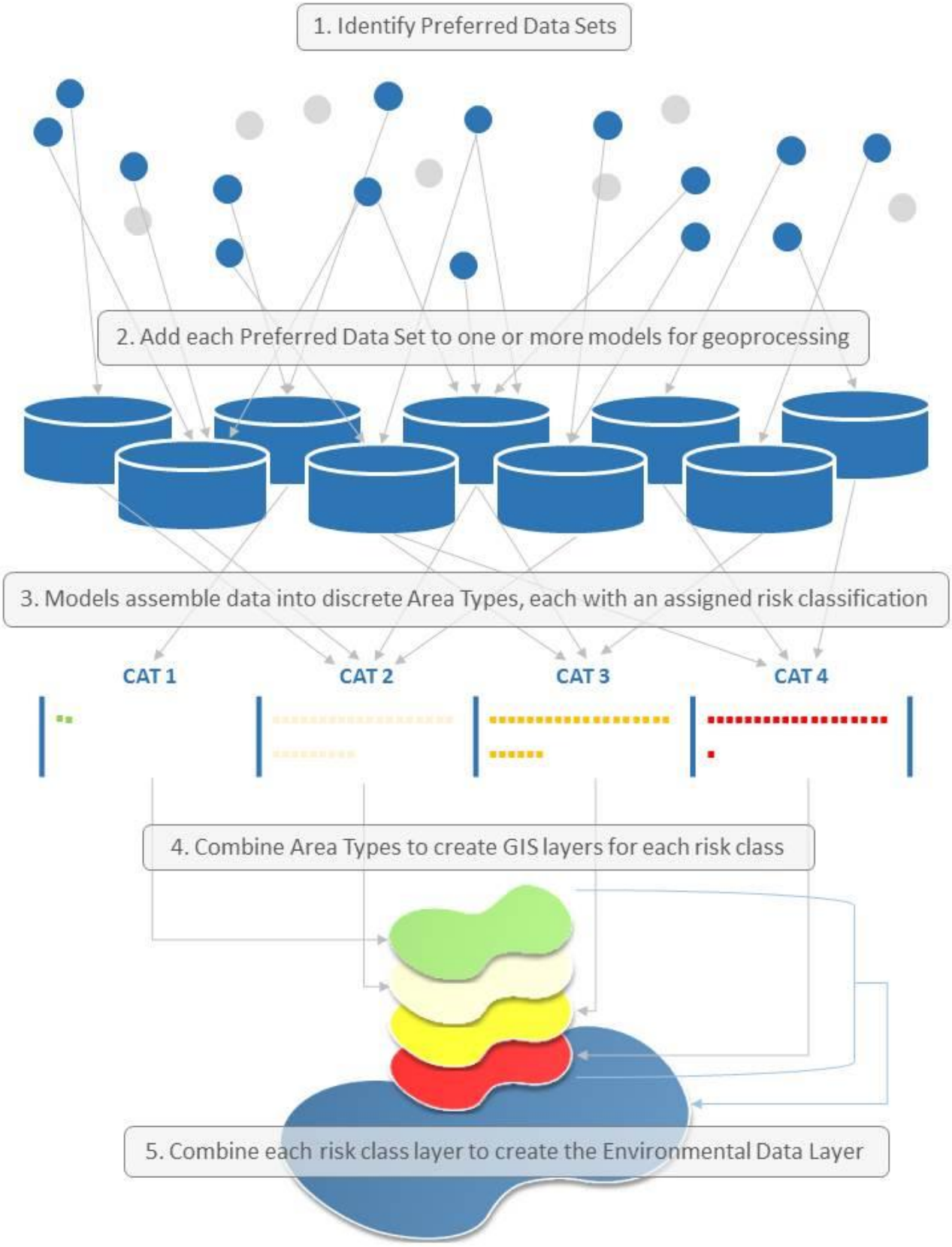


Figure 1. Environmental Data Layer Development Process

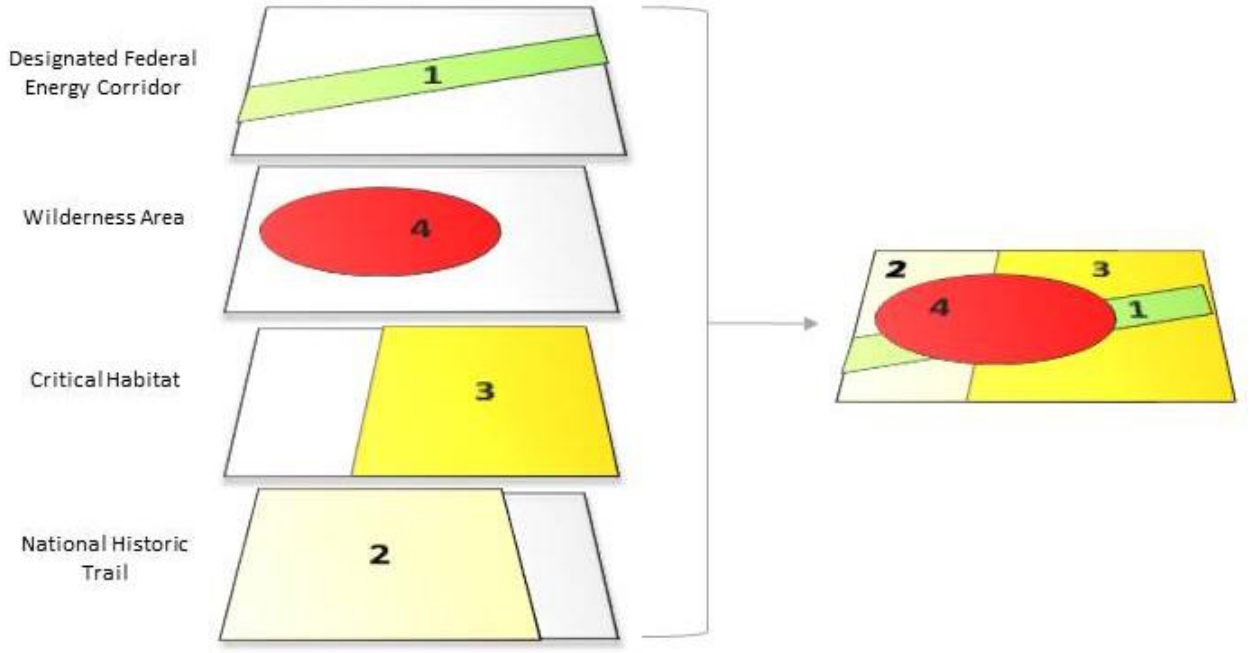


Figure 2. Identifying Risk Classification Category for overlapping polygons

In addition to the complete ranked (overlapped) information, the Environmental Data Layer allows a user to explore the pre-overlap risk category (1, 2, 3, and 4) for any given parcel of land. Using this feature of the data layer, stakeholders can explore all the different Area Types that overlay a given location.

The Environmental Data Layer is updated on a biennial basis. The biennial process involves updates to existing Preferred Data Sets, the incorporation of new Area Types and new data as preferred, and the removal of Area Types and data that are no longer suitable for use in light of changing regulatory or resource conditions.

Potential Uses of the Environmental Data Layer

The Environmental Data Layer, contributing source data sets, and analysis methods described in this Manual may be used in various capacities, and by various users, throughout the regional transmission expansion planning process. In particular, the following three types of applications are anticipated or have already been attempted.

Input to WECC's Long Term Planning Tools

A version of the Environmental Data Layer, and its contributing source data files, was used in WECC's Long Term Planning Tool (LTPT). Geospatial data are one of several types of information that serve as input to that tool. Please see the *EDTF Input for 2013 Transmission Plan* document located here for additional information on how the environmental data has been considered in the LTPT.

Input to the EDTF's Comparison Process

The EDTF has developed a *Process for Using Environmental and Cultural Information to Compare Transmission Alternatives* (referred to as the "Comparison Process") to inform decision-makers of the relative environmental and cultural risks of transmissions alternatives. The Comparison Process is based on three criteria: (1) an environmental risk score, (2) stakeholder involvement, and (3) alternative description. The "environmental risk score" for each transmission alternative may be calculated using the Environmental Data Layer to evaluate the miles of each risk category crossed by transmission alternatives and/or the proportion of the alternatives that crosses Area Types within each risk category.

Use by Non-WECC Organizations

It is possible that the Environmental Data Layer and associated risk classification system, Preferred Data Sets, and the analysis methods described in this document may be useful for organizations outside of WECC (e.g., government agencies, non-governmental organizations, and project proponents such as utility companies and transmission developers). These parties may find value in the following:

- **Attachment A** of this Manual contains a complete list of the EDTF-developed Area Types. A stakeholder-approved land classification system reduces ambiguity and guesswork on the part of the transmission project sponsors and other organizations interested in evaluating projects at early stages of development (i.e., pre-siting level of analysis).
- **Attachment C** of this Manual contains a complete list of the Preferred Data Sets. Though subject to change over time as new data become available, these data sets have all undergone a stakeholder-driven screening process and may provide a valuable resource to organizations interested in identifying data for planning-level reviews of transmission alternatives and facilities.

Limitations of the Environmental Data Layer

The Environmental Data Layer represents WECC's best available information on environmental risks to siting transmission. Although every effort was made to ensure consistency and accuracy of the information, the Environmental Data Layer contains a number of placeholders and unresolved issues that WECC may attempt to address in future versions. The major unresolved issues are described below.

Risk Category 2/3 – Native Land Allotments and American Indian/Native American Reservations

To date, WECC has received limited input from U.S. tribes on the appropriate risk categories to assign to reservations and other tribal territories. WECC has classified these areas as Risk Category 2 or 3 pending confirmation from these governments; however, because the Environmental Data Layer

requires a discrete risk classification, these areas are represented as Risk Category 2 in data available through the Environmental Data Viewer. WECC is committed to continuing outreach to tribal governments to clarify the appropriate categorization of their lands.

Canadian Lands

WECC has limited information regarding environmental and cultural sensitivities in portions of Canada. To avoid over- or under-representing the risk associated with areas where no environmental or cultural data is available, these areas have not been assigned a risk category value in the Environmental Data Layer. WECC continues to work with its Canadian members and stakeholders, including the First Nations, to address these data gaps and assign appropriate risk categories to currently unassigned lands areas.

Cultural Data

While WECC has been successful in identifying and classifying risk for certain nationally-designated features that represent cultural resources (e.g., certain National Monuments), they have not succeeded to date in developing a single Environmental Data Layer that incorporates the risk from environmental features with the risk from cultural resource site locations available in State Historic Preservation Offices and federal agency databases. To address this issue, WECC has developed a separate, distinct system for addressing risk to transmission development from cultural sites. **Attachment E** describes that system.

Section 368 Corridors

Section 368 Corridors were designated in the 2005 Energy Policy Act to help identify suitable locations for energy facility development on federal lands across the western U.S. While WECC included these corridors as the lowest risk (Category 1) Area Types in previous versions of the Environmental Data Layer, a recent lawsuit from environmental groups and resulting settlement means that some of these corridors may change. Pending publication of a revised Section 368 Corridor GIS layer from the U.S. federal government, corridors that were remanded for additional review in the settlement agreement have been removed from the Environmental Data Layer.

Visual Resource Data

WECC and the EDTF continue to explore methods to include visual sensitivity (visual resources) in the Environmental Data Layer. WECC will continue ongoing coordination with the Bureau of Land Management and other land management agencies to create a comprehensive data set that may address this issue.

Planning versus Siting Level Data

The data sets identified in the Data Inventory Spreadsheet that were used to construct the Environmental Data Layer were evaluated for their usefulness in the Regional Transmission Expansion Planning process; siting level analyses, while they may employ some of the same data sets, will also use other, project-level data sets more appropriate to such analyses. Even data that is used in both the Regional Transmission Expansion Planning and siting level analyses will require additional review and consideration. For example, while both WECC and a siting level analysis may use data from the National Conservation Easement Database, their interpretation of that data may differ. In the Environmental Data Layer, conservation easements have been classified as either Risk Category 2 or 3, indicating a high to moderate risk to transmission. However, transmission developers may find during the siting process that development is precluded on some conservation easements. Because of the scale at which the Regional Transmission Expansion Planning process operates, it is not possible or appropriate to determine where these precluded conservation easements may occur.

Future Updates and Improvements to the Environmental Data Layer

Data is dynamic; therefore, ongoing updates and refinements to the Preferred Data Sets listed in **Attachment C** are necessary to ensure the best available information is used. To maintain this data inventory, an *Environmental Data Update and Review Process* document listing an ongoing protocol to review and validate data sets has been developed and implemented to collect new and updated data from transmission stakeholders during a biennial data "open season."

WECC is committed to refining the risk classification system based on emerging issues, changing circumstances, and stakeholder-recommended updates to the environmental and cultural data set catalog.

Updates to the Environmental Data Layer during the 2013-2014 Review Cycle

Based on information received from stakeholders and members of the EDTF, WECC made several revisions to the Environmental Data Layer during the 2013-2014 data collection open season and biennial update process. Of the more than 60 GIS models used to create the layer, 29 were updated due to new and revised Preferred Data Sets. In addition, WECC added several new GIS models in 2014 as a result of new Area Types approved by the SPSG in 2013 and 2014. In addition to routine updates to individual Preferred Data Sets, the primary substantive changes to the 2014 Environmental Data Layer were:

- **Revised –** WECC refined classification of some environmental features in Canada, based on reviews by Canadian stakeholder in 2013 and 2014.
- **Revised –** WECC revised its GIS modeling approach so that in areas where Risk Category 4 Area Types intersect Risk Category 1 Area Types, the area would be classified as Risk Category 4. This

change was made based on stakeholder feedback that placing new transmission in an existing linear right-of-way in a Risk Category 4 Area Type could be as difficult as developing a new right-of-way. Previously, Risk Category 1 Area Types overrode all other risk categories.

- **New Area Types –** WECC worked with the Bureau of Land Management to collect data on right-of-way management on Bureau of Land Management lands; these data were used to create several new Area Types that better reflect restrictions and opportunities for transmission.
- **New Area Types –** WECC created new Area Types for State Scenic Highways/Byways and Railroads.

WECC completed the 2014 Environmental Data Layer in June 2014.

4. WECC Environmental Data Viewer v2.0

In 2013, WECC and its stakeholders identified an interest in making the Environmental Data Layer and other data products more widely accessible; in response, WECC developed its Environmental Data Viewer. Prior to the publication of the Environmental Data Viewer, WECC stakeholders identified several barriers to the use of WECC's data products, including the cost associated with individually downloading and processing the data sets that make up the EDTF's Preferred Data Sets to create their own version of the Environmental Data Layer, as well as the variation in versions of the data layers built by individual stakeholders. The WECC Environmental Data Viewer tool solves these issues by providing stakeholders a single, easily accessible location to view and download the Environmental Data Layer.

Application Data Contents

The Environmental Data Viewer displays the following content:

Environmental Data Layer	A single data layer that compiles Risk Categories 1, 2, 3, and 4 (with the most restrictive risk category visible in areas where Categories overlap, with the exception of Risk Category 1) for the Western Interconnection.
Basemaps	Options to display a variety of basemaps, such as aerial imagery, topography, and street maps.
Informational Layers (data publisher)	A selection of data layers intended to compliment and provide additional context for the Environmental Data Layer: • Highways (ESRI) • Railroads (ESRI) • Section 368 West-wide Energy Corridors (Bureau of Land Management) • Existing Transmission Facilities (Platts, a division of McGraw Hill Financial) • Wildlife Species Conservation Status or Federal Listing Status (NatureServe) • Jurisdictional Land Ownership (United States Geological Survey) • Crucial Habitat Rank (Western Governors' Association) • *ANTICIPATED IN 2015* - Ocean and Coastal Environmental Data Layer (WECC)
Hyperlinks	Hyperlinks to related WECC and EDTF Products: • Download site for both the complete Environmental Data Layer and individual Risk Category 1, 2, 3, and 4 data layers • Links to the *WECC Environmental Data Viewer v2.0: Quick Start Guide* • EDTF foundational documents, including the *Data Quality Protocol*

Note: Individual Preferred Data Sets used to develop the Environmental Data Layer are not available for viewing or download directly from the application.

Using the Environmental Data Viewer

The Environmental Data Viewer provides a basic user interface accessible to anyone with an Internet connection and a supported browser. **Attachment D - WECC Environmental Data Viewer v2.0: Quick Start Guide** provides a simple how-to guide for using its functions and capabilities.

Notes for Using the Environmental Data Layer GIS Data on Your Own Machine

The following sections contain tips for users who choose to download and use the Environmental Data Layer directly in their own GIS system software.

Understanding the Environmental Data Layer Structure

The Environmental Data Layer is structured to allow users to view the attributes associated with a selected polygon. The data contains multiple attribute columns named "CAT1", "CAT2", "CAT3", and "CAT4" which reflect the four risk categories (e.g., CAT1 = Risk Category 1). If an attribute (Area Type) appears in a particular column, then the attribute has that risk category. For example, if the column starts with "CAT3" then the risk category associated with that attribute is Risk Category 3. In addition, the data contains a column "Risk_Class" that identifies the risk category for a particular polygon and a "CBITYPE" column that identifies the original land description for the area from the Conservation Biology Institute's Protected Area Database (CBI-PAD), a seamless land classification data set that covers the entire U.S.

In areas of overlap, the hierarchy of the four Risk Categories are displayed as follows:

- A value of Risk Category 3 over-rides a value of Risk Category 2
- A value of Risk Category 1 over-rides a value of Risk Category 3 or a value of Risk Category 2
- A value of Risk Category 4 over-rides all other values

The Environmental Data Layer contains all attributes used to develop the final ranked risk coverage, including those lower risk categories that are superseded by an overlapping higher risk category. Using the data layer, users can therefore select a polygon and identify all Risk Category attributes and all potential Area Types for that location.

Attachment A - Preferred Data Set Inventory
WECC Environmental Data Task Force
December 22, 2014

Attachment A summarizes information from the Preferred Data tab of the Data Inventory Spreadsheet. Data layers were generally identified as "preferred" if they met the criteria described in the Data Quality Protocol and they were considered relevant to regional transmission planning. For a complete list of data layers reviewed by WECC, including those not determined to be preferred, and details on the results of the Data Quality Protocol reviews, please see refer to the Data Inventory Spreadsheet.

The *Data Quality Protocol: Identification of Preferred Geospatial Data Sets* contains the data quality standards against which data layers were measured.

The table below includes the following information about each preferred data layer: the data publisher and their organization types (e.g., Non-governmental organization, Federal Agency, Private Entity), the data layer's name, and the URL location where the data can be found.

The Preferred Data Layers were used to make each of these Area Types listed in **Attachment C** mappable, thus allowing their inclusion in the Environmental Data Layer. See **Attachment B - Methodology for Assembling the Environmental Data Layer** for information on how the Preferred Data Layers were used to create the Environmental Data Layer.

Data ID	Publication Type	Location	Publisher	Data Name	DatabURL	File Name
0001	Federal	USA	National Park Service	NPS boundaries - National Historic Trails	http://www.arcgis.com/home/search.html?q=owner%3ANPSGIS&focus=maps	Due to a confidentiality agreement with NPS the shapefile names are not listed
0008	Federal	USA	Federal Emergency Management Agency	National Flood Hazard Layer Database	https://hazards.fema.gov/femaportal/NFHL/	S_Fld_Haz_Ar
0013	Federal	USA	United States Census Bureau	2010 Census Urban Areas Boundary	http://www.census.gov/geo/www/cob/ua_metadata.html - meta	cb_2012_us_uac10_500k
0016	Federal	USA	United States Geological Survey	Gap Analysis Program - Land Cover Data v2.2	http://gapanalysis.usgs.gov/gaplandcover/data/download/	gaplc_nwest, gaplc_swest
0024	State/Province	AZ	Bureau of Land Management	Lake Havasu Field Office Wildlife Corridors	http://www.blm.gov/az/st/en/prog/maps/gis_files.html	wildlife_corridors.shp
0040	State/Province	AZ	Arizona Game and Fish Department	Species and Habitat Conservation Guide	http://habimap.org/	finmisk_shcg
0056	State/Province	CA	California Department of Fish and Game	Central Valley Wetland and Riparian Areas	ftp://ftp.dfg.ca.gov/BDB/GIS/Wetlands/Central_Valley_Wetlands_and_Riparian_GIS/	amer5ac_p; butte5ac_p; col5ac_p; delta5ac_p; sanjoa5ac_p; sfbay5ac_p; suisun5ac_p; sut5ac_p; yolo5ac_p
0073	State/Province	CA	Renewable Energy Transmission Initiative	Desert Wildlife Management Areas in California Desert Conservation Area	http://www.energy.ca.gov/reti/documents/index.html	dwma_cdca
0090	State/Province	CA	California Department of Fish and Game	Statewide rare species richness/Statewide rarity-weighted richness	http://imaps.dfg.ca.gov/maps/ace/	RareSpRich_RWI_ACEII
0098	State/Province	CO	Colorado Division of Wildlife	Species Activitiy Data: Severe Winter Range, Winter Concentration, Winter Range, Migration Patters, and Migration Corrid	http://www.arcgis.com/home/group.html?owner=rsacco&title=Colorado%20Parks%20and%20Wildlife%20-%20Species%20Activity%20Data	CPW-Species Activity Data; various individual shapefile names
0118	State/Province	ID	Bureau of Land Management	Greater Sage-grouse Preliminary Priority Habitat	http://www.insideidaho.org/	WLDLFE_SageGrouseIdahoPPH_PUB_100K_POLY_2011
0119	State/Province	ID	Bureau of Land Management	Greater Sage-grouse Preliminary General Habitat	http://www.insideidaho.org/	WLDLFE_SageGrouseIdahoPGH_PUB_100K_POLY_2012
0122	State/Province	CO, NM	Kansas Biological Survey and Playa Lake Joint Venture	Lesser Prairie Chicken Crucial Habitat	http://www.kars.ku.edu/maps/sgpchat/	sgpchat_crucial_habitat_110813
0143	State/Province	MT	Montana Dept of Fish Wildlife and Parks: Crucial Areas Planning System (CAPS)	Big Game Winter Range Habitat	http://fwp.mt.gov/fishAndWildlife/conservationInAction/crucialAreas.html	terrestrialValues.shp
0144	State/Province	MT	Montana Dept of Fish Wildlife and Parks: Crucial Areas Planning System (CAPS)	Bighorn Sheep & Mountain Goat Habitat	http://fwp.mt.gov/fishAndWildlife/conservationInAction/crucialAreas.html	terrestrialValues.shp
0145	State/Province	MT	Montana Dept of Fish Wildlife and Parks: Crucial Areas Planning System (CAPS)	Forest Carnivore Habitat	http://fwp.mt.gov/fishAndWildlife/conservationInAction/crucialAreas.html	terrestrialValues.shp
0146	State/Province	MT	Montana Dept of Fish Wildlife and Parks: Crucial Areas Planning System (CAPS)	Prairie Grouse Habitat	http://fwp.mt.gov/fishAndWildlife/conservationInAction/crucialAreas.html	terrestrialValues.shp
0149	State/Province	MT	Montana Dept of Fish Wildlife and Parks: Crucial Areas Planning System (CAPS)	Wetland Areas	http://fwp.mt.gov/fishAndWildlife/conservationInAction/crucialAreas.html	terrestrialValues.shp
0161	State/Province	NM	New Mexico Department of Game and Fish	Big Game Priority Habitat		CHATsubmit20130612

Data ID	Publication Type	Location	Publisher	Data Name	DatabURL	File Name
0181	State/Province	OR	Oregon Department of Fish and Wildlife	Elk and Deer Winter Range	http://rainbow.dfw.state.or.us/nrimp/default.aspx?pn=dataresources	eor_deerwrodfw2009_2012; eor_elkwrodfw2009_2012
0192	State/Province	OR	Bureau of Land Management	Greater Sage-Grouse Preliminary General and Priority Habitats	http://www.blm.gov/wo/st/en/prog/more/sagegrouse/documents_and_resources.html	or_sg_pph_pgh_plus_COH2006
0251	State/Province	WA	Wildlife Habitat Connectivity Working Group	Landscape Integrity, Columbia Plateau Ecoregion	http://databasin.org/datasets/1a09c9be2b664d89b6d134386d394b47	LI_core_areas
0255	State/Province	WY	Wyoming Game and Fish	Big Game Crucial Habitat	http://wgfd.wyo.gov/web2011/wildlife-1000819.aspx	ant12cr; bhs1cr; elk1cr; mdr1cr; wtd12cr
0256	State/Province	WY	Wyoming Game and Fish	Big Game Migration Routes/Corridors	ftp://gf.state.wy.us/	ant12mc_draft; bhs12mc_draft; elk12mc_draft; mdr12mc_dra; wtd12mc_draft
0258	State/Province	WY	Wyoming Game and Fish	Sage Grouse Core Manaegment Areas, Version 3	https://wgfd.wyo.gov/web2011/wildlife-1000382.aspx	coreareas_v3_062910
0260	State/Province	WY	Wyoming Game and Fish	General Sage Grouse Habitat	https://wgfd.wyo.gov/web2011/wildlife-1000382.aspx	WYSagegrouse_currentdistribution
0276	State/Province	AB	AltaLIS	Eastern Slopes Land Use Zoning	http://www.altalis.com/products/base/alberta_boundary_data.html	BF_EASTRN_SLPS_LUZ_POLYGON
0277	State/Province	AB	AltaLIS	Ecological Reserves	http://www.altalis.com/products/base/alberta_boundary_data.html	BF_ECO_RESERVE_POLYGON
0278	State/Province	AB	AltaLIS	Heritage Rangelands	http://www.altalis.com/products/base/alberta_boundary_data.html	BF_HERITAGE_RGELAND_POLYGON
0279	State/Province	AB	AltaLIS	Natural Areas	http://www.altalis.com/products/base/alberta_boundary_data.html	BF_NATURAL_AREA_POLYGON
0280	State/Province	AB	AltaLIS	Provincial Parks	http://www.altalis.com/products/base/alberta_boundary_data.html	BF_PROVINCIAL_PARK_POLYGON
0281	State/Province	AB	AltaLIS	Provincial Recreation Area	http://www.altalis.com/products/base/alberta_boundary_data.html	BF_PRA_POLYGON
0283	State/Province	AB	AltaLIS	Wilderness Areas	http://www.altalis.com/products/base/alberta_boundary_data.html	BF_WILDERNESS_AREA_POLYGON
0284	State/Province	AB	AltaLIS	Wildlands Parks	http://www.altalis.com/products/base/alberta_boundary_data.html	BF_WILDLAND_PARK_POLYGON
0285	State/Province	AB	AltaLIS	Willmore Wilderness Park	http://www.altalis.com/products/base/alberta_boundary_data.html	BF_WILDERNESS_PARK_POLYGON
0298	State/Province	BC	Ministry of Forests, Lands and Natural Resource Operations	Parks, Ecological Reserves, and Protected Areas	https://apps.gov.bc.ca/pub/geometadata/metadataDetail.do?recordUID=54259&recordSet=ISO19115	TA_PEP_SVW_polygon
0482	Private Entity	USA	Platts, a division of McGraw Hill Financial	Transmission Line Data	http://www.platts.com/Products/gisdata	

Data ID	Publication Type	Location	Publisher	Data Name	DatabURL	File Name
0301	State/Province	BC	Ministry of Forests, Lands and Natural Resource Operations	Conservancy Areas	https://apps.gov.bc.ca/pub/geometadata/metadataDetail.do?from=search&edit=true&showall=showall&recordSet=ISO19115&recordUID=54219	TA_CA_SVW_polygon
0305	State/Province	BC	Ministry of Environment, Ecosystems Branch	Endangered Species and Ecosystems Masked Sensitive Occurrences	https://apps.gov.bc.ca/pub/geometadata/metadataDetail.do?recordUID=34351&recordSet=ISO19115	BIOT_MS_SP_polygon.shp
0306	State/Province	BC	Ministry of Forests, Lands and Natural Resource Operations, Resource Management Objectives Branch	Old growth Management Areas	https://apps.gov.bc.ca/pub/geometadata/metadataDetail.do?recordUID=51680&recordSet=ISO19115	OGMA_LEG_C.shp
0307	State/Province	BC	Ministry of Environment, Knowledge Management Branch	Ungulate Winter Range	https://apps.gov.bc.ca/pub/geometadata/metadataDetail.do?from=search&edit=true&showall=showall&recordSet=ISO19115&recordUID=36173	WCP_UWR_SP_polygon
0308	State/Province	BC	Ministry of Forests, Lands and Natural Resource Operations	Wildlife Management Areas	https://apps.gov.bc.ca/pub/geometadata/metadataDetail.do?recordUID=54319&recordSet=ISO19115	TA_WMA_SVW_polygon
0318	Non-Governmental Organization	USA	NatureServe	Landscape Conditions	http://www.natureserve.org/getData/customData.jsp	l48_con100wt
0319	Non-Governmental Organization	USA	NatureServe	National Heritage Program Species Occurrence Data, Multi-Jurisdictional Database of Species Occurrence	http://www.natureserve.org/getData/customData.jsp	nsfed_new; nsg1g2_new; nsg3_new
0359	Federal	CAN	Natural Resources Canada - Geogratis	Agricultural Land	http://www.geobase.ca/geobase/en/data/landcover/index.html;jsessionid=670BB8ADBF8F9F32F1EF43962CDA9B1A.geobase1	bcab
0360	State/Province	NV	Nevada Department of Wildlife	Greater Sage-Grouse Habitat Categorization	http://www.ndow.org/Nevada_Wildlife/Sage_Grouse/	SageGrouse_HabitatCategorization_12132012
0368	Federal	USA	Natural Resources Conservation Service	Easements	http://datagateway.nrcs.usda.gov/	easement_a_extract
0434	Federal	USA	United States Fish and Wildlife Service	Critical Habitat for Threatened and Endangered Species Composite Layer	http://criticalhabitat.fws.gov/	CRITHAB_EXPORT_LINE; CRITHAB_EXPORT_POLY
0330	Federal	USA	United States Geological Survey	Wild and Scenic Rivers	http://www.rivers.gov/mapping-gis.php	Master_Conus_WSR2009_Oct20
0480	Private Entity	USA	Vendor	USA Major Highways		highways.sdc
0481	Private Entity	USA	Vendor	Railroads		railroads.sdc
0490	Federal	USA	United States Fish and Wildlife Service	National Wetlands Inventory	http://www.fws.gov/wetlands/Data/State-Downloads.html	CONUS_wet_poly
0541	Federal	USA	United States Forest Service	National Inventoried Roadless Areas	http://corridoreis.anl.gov/eis/fmap/arcreader/index.cfm	land_restriction_area_roadless_area
0566	State/Province	AB	AltaLIS	Rocky Mountain Forest Reserve	http://www.altalis.com/products/base/alberta_boundary_data.html	BF_ROCKY_MTN_FOR_POLYGON

Data ID	Publication Type	Location	Publisher	Data Name	DatabURL	File Name
0570	Non-Governmental Organization	USA	National Conservation Easement Database	Conservation Easements	http://nced.conservationregistry.org/login	NCED_Complete_09032013
0571	State/Province	CO	Colorado Division of Wildlife	Greater sage-grouse, Preliminary Priority Habitat (PPH), Preliminary General Habitat (PGH)	http://www.arcgis.com/home/item.html?id=32687e3f2a95432dbc6428f5bde7af29	GrSGPPHPGH09122012
0572	State/Province	CA	Bureau of Land Management	Sage Grouse General and Priority Habitats	http://www.blm.gov/wo/st/en/prog/more/sagegrouse/documents_and_resources.html	20120229_003_SageGrouse_Habitat
0576	State/Province	MT	Montana Fish, Wildlife and Parks	Sage Grouse Core Areas; Distribution - Sage Grouse (Habitat)	http://fwp.mt.gov/doingBusiness/reference/gisData/dataDownload.html	SageGrouseCoreAreas; DistributionSageGrouse
0578	State/Province	WA	Washington Department of Fish and Wildlife	Sage-grouse - General Habitat	http://www.blm.gov/wo/st/en/prog/more/sagegrouse/documents_and_resources.html	mgmtunits
0579	Non-Governmental Organization	USA	Conservation Biology Institute	Protected Areas Database of the US, PAD-US (CBI Edition)	http://consbio.org/products/projects/pad-us-cbi-edition	PADUSCBIEdition_v2
0580	Federal	CAN	Natural Resources Canada; Earth Sciences Sector; Canada Centre for Mapping and Earth Observation	Protected Areas - National Parks, Migratory Bird Sanctuaries, National Wildlife Area	http://geogratis.gc.ca/api/en/nrcan-rncan/ess-sst/08e80876-a3a6-5aba-9c94-4ff82337cc64.html	protarea.shp
0581	State/Province	BC	Ministry of Forests, Lands and Natural Resource Operations	Freshwater Atlas Wetlands	https://apps.gov.bc.ca/pub/geometadata/metadataDetail.do?from=search&edit=true&showall=showall&recordSet=ISO19115&recordUID=50653	WHSE_BASEMAPPING_FWA_WETLANDS_POLY
0583	Federal	CAN	Natural Resources Canada; Earth Sciences Sector; Canada Centre for Mapping and Earth Observation	Peat Lands	http://geogratis.gc.ca/api/en/nrcan-rncan/ess-sst/d5a3860c-2920-50b2-87ca-7e748778d4f0.html)	of4002
0597	Federal	OR and WA	Bureau of Land Management	BLM Oregon and Washington State Office Rights-of-Way Corridors, Open, Avoidance, and Exclusion Areas	http://www.blm.gov/or/gis/data.php	ROW_DSG_PUB_POLY
0599	Federal	WY	Bureau of Land Management	BLM Rawlins Field Office Designated Rights-of-Way	http://www.blm.gov/wy/st/en/resources/public_room/gis/datagis/office/lands/rawlins_field_office/rawlins-row.html	rforowcor_geo
0600	Federal	WY	Bureau of Land Management	BLM Worland Field Office Rights-of-Way Corridors, Open, Avoidance, and Exclusion Areas	http://www.blm.gov/wy/st/en/resources/public_room/gis/datagis/office/lands/worland_field_office/worland-row.html	wfo-RightofWay_Corridors
0602	Federal	USA	Audubon Society	Important Bird Areas	http://web4.audubon.org/bird/iba/IBADataRequest.html	ibas_20140320_west
0603	Federal	ID	Bureau of Land Management	BLM Idaho State Office Right-of-Way Corridors		Idaho_Corridors_IDTM
0604	Federal	ID	Bureau of Land Management	BLM Idaho State Office Right-of-Way Exclusion and Avoidance Areas		SIdaho_Exclusion_Avoidance_Open_Alt_A_dslv; CDA_ROWavoidexcludeopen
0609	Federal	WY	Bureau of Land Management	BLM Buffalo FO Right-of-Way Corridors		AltA_GovCorridor_092512
0610	Federal	WY	Bureau of Land Management	BLM Pinedale FO Right-of-Way Corridors		ROW_Corridors

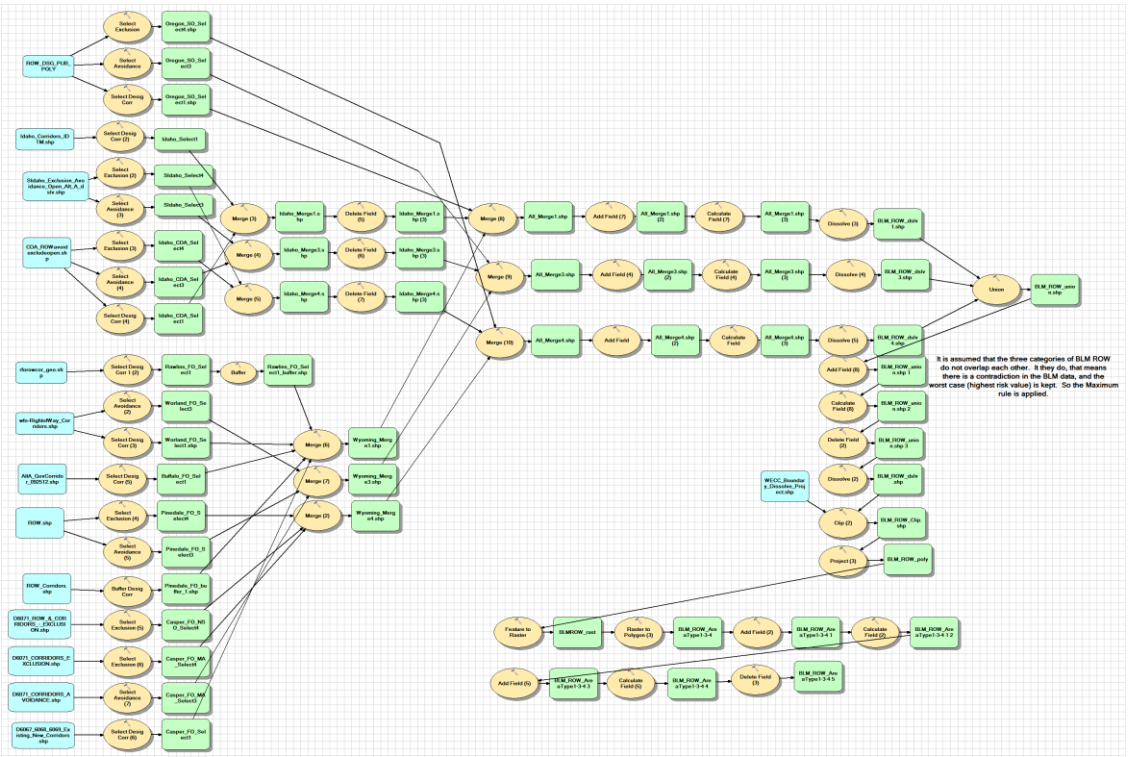
Data ID	Publication Type	Location	Publisher	Data Name	DatabURL	File Name
0612	Federal	WY	Bureau of Land Management	BLM Casper FO Right-of-Way Corridors and Restrictions		D6071_ROW_&_CORRIDORS_-_Exclusion; D6071_CORRIDORS _EXCLUSION; D6071_CORRIDORS_AVOIDANCE; D6067_6068_6069_Existing_New_Corridors
0613	State/Province	NV	Nevada Natural Heritage Program	Priority Wetlands Inventory		NV_WetRip_11012013
0614	Federal	USA	Federal Highway Administration	America's Byways		AmericasBywayRoutes; AllBywayRoutes
0615	State/Province	AZ	Arizona Department of Roads	Arizona Scenic Roads		az_scenic_2013
0616	State/Province	CA	Caltrans	California Scenic Highways	http://dot.ca.gov/hq/tsip/gis/datalibrary/gisdatalibrary.html	ScenicHwy2012
0617	State/Province	ID	Idaho Department of Transportation	Scenic Byways of Idaho	http://catalog.data.gov/dataset/state-of-idaho-scenic-byways	ScenicByways
0618	State/Province	CO	Colorado Department of Transportation	Colorado Scenic and Historic Byways		Scenic_Byways
0619	State/Province	NM	New Mexico Department of Transportation	New Mexico State and National Scenic Byways		All_Scenic_Byways_Oct_2010
0620	State/Province	OR	Oregon Department of Transportation	Oregon Scenic Byways	ftp://ftp.odot.state.or.us/tdb/trandata/GIS_data	oregon_scenic_byways
0621	State/Province	WA	Washington State Department of Transportation	Washington Scenic Highways	http://www.wsdot.wa.gov/mapsdata/geodatacatalog/default.htm	ScenicHighways
0622	State/Province	WY	Wyoming Department of Transportation	Wyoming Scenic Highways and Byways	http://wygl.wygisc.org/wygeolib/	Scenic_Highways_Byways_Cleaned
0625	Federal	CAN	Government of Canada; Natural Resources Canada; Earth Sciences Sector; Canada Centre for Mapping and Earth Observation	National Railway Network Version 1.0	http://geobase.ca/geobase/en/search.do?produit=nrwn&language=en	NRWN_AB_1_0_TRACK; NRWN_BC_1_0_TRACK
0626	State/Province	BC	Ministry of Forests, Lands and Natural Resource Operations	Freshwater Atlas Wetlands	https://apps.gov.bc.ca/pub/geometadata/metadataDetail.do?recordUID=50653&amp,recordset=ISO19115	FWWTLNDSPL_polygon
0629	State/Province	BC	Ministry of Environment, Ecosystems Branch	Endangered Species and Ecosystems - Non-Confidential Occurrences	https://apps.gov.bc.ca/pub/geometadata/metadataDetail.do?from=search&edit=true&showall=showall&recordSet=ISO19115&recordUID=3651	BIOS_NS_SVW_polygon
0630	State/Province	BC	Ministry of Forests, Lands and Natural Resource Operations, Sites and Trails Branch	Recreation Polygon	https://apps.gov.bc.ca/pub/geometadata/metadataDetail.do?from=search&edit=true&showall=showall&recordSet=ISO19115&recordUID=51178	FTN_REC_PL_polygon
0632	State/Province	CAN	Ministry of Forests, Lands and Natural Resource Operations, Regional Operations (Northeast)	Klingzut Access Management Area Mt Motor Vehicle Closed Area	https://apps.gov.bc.ca/pub/geometadata/metadataDetail.do?from=search&edit=true&showall=showall&recordSet=ISO19115&recordUID=33550	KLNGZTCCSS_polygon

Data ID	Publication Type	Location	Publisher	Data Name	DatabURL	File Name
0635	State/Province	BC	Ministry of Forests, Lands and Natural Resource Operations, Resource Management Objectives Branch	Conservation Lands	https://apps.gov.bc.ca/pub/geometadata/metadataDetail.do?from=search&edit=true&showall=showall&recordSet=ISO19115&recordUID=62619	WCLCNSRVTN_polygon
0636	State/Province	AB	Fish and Wildlife Policy Branch, Policy Division	Key Wildlife and Biodiversity Zones	http://esrd.alberta.ca/forms-maps-services/maps/wildlife-sensitivity-maps/default.aspx	KeyWildlifeAndBiodiversityZones
0637	State/Province	AB	Tourism, Parks and Recreation	Crown Reservation	http://www.albertaparks.ca/albertaparksca/library/downloadable-data-sets.aspx	pashape_reservations_10tm
0638	State/Province	AB	Tourism, Parks and Recreation	Protected Areas	http://albertaparks.ca/albertaparksca/management-land-use/alberta-conservation-information-management-system-(acims)/download-data.aspx	Parks_and_Protected_Areas_Alberta
0639	State/Province	AB	AltaLIS	Public Land Recreation Areas	http://www.altalis.com/products/base/alberta_boundary_data.html	BF_PUBLND_REC_AREA_POLYGON
0640	State/Province	AB	AltaLIS	Public Land Recreation Trail	http://www.altalis.com/products/base/alberta_boundary_data.html	BF_PUBLND_REC_TRL_POLYGON
0641	Federal	CAN	Bird Studies Canada	Important Bird Areas		AB_BC_IBAs_ICFI_08May2014
0642	State/Province	UT	Utah Division of Wildlife Resources	Greater Sage-Grouse Occupied Habitat Areas	http://www.blm.gov/wo/st/en/prog/more/sagegrouse/documents_and_resources.html	SG_occupied_20110926
0643	State/Province	WA	Washington Department of Fish and Wildlife	Greater Sage Grouse Core Areas		2012_GSGCOT_WA_PAC

Attachment B - Methodology for Assembling the Environmental Data Layer

WECC Environmental Data Task Force

December 22, 2014



This attachment details the geo-processing steps used to create the Environmental Data Layer. The data layer resulting from application of these geo-processing steps represents the application of the area type risk classification system in Attachment C of this Manual to WECC's Preferred Data Set Inventory compiled in Attachment A of this Manual. To allow consistent application of the Environmental Data Layer by transmission planning stakeholders, a complete and pre-assembled version of the Environmental Data Layer is available through the WECC Environmental Data Viewer.

Geo-processing

Since multiple geo-processing steps are required to prepare each of the data sets used to create the Environmental Data Layer, this attachment is divided into two sub-sections: Geo-processing Common to All Data and Geo-processing Unique to Select Data. For purposes of this discussion, the terms file, data layer, and feature class are used synonymously to indicate the storage of features for a particular data theme in an ESRI format.

Geo-processing Common to All Data

1. During geo-processing all data layers should be clipped to the WECC boundary. As of the time of publication of this manual, there was no GIS file available for the WECC boundary. A boundary layer can be created using GIS data from ESRI and information from the WECC website.

   Program Used: ArcGIS

   Unique Tools Used: Clip

   For users interested in only a limited geography or subset for the Western Interconnection, other boundaries may be used. For smaller areas, all the preferred data sets listed in the following section and Data Inventory Spreadsheet may not be needed, particularly data sets that are stored by state (e.g., Audubon State Important Bird Areas). This Manual discusses the geographic area covered by each preferred data set.

2. All data should be projected into a common projection with the following parameters:

   Projection: Albers

   False_Easting: 0.000000

   False_Northing: 0.000000

   Central_Meridian: -96.000000

   Standard_Parallel_1: 29.500000

   Standard_Parallel_2: 45.500000

Latitude_Of_Origin:	23.000000
Linear Unit:	Meter (1.000000)
Geographic Coordinate System:	GCS_North_American_1983
Angular Unit:	Degree (0.0174532925199433299)
Prime Meridian:	Greenwich (0.000000000000000000)
Datum:	D_North_American_1983
Spheroid:	GRS_1980
Semimajor Axis:	6378137.000000000000000000
Semiminor Axis:	6356752.314140356100000000
Inverse Flattening:	298.257222101000020000
Program used:	ArcGIS
Unique Tools used:	Project

3. A short-integer field in the attribute table entitled 'WECCCLASS' should be added to each file. The corresponding Risk Classification Category from Table D-2 should be added into the 'WECCCLASS' column for each file.

Program Used:	ArcGIS
Unique Tools Used:	Add Field, Calculate Field

4. All data layers should be converted into a raster format (either preferably an ESRI Grid or ERDAS IMAGINEor geodatabase raster file) with an output of a 500 meter (0.5 kilometer) pixel size (grid cell). The WECC boundary can be converted to raster based on the specifications below and then set as the 'Snap Raster' within the Environment Settings of ArcGIS to provide a consistent starting point for rasterization and to ensure the center-points of all pixels from all files are aligned. The 'WECCCLASS' field should be used as the field upon which the value of each raster pixel is based. The following specifications should be applied in creation of the raster files:

Cell Size (X, Y):	500, 500 (meter)
Number of Columns:	4134
Number of Rows:	7552
Extent Top:	4646000

Extent Left: -2571000

Extent Right: -504000

Extent Bottom: 870000

Program Used: ArcGIS, Spatial Analyst

Unique Tools Used: Feature to Raster

5. After conversion to raster the data should be converted back into polygons. If using ArcGIS make sure the 'Simplify Polygons' box is unchecked.

   Program Used: ArcGIS

   Unique Tools Used: Project

6. A short-integer field in the attribute table entitled 'WECCCLASS' should be added to each file. The corresponding Risk Classification Category from the Approved Environmental Recommendations Report, Appendix D, Table D-2should be added into the 'WECCCLASS' column for each file.

   Program Used: ArcGIS

   Unique Tools Used: Add Field, Calculate Field

7. A field in the attribute table entitled 'TYPE' should be added to each file. Text indicating the Area Type (as expressed in the Approved Environmental Recommendations Report) contained within the file (e.g., California Wetlands, Important Bird Areas etc.) should be added to each file's TYPE field for later use.

   Program Used: ArcGIS

   Unique Tools Used: Add Field, Calculate Field

Geo-processing Unique to Select Data

The GIS processing steps listed on the pages that follow are intended for use by GIS analysts at organizations that wish to perform the analysis for their own purposes; it is assumed that ESRI GIS software would be used for this purpose. Unique Geo-processing techniques for each model are described below. If no special processing is required for a particular data set, it is noted in the description for that data set.

Data sets are organized by risk category with several exceptions; data sets with exceptions are described at the end of this section. The PAD-US data set contain Categories 2, 3, and/or 4. The unique geo-processing techniques used on the PAD-US data set are described in a separate section following

the other descriptions. State CHAT data, the NatureServe Multi-Jurisdictional Database of Species Occurrence, and several Canadian data sources help inform multiple area types with different risk classification categories as well. Specific data sets are described under the area type they help inform.

Model Name: Cat1/2 - Linear Corridor

Risk Class:

1	2	3	4
☑	☑	☐	☐

Input Data:

DataName	*FileName*
Railroads	railroads.sdc
Transmission Line Data	NOT SHOWN PER LICENSING AGREEMENT
USA Major Highways	highways.sdc

Area Types: Area Following Existing Linear Corridor; Area Following Existing Railroad Corridor

Unique Tools: Feature Class to Shapefile, Merge

Process Steps:

1. Convert the .sdc files to shapefiles using 'Feature Class to Shapefile' tool.
2. Project the source data to Albers projection.
3. Merge the projected feature classes into a single feature class
4. Clip to WECC boundary.
5. Convert polygons to raster.
6. Add and calculate the risk category field.
7. Convert raster to polygons.
8. Add and calculate the risk category field.
9. Add and calculate the type field.

Notes: The original data source is a .sdc (smart data compression) file, so the 'Feature Class to Shapefile' tool should be used to convert it into a .shp (shapefile) format. Multiple shapefiles make up this area type so the 'Merge' tool should be used to merge all of the shapefiles.

Model Name: Cat1-3-4 - BLM ROW

Risk Class:

1	2	3	4
☑	☐	☑	☑

Input Data:

DataName	*FileName*
BLM Buffalo FO Right-of-Way Corridors	AltA_GovCorridor_092512
BLM Casper FO Right-of-Way Corridors and Restrictions	D6071_ROW_&_CORRIDORS_-_Exclusion; D6071_CORRIDORS _EXCLUSION; D6071_CORRIDORS_AVOIDANCE; D6067_6068_6069_Existing_New_Corridors
BLM Idaho State Office Right-of-Way Corridors	Idaho_Corridors_IDTM
BLM Idaho State Office Right-of-Way Exclusion and Avoidance Areas	SIdaho_Exclusion_Avoidance_Open_Alt_A_dslv; CDA_ROWavoidexcludeopen
BLM Oregon and Washington State Office Rights-of-Way Corridors, Open, Avoidance, and Exclusion Areas	ROW_DSG_PUB_POLY
BLM Pinedale FO Right-of-Way Corridors	ROW_Corridors
BLM Rawlins Field Office Designated Rights-of-Way	rforowcor_geo
BLM Worland Field Office Rights-of-Way Corridors, Open, Avoidance, and Exclusion Areas	wfo-RightofWay_Corridors

Model Name: Cat1-3-4 - BLM ROW

Area Types: Designated Federal Energy Corridor

Unique Tools: Select

Process Steps:

1. Select desired features from the source data.
2. Merge the source data into three feature classes corresponding to their risk classification.
3. Apply dissolve tool to eliminate merge features within each risk category.
4. Apply union tool to combine the three risk class layers into a single layer.
5. Add and calculate the risk category field.
6. Clip to WECC boundary.
7. Project the merged feature class to Albers projection.
8. Convert polygons to raster.
9. Convert raster to polygons.
10. Add and calculate the risk category field.
11. Add and calculate the type field.

Model Name: Cat2 - Ag Land

Risk Class:

1	2	3	4
☐	☑	☐	☐

Input Data:

DataName	*FileName*
Gap Analysis Program - Land Cover Data v2.2	gaplc_nwest, gaplc_swest

Area Types: Agricultural Land (excluding Prime Farmland)

Unique Tools: Reclassify, Mosaic to New Raster, Resample, Raster to Polygon

Process Steps:

1. Reclassify the agricultural cells from the input raster files.
2. Mosaic the reclassified rasters to a new raster.
3. Resample the grid raster to 500-meter cells.
4. Project the raster to Albers projection.
5. Convert the raster into polygons.
6. Add and calculate the risk category field.
7. Add and calculate the type field.

Notes: This data layer is in a Grid (raster) from its source. The 'Reclassify' tool should be used to isolate the raster cells representing the agricultural data. The data consists of two data sets, so the 'Mosaic to New Raster' (a tool similar to the 'Merge' tool for vector data) should be used to create one raster file. The data originally has a 30 meter cell size, so the 'Resample' tool should be used to resample the data into a 500 meter cell size to be consistent with the other data sets. The final raster should be converted into polygons. If using ArcGIS, the 'simplify polygons' box should be unchecked.

Model Name: Cat2 - Flood Zone

Risk Class:

1	2	3	4
☐	☑	☐	☐

Input Data:

DataName	*FileName*
National Flood Hazard Layer Database	S_Fld_Haz_Ar

Area Types: Flood Zones

Unique Tools: Merge, Select

Process Steps:

1. Merge the state-specific source data into a single feature class.
2. Select the features using the FLD_ZONE field.
3. Project the source data to Albers projection.
4. Clip to WECC boundary.
5. Add and calculate the risk category field.
6. Convert polygons to raster.
7. Convert raster to polygons.
8. Add and calculate the risk category field.
9. Add and calculate the type field.

Notes: FEMA flood zone data exists for every state so it is necessary to use the 'Merge' tool to merge all of the data into one file. There are many polygons included in the FEMA flood zone data so the 'Select' tool should be used to select only the polygons representing the 100 year floodplain. The following features should be selected based on the 'FLD_ZONE' field: 1 PCT ANNUAL CHANCE FLOOD HAZARD CONTAINED IN CHANNEL; A; AH; AO; AE.

Model Name: Cat2 - IBA Canada

Risk Class:

1	2	3	4
☐	☑	☐	☐

Input Data:

DataName	*FileName*
Important Bird Areas	AB_BC_IBAs_ICFI_08May2014

Area Types: Important Bird Area

Unique Tools: Calculate Field

Process Steps:

1. Project the source shapefile to Albers projection.
2. Clip to WECC boundary.
3. Add and calculate the risk category field.
4. Convert polygons to raster.
5. Convert raster to polygons.
6. Add and calculate the risk category field.
7. Add and calculate the type field.

Notes: The Calculate Field tool, used to calculate WECCCLASS to either 2 or 3, uses a Python codeblock to select features where the field PRIORITY is equal to “Global”.

Model Name: Cat2 - Landscape Condition

Risk Class:

1	2	3	4
☐	☑	☐	☐

Input Data:

DataName	*FileName*
Landscape Conditions	l48_con100wt

Area Types: Areas that contain ecosystems or species that are at moderate risk

Unique Tools: Mosaic, Resample, Reclassify

Process Steps:

1. Mosaic the four ecological systems raster files.
2. Project the mosaic ecological systems raster file to Albers projection.
3. Reclassify values in the ecological systems raster.
4. Resample the projected raster to the WECC standard raster (using the Centroid parameter).
5. Convert raster to polygon.
6. Project the landscape condition file to Albers projection.
7. Clip the ecological systems polygons by the Albers projection.
8. Reclassify the landscape condition file (score 55-80 = risk category 2; score 80-100 = risk category 3).
9. Clip reclassified landscape condition file by the WECC boundary.
10. Resample the landscape condition file to the WECC standard raster (using the Centroid parameter).
11. Convert raster to polygon.
12. Intersect the landscape condition file with the ecological systems file.
13. Add and calculate risk category field.
14. Add and calculate the type field.

Notes: This area type is defined using NatureServe's Ecological Systems Map and Landscape Conditions Map data sets. Its assembly uses the Ecological Systems Map to identify "Natural" ecological systems, and the Landscape Conditions Map to identify areas of "Fair" and "Good" ecological integrity. Ecological integrity is measured using a scale of 0 to 100; "Fair" ecological integrity is defined as a score of 55- 79, and "Good" ecological integrity is defined as a score of 80-100.

Model Name: Cat2 - MT Forest Carnivore

Risk Class:

1	2	3	4
☐	☑	☐	☐

Input Data:

DataName	*FileName*
Forest Carnivore Habitat	terrestrialValues.shp

Area Types: Areas that contain ecosystems or species that are at moderate risk; Area with irreplaceable natural or cultural resources

Unique Tools: Select

Process Steps:

1. Project the feature class to Albers projection.
2. Select the forest carnivore polygons (ForCarnScr) with attributed Scores 3 and 4.
3. Add and calculate the risk category field.
4. Convert polygons to raster.
5. Convert raster to polygons.
6. Add and calculate the risk category field.
7. Add and calculate the type field.

Notes: Three species are represented in this layer: wolverine, fisher, and marten. Wolverine is listed as a USFWS Candidate species. Forest carnivore habitat values scores were 2 points for wolverine habitat; 2 points to highly suitable marten or fisher habitat; and 1 point to moderately suitable marten or fisher habitat. In areas of species overlap, values were cumulative to a maximum value of 6 points. The State of Montana requested that areas with scores of 3 and 4 be considered EDTF Risk Classification Category 2 (see discussion under Area with irreplaceable natural or cultural resources).

Model Name: Cat2 - MT Wetlands

Risk Class:

1	2	3	4
☐	☑	☐	☐

Input Data:

DataName	*FileName*
Wetland Areas	terrestrialValues.shp

Area Types: Wetlands

Unique Tools: Select

Process Steps:

1. Select the wetlands polygons from the terrestrialValues.shp shapefile.
2. Project the clipped feature class to Albers projection.
3. Convert polygons to raster.
4. Add and calculate the risk category field.
5. Convert raster to polygon.
6. Add and calculate the risk category field.
7. Add and calculate the type field.

Notes: The attribute WetCls in the input shapefile represents wetlands class on a scale of 0 to 4. The following features should be selected from the input shapefile: 'WetCls' field: = 1

Model Name: Cat2 - NHT

Risk Class:

1	2	3	4
☐	☑	☐	☐

Input Data:

DataName	*FileName*
NPS boundaries - National Historic Trails	Due to a confidentiality agreement with NPS the shapefile names are not listed

Area Types: National Historic Trails and other National Trails

Unique Tools: Merge

Process Steps:

1. Merge the source data into a single feature class.
2. Project the merged feature class to Albers projection.
3. Clip to WECC boundary.
4. Add and calculate the risk category field.
5. Convert polygons to raster.
6. Convert raster to polygons.
7. Add and calculate the risk category field.
8. Add and calculate the type field.

Notes: Each historic trail is represented in an individual shapefile, so it is necessary to merge all trails into a single WECC-wide GIS file.

Model Name: Cat2 - NWI

Risk Class:

1	2	3	4
☐	☑	☐	☐

Input Data:

DataName	*FileName*
National Wetlands Inventory	CONUS_wet_poly

Area Types: Wetlands

Unique Tools: Merge, Select

Process Steps:

1. Merge the state-specific source data into a single feature class.
2. Select the wetlands polygons from the NWI data.
3. Project the NWI data to Albers projection.
4. Clip the merged data layer to WECC boundary.
5. Add and calculate the risk category field.
6. Convert polygons to raster three times, using Cell Center, Maximum Area, and Maximum Combined Area cell assignment types.
7. Mosaic the three rasters into a new raster.
8. Convert raster to polygons.
9. Add and calculate the risk category field.
10. Add and calculate the type field.

Notes: National Wetland Inventory (NWI) data exists for every state so it is necessary to use the 'Merge' tool to merge all of the data into one file. There are many polygons included in the NWI data so the 'Select' tool should be used to select only the polygons representing wetlands. The following attributes should be selected from the 'WETLAND_TY' field: Estuarine and Marine Wetland, Freshwater Emergent Wetland, Freshwater Forested/Shrub Wetlad. NWI data for the state of Montana was included and was supplemented by data from Montana's Crucial Area Planning System (terrestrialValues.shp)

Model Name: Cat2 - Scenic Highways

Risk Class:

1	2	3	4
☐	☑	☐	☐

Input Data:

DataName	*FileName*
America's Byways	AmericasBywayRoutes; AllBywayRoutes
Arizona Scenic Roads	az_scenic_2013
California Scenic Highways	ScenicHwy2012
Colorado Scenic and Historic Byways	Scenic_Byways
New Mexico State and National Scenic Byways	All_Scenic_Byways_Oct_2010
Oregon Scenic Byways	oregon_scenic_byways
Scenic Byways of Idaho	ScenicByways
Washington Scenic Highways	ScenicHighways
Wyoming Scenic Highways and Byways	Scenic_Highways_Byways_Cleaned

Area Types: Scenic Highway, Scenic Byways, and All-American Roads

Unique Tools: Select

Process Steps:

1. Project the feature class to Albers projection.
2. Clip to WECC boundary.
3. Convert polygons to raster.
4. Convert raster to polygons.
5. Add and calculate the risk category field.
6. Add and calculate the type field.

Model Name: Cat2 - Urban Areas

Risk Class:

1	2	3	4
☐	☑	☐	☐

Input Data:

DataName	*FileName*
2010 Census Urban Areas Boundary	cb_2012_us_uac10_500k

Area Types: Urban Fringe Area

Unique Tools: None

Process Steps:

1. Clip source data to WECC boundary.
2. Project the clipped feature class to Albers projection.
3. Add and calculate the risk category field.
4. Convert polygons to raster.
5. Convert raster to polygons.
6. Add and calculate the risk category field.
7. Add and calculate the type field.

Model Name: Cat2 - WA CHAT

Risk Class:

1	2	3	4
☐	☑	☐	☐

Input Data:

DataName	*FileName*
Landscape Integrity, Columbia Plateau Ecoregion	LI_core_areas

Area Types: Areas that contain ecosystems or species that are at moderate risk; Areas that contain ecosystems or species that are at moderate risk; Areas that contain ecosystems or species that are at moderate risk; Areas that contain ecosystems or species that are a

Unique Tools: Feature Class to Shapefile

Process Steps:

1. Convert the geodatabase files to shapefiles using 'Feature Class to Shapefile' tool.
2. Project the shapefile to Albers projection.
3. Add and calculate the risk category field.
4. Convert polygons to raster.
5. Convert raster to polygons.
6. Add and calculate the risk category field.
7. Add and calculate the type field.

Notes: The Washington Wildlife Habitat Connectivity Working Group has available for download a number of data sets that map linkages and habitat concentration or core areas for focal species, climate, and landscape integrity across the landscape. These data sets include both modeled general habitat data and by-species data. Because some of these data sets (described below) and supporting metadata were still in production at the time of this manual's publication, the data developer requested that the layer shown below be listed as EDTF Risk Classification Category 2 areas. As additional testing and refinement of these data sets occur, the Washington Wildlife Habitat Connectivity Working Group and WECC may reassess the recommended data sets and their associate risk classification categories.

Model Name: Cat2 - Wetland (Canada)

Risk Class:

1	2	3	4
☐	☑	☐	☐

Input Data:

DataName	*FileName*
Freshwater Atlas Wetlands	FWWTLNDSPL_polygon
Peat Lands	of4002

Area Types: Wetlands

Unique Tools: None

Process Steps:

1. Project the two shapefiles into the Albers projection.
2. Clip both data layers to WECC boundary.
3. Convert the WHSE_BASEMAPPING_FWA_WETLANDS_POLY polygons to raster three time
4. Mosaic the three rasters into a new raster.
5. Convert the peatm2 data to raster.
6. Convert both rasters to polygons.
7. Merge the two shapefiles together.
8. Add and calculate the risk category field.
9. Add and calculate the type field.

Model Name: Cat2/3 - CA CHAT

Risk Class:

1	2	3	4
☐	☑	☑	☐

Input Data:

DataName	*FileName*
Statewide rare species richness/Statewide rarity-weighted richness	RareSpRich_RWI_ACEII

Area Types: Areas that contain ecosystems or species that are at moderate risk; Areas that contain ecosystems or species that are at moderate risk; Area with irreplaceable natural or cultural resources

Unique Tools: Merge, Select

Process Steps:

1. Merge the source data into a single feature class.
2. Project the merged feature class to Albers projection.
3. Clip to WECC boundary.
4. Convert polygons to raster.
5. Convert raster to polygons.
6. Select “Gridcode = 2 or Gridcode = 3” for Category 2; select “Gridcode = 5” for Category 3.
7. Add and calculate the risk category field.
8. Add and calculate the type field.

Model Name: Cat2/3 - IBA

Risk Class:

1	2	3	4
☐	☑	☑	☐

Input Data:

DataName	*FileName*
Important Bird Areas	ibas_20140320_west

Area Types: Important Bird Area (IBA)

Unique Tools: Calculate Field

Process Steps:

1. Project the state-specific source data to Albers projection.
2. Clip to WECC boundary.
3. Add and calculate the risk category field.
4. Convert polygons to raster.
5. Convert raster to polygons.
6. Add and calculate the risk category field.
7. Add and calculate the type field.

Notes: The Calculate Field tool, used to calculate WECCCLASS to either 2 or 3, uses a Python codeblock to select features where the field PRIORITY is equal to “Continental” or “State”).

Model Name: Cat2/3 - Multi-Jurisdictional

Risk Class:

1	2	3	4
☐	☑	☑	☐

Input Data:

DataName	*FileName*
National Heritage Program Species Occurrence Data, Multi-Jurisdictional Database of Species Occurrence	nsfed_new; nsg1g2_new; nsg3_new

Area Types: Areas that contain ecosystems or species that are at moderate risk; Area with irreplaceable natural or cultural resources

Unique Tools: Extract by Attributes, Resample

Process Steps:

1. Extract by Attributes where "value" = 2
2. Resample the data to 500 meter cell size.
3. Clip to WECC boundary.
4. Convert raster to polygons.
5. Add and calculate the risk category field.
6. Add and calculate the type field.

Model Name: Cat2/3 - NCED

Risk Class:

1	2	3	4
☐	☑	☑	☐

Input Data:

DataName	*FileName*
Conservation Easements	NCED_Complete_09032013

Area Types: Conservation Easements for “recreation” or “education,” purposes, or those for “unknown” purposes no

Unique Tools: Select

Process Steps:

1. Select the proper data.
2. Project the feature class to Albers projection.
3. Clip to WECC boundary.
4. Convert polygons to raster.
5. Convert raster to polygons.
6. Add and calculate the risk category field.
7. Add and calculate the type field.

Notes: For Category 2: The following attributes will need to be selected from the data where: ("purpose" = 'Recreation or Education' AND "eholdtyp" = 'Federal') OR ("purpose" = 'Recreation or Education' AND "eholdtyp" = 'Private') OR ("purpose" = 'Unknown' AND "eholdtyp" <> 'Federal'). For Category 3: The following attributes will need to be selected from the “purpose” field in the data: ‘Environmental System’, ‘Historic Preservation’, Open Space – Farm’, ‘Open Space – Forest’, ‘Open Space – Other’, ‘Open Space – Ranch’. Additional data will need to be selected where “purpose” = ‘Unknown’ AND “eholdtyp” = ‘Federal’.

Model Name: Cat2/3 - Sgrouse

Risk Class:

1	2	3	4
☐	☑	☑	☐

Input Data:

DataName	*FileName*
General Sage Grouse Habitat	WYSagegrouse_currentdistribution
Greater Sage Grouse Core Areas	2012_GSGCOT_WA_PAC
Greater Sage-Grouse Habitat Categorization	SageGrouse_HabitatCategorization_12132012
Greater Sage-Grouse Occupied Habitat Areas	SG_occupied_20110926
Greater Sage-Grouse Preliminary General and Priority Habitats	or_sg_pph_pgh_plus_COH2006
Greater Sage-grouse Preliminary General Habitat	WLDLFE_SageGrouseIdahoPGH_PUB_100K_POLY_2012
Greater Sage-grouse Preliminary Priority Habitat	WLDLFE_SageGrouseIdahoPPH_PUB_100K_POLY_2011
Greater sage-grouse, Preliminary Priority Habitat (PPH), Preliminary General Habitat (PGH)	GrSGPPHPGH09122012
Sage Grouse Core Areas; Distribution - Sage Grouse (Habitat)	SageGrouseCoreAreas; DistributionSageGrouse
Sage Grouse Core Manaegment Areas, Version 3	coreareas_v3_062910
Sage Grouse General and Priority Habitats	20120229_003_SageGrouse_Habitat
Sage-grouse - General Habitat	mgmtunits

Model Name: Cat2/3 - Sgrouse

Area Types: Greater Sage-Grouse Preliminary General Habitats; Greater Sage-Grouse Preliminary Priority Habitats

Unique Tools: Select, Merge

Process Steps:

1. Select the general habitat data from the data.
2. Merge the source data into a single feature class.
3. Project the merged feature class to Albers projection.
4. Clip to WECC boundary.
5. Convert polygons to raster.
6. Convert raster to polygons.
7. Add the calculate the risk category field.
8. Add and calculate the type field.

Notes: Sage-Grouse data exists for every state so it is necessary to use the 'Merge' tool to merge all of the data into one file. Sage-grouse general habitat (PGH) will need to be selected from the California, Colorado, Idaho, Nevada, Oregon, and Wyoming data.

Model Name: Cat2/3/4 - CBI 20130703

Risk Class:

1	2	3	4
☐	☑	☑	☑

Input Data:

DataName	*FileName*
Protected Areas Database of the US, PAD-US (CBI Edition)	PADUSCBIEdition_v2

Area Types: U.S. Army Corps of Engineers Land; Native Allotment; Other Land Administered by US Federal Agencies; Other Private Non-profit Land; Other Public Land; Other Water District Land; Private Land – Unknown Restrictions; Private Land – Unrestricted for Developm

Unique Tools: Merge, Add Join, Calculate Field

Process Steps:

1. Merge the projected feature classes and save as a new feature class.
2. Clip projected, merged data layer to WECC boundary.
3. Add and calculate the risk category fields for the six area type fields for each polygon.
4. Add and calculate the maximum risk category.
5. Add and calculate the overriding area type designation for the maximum risk category.
6. Create a 'JOIN' column in the table based upon the FID number.
7. Covert polygons to raster based upon the FID number.
8. Covert raster to polygons based upon the FID number.
9. Join the risk category field and type field from the original table based upon the FID number.
10. Save as a new feature class.

Notes: The CBI PAD-US data set provides seamless data coverage for the United States and contains administrative boundaries for areas that make up multiple EDTF area types in Categories 2, 3, and 4. The source data set is divided into two layers for the Pacific and Mountain regions; these data layers were combined through the 'Merge" tool. The CBI PAD-US data layer contains multiple attribute fields, which are designed to store designations for EDTF area types; these fields are: p_des_tp; s_des_tp; t_des_tp; p_loc_ds; s_loc_ds; t_loc_ds (where prefixes p, s, and t indicate primary, secondary, and tertiary entries, and "des" and "loc" indicate land management descriptions that are standardized for the nation or are local, respectively). Risk Classification Categories were determined for all six fields. The area type with the most restrictive Risk Classification Category (i.e. with the maximum risk value) was the area type applied to the final WECC Risk Category GIS data.

Model Name: Cat3 - Big Game

Risk Class:

1	2	3	4
☐	☐	☑	☐

Input Data:

DataName	*FileName*
Big Game Crucial Habitat	ant12cr; bhs1cr; elk1cr; mdr1cr; wtd12cr
Big Game Priority Habitat	CHATsubmit20130612
Big Game Winter Range Habitat	terrestrialValues.shp
Elk and Deer Winter Range	eor_deerwrodfw2009_2012; eor_elkwrodfw2009_2012
Species Activitiy Data: Severe Winter Range, Winter Concentration, Winter Range, Migration Patters, and Migration Corrid	CPW-Species Activity Data; various individual shapefile names

Area Types: State Mapped Crucial Big Game Winter Range/Severe Winter Range; State Mapped Crucial Big Game Winter Range/Severe Winter Range; State Mapped Crucial Big Game Winter Range/Severe Winter Range; State Mapped Crucial Big Game Winter Range/Severe Winter Range;

Unique Tools: Merge, Select

Process Steps:

1. Merge into a single shapefile.
2. Select polygons from terrestrialValues.shp
3. Project to Albers projection.
4. Merge the projected, selected feature classes into a single feature class.
5. Clip merged, projected data layer to WECC boundary.
6. Add and calculate the risk category field.
7. Convert polygons to raster.
8. Convert raster to polygons.
9. Add and calculate the risk category field.
10. Add and calculate the type field.

Notes: Several data layers contribute to this area type, so the 'Merge' tool should be used to merge the files into one. The 'Select' tool should be used on the shapefile 'terrestrialValues.shp' to select the winter range in the 'BigGmScr' field (value of 2).

Model Name: Cat3 - CA Wetlands

Risk Class:

1	2	3	4
☐	☐	☑	☐

Input Data:

DataName	*FileName*
Central Valley Wetland and Riparian Areas	amer5ac_p; butte5ac_p; col5ac_p; delta5ac_p; sanjoa5ac_p; sfbay5ac_p; suisun5ac_p; sut5ac_p; yolo5ac_p

Area Types: California State Wetland

Unique Tools: Merge, Select

Process Steps:

1. Merge the source shapefiles into a single feature class.
2. Project the clipped feature class to Albers projection.
3. Clip merged data layer to WECC boundary.
4. Project the clipped feature class t Albers projection.
5. Select the wetlands polygon from the CLASS field.
6. Add and calculate the risk category field.
7. Convert polygons to raster.
8. Convert raster toe polygons.
9. Add and calculate the risk category field.
10. Add and calculate the type field.

Notes: The California Wetland data is made up of nine shapefiles so it is necessary to use the 'Merge' tool to merge all of the data into one file. There are many polygons included in the California Wetland data so the 'Select' tool should be used to select only the polygons representing wetlands. The following attributes should be selected from the 'CLASS' field: Flooded Agricultu, Open Water, Permanently Flooded Estuarine Emergents, Permanently Flooded Palustrine Emergents, Riparian Woody, Seasonally Flooded Agriculture, Seasonally Flooded Estuarine Emergents, Seasonally Flooded Palustrine Emergents, Tidal Estuarine EmergenTidal Flat

Model Name: Cat3 - Canada - Conservancy and Mitigation Banks

Risk Class:

1	2	3	4
☐	☐	☑	☐

Input Data:

DataName	*FileName*
Conservation Lands	WCLCNSRVTN_polygon

Area Types: Existing Conservation and Mitigation Bank

Unique Tools: None

Process Steps:

1. Project the selected feature class to Albers projection.
2. Clip projected data layer to WECC boundary.
3. Convert polygons to raster.
4. Convert raster to polygons.
5. Add and calculate the risk category field.
6. Add and calculate the type field.

Model Name: Cat3 - Canada - AB Habitat Areas for Candidate or

Risk Class:

1	2	3	4
☐	☐	☑	☐

Input Data:

DataName	*FileName*
Key Wildlife and Biodiversity Zones	KeyWildlifeAndBiodiversityZones

Area Types: Habitat Areas for Candidate or Listed Wildlife Species Mapped by State, Provincial, or Federal Agenc

Unique Tools: None

Process Steps:

1. Project the selected feature class to Albers projection.
2. Clip projected data layer to WECC boundary.
3. Convert polygons to raster.
4. Convert raster to polygons.
5. Add and calculate the risk category field.
6. Add and calculate the type field.

Model Name: Cat3 - Canada - AB Public Land Recreation Areas

Risk Class:

1	2	3	4
☐	☐	☑	☐

Input Data:

DataName	*FileName*
Public Land Recreation Areas	BF_PUBLND_REC_AREA_POLYGON
Public Land Recreation Trail	BF_PUBLND_REC_TRL_POLYGON

Area Types: Alberta Public Land Recreation Areas

Unique Tools: Merge

Process Steps:

1. Merge the source data into a single feature class.
2. Project the merged feature class to Albers projection.
3. Clip to WECC boundary.
4. Convert polygons to raster.
5. Convert raster to polygons.
6. Add and calculate the risk category field.
7. Add and calculate the type field.

Model Name: Cat3 - Canada - BC Conservancy Areas

Risk Class:

1	2	3	4
☐	☐	☑	☐

Input Data:

DataName	*FileName*
Conservancy Areas	TA_CA_SVW_polygon

Area Types: British Columbia Conservancy

Unique Tools: None

Process Steps:

1. Project the selected feature class to Albers projection.
2. Clip projected data layer to WECC boundary.
3. Convert polygons to raster.
4. Convert raster to polygons.
5. Add and calculate the risk category field.
6. Add and calculate the type field.

Model Name: Cat3 - Canada - BC Endangered Species or

Risk Class:

1	2	3	4
☐	☐	☑	☐

Input Data:

DataName	*FileName*
Endangered Species and Ecosystems - Non-Confidential Occurrences	BIOS_NS_SVW_polygon
Endangered Species and Ecosystems Masked Sensitive Occurrences	BIOT_MS_SP_polygon.shp

Area Types: British Columbia Endangered Species and Ecosystems –Sensitive Occurrence and Non-sensitive Occurrenc

Unique Tools: None

Process Steps:

1. Project the shapefile to Albers projection.
2. Clip projected data layer to WECC boundary.
3. Add and calculate the risk category field.
4. Convert polygons to raster.
5. Convert raster to polygons.
6. Add and calculate the risk category field.
7. Add and calculate the type field.

Model Name: Cat3 - Canada - BC Old Growth Management Areas

Risk Class:

1	2	3	4
☐	☐	☑	☐

Input Data:

DataName	*FileName*
Old growth Management Areas	OGMA_LEG_C.shp

Area Types: British Columbia Old Growth Management Area

Unique Tools: None

Process Steps:

1. Project the shapefile to Albers projection.
2. Clip projected data layer to WECC boundary.
3. Convert polygons to raster.
4. Convert raster to polygons.
5. Add and calculate the risk category field.
6. Add and calculate the type field.

Model Name: Cat3 - Canada - BC Park Class B

Risk Class:

1	2	3	4
☐	☐	☑	☐

Input Data:

DataName	*FileName*
Parks, Ecological Reserves, and Protected Areas	TA_PEP_SVW_polygon

Area Types: British Columbia Parks: Class B

Unique Tools: Select

Process Steps:

1. Project the selected feature class to Albers projection.
2. Clip projected data layer to WECC boundary.
3. Use the select tool where "PARK_CLASS" = 'Class B'.
4. Convert polygons to raster.
5. Convert raster to polygons.
6. Add the calculate the risk category field.
7. Add and calculate the type field.

Model Name: Cat3 - Canada - BC Recreation Areas

Risk Class:

1	2	3	4
☐	☐	☑	☐

Input Data:

DataName	*FileName*
Parks, Ecological Reserves, and Protected Areas	TA_PEP_SVW_polygon
Recreation Polygon	FTN_REC_PL_polygon

Area Types: British Columbia Recreational Area

Unique Tools: Select

Process Steps:

1. Project the selected feature class to Albers projection.
2. Use the select tool where "PROTECTE_1" = 'Recreation Area'.
3. Clip projected data layer to WECC boundary.
4. Convert polygons to raster.
5. Convert raster to polygons.
6. Add and calculate the risk category field.
7. Add and calcualte the type field.

Model Name: Cat3 - Canada - BC Ungulate Winter Range

Risk Class:

1	2	3	4
☐	☐	☑	☐

Input Data:

DataName	*FileName*
Ungulate Winter Range	WCP_UWR_SP_polygon

Area Types: British Columbia Ungulate Winter Range

Unique Tools: None

Process Steps:

1. Project the shapefile to Alberts projection.
2. Clip projected data layer to WECC boundary.
3. Convert polygons to raster.
4. Convert raster to polygons.
5. Add and calculate the risk category field.
6. Add and calculate the type field.

Model Name: Cat3 - Canada - BC Wildlife Management Areas

Risk Class:

1	2	3	4
☐	☐	☑	☐

Input Data:

DataName	*FileName*
Wildlife Management Areas	TA_WMA_SVW_polygon

Area Types: British Columbia Wildlife Management Area

Unique Tools: None

Process Steps:

1. Project the selected feature class to Albers projection.
2. Clip projected data layer to WECC boundary.
3. Convert polygons to raster.
4. Convert raster to polygons.
5. Add and calculate the risk category field.
6. Add and calculate the type field.

Model Name: Cat3 - Critical Habitat

Risk Class:

1	2	3	4
☐	☐	☑	☐

Input Data:

DataName	*FileName*
Critical Habitat for Threatened and Endangered Species Composite Layer	CRITHAB_EXPORT_LINE; CRITHAB_EXPORT_POLY

Area Types: Critical Habitat

Unique Tools: Raster Calculator is used to merge the rasters that are based on line and polygon features into

Process Steps:

1. Clip polygon data layer to WECC boundary.
2. Project the clipped feature class to Albers projection.
3. Add and calculate the risk category field.
4. Convert polygons to raster.
5. Convert raster to polygons.
6. Add and calculate the risk category field.
7. Add and calculate the type field.
8. Repeat steps 1-7 for linear data.

Model Name: Cat3 - MT Bighorn Shp and Mtn Gt Habitat

Risk Class:

1	2	3	4
☐	☐	☑	☐

Input Data:

DataName	*FileName*
Bighorn Sheep & Mountain Goat Habitat	terrestrialValues.shp

Area Types: Habitat Areas for Candidate or Listed Wildlife Species Mapped by State, Provincial, or Federal Agenc

Unique Tools: Select

Process Steps:

1. Select the features by attribute.
2. Project the state-specific shapefiles to Albers projection.
3. Clip to WECC boundary.
4. Add and calculate the risk category field.
5. Convert polygons to raster.
6. Convert raster to polygons.
7. Add and calculate the risk category field.
8. Add and calculate the type field.

Notes: The following attribute should be selected from the 'ShpGtScr' field in the terrestrialValues.shp file: 2,

Model Name: Cat3 - NRCS Easements

Risk Class:

1	2	3	4
☐	☐	☑	☐

Input Data:

DataName	*FileName*
Easements	easement_a_extract

Area Types: Conservation Easements for “environmental system,” “historic preservation,” “open space” purposes, o

Unique Tools: None

Process Steps:

1. Clip the source data layer to WECC boundary.
2. Project the clipped feature class to Albers projection.
3. Add and calculate the risk category field.
4. Convert polygons to raster.
5. Convert raster to polygons.
6. Add and calculate the risk category field.
7. Add and calculate the type field.

Model Name: Cat3 - Other Habitat

Risk Class:

1	2	3	4
☐	☐	☑	☐

Input Data:

DataName	*FileName*
Desert Wildlife Management Areas in California Desert Conservation Area	dwma_cdca
Prairie Grouse Habitat	terrestrialValues.shp

Area Types: Habitat Areas for Candidate or Listed Wildlife Species Mapped by State, Provincial, or Federal Agenc

Unique Tools: Merge

Process Steps:

1. Select the polygons from the terrestrialValues.shp file.
2. Select the polygons from the sgpchat_crucual_habitat_1108213.shp file.
3. Merge the source shapefiles into a single feature class.
4. Project the merged feature class to Albers projections.
5. Clip merged data layer to WECC boundary.
6. Add and calculate the risk category field.
7. Convert polygons to raster.
8. Convert raster to polygons.
9. Add and calculate the risk category field.
10. Add and calculate the type field.

Notes: The 'Merge' tool should be used to merge the unique shapefiles into one. The following attributes should be selected from the 'GrouseScr' field in the terrestrialValues.shp file (from the State of Montana): 3, 4, and 5. The following attributes should be selected from the 'CHAT_score" field in the sgpchat_crucial_habitat_110813.shp file (from the Kansas Biological Survey and Playa Lake Joint Venture): "CHAT_score"=1 OR "CHAT_score"=2.

Model Name: Cat3 - Roadless

Risk Class:

1	2	3	4
☐	☐	☑	☐

Input Data:

DataName	*FileName*
National Inventoried Roadless Areas	land_restriction_area_roadless_area

Area Types: US Forest Service Roadless Area

Unique Tools: None

Process Steps:

1. Project the feature class to Albers projection.
2. Clip the projected data layer to WECC boundary.
3. Add and calculate the risk category field.
4. Convert polygons to raster.
5. Convert raster to polygons.
6. Add and calculate the risk category field.
7. Add and calculate the type field.

Model Name: Cat3 - SGP CHAT

Risk Class:

1	2	3	4
☐	☐	☑	☐

Input Data:

DataName	*FileName*
Lesser Prairie Chicken Crucial Habitat	sgpchat_crucial_habitat_110813

Area Types: Habitat Areas for Candidate or Listed Wildlife Species Mapped by State, Provincial, or Federal Agenc

Unique Tools: Select

Process Steps:

1. Select the data where "LPC_habit" = 1 or "LPC_habit" = 2 or "LPC_habit" = 3.
2. Project the feature class to Albers projection.
3. Clipp to WECC boundary.
4. Convert polygons to raster.
5. Convert raster to polygons.
6. Add and calculate the risk category field.
7. Add and calculate the type field.

Model Name: Cat3 - Wild and Scenic Rivers

Risk Class:

1	2	3	4
☐	☐	☑	☐

Input Data:

DataName	*FileName*
Wild and Scenic Rivers	Master_Conus_WSR2009_Oct20

Area Types: Wild and Scenic River, National Rivers and Wild and Scenic Riverways

Unique Tools: None

Process Steps:

1. Project the feature class to Albers projection.
2. Clip the projected data layer to WECC boundary.
3. Add and calculate the risk category field.
4. Convert polygons to raster.
5. Convert raster to polygons.
6. Add and calculate the risk category field.
7. Add and calculate the type field.

Model Name: Cat3 - Wildlife Corridor

Risk Class:

1	2	3	4
☐	☐	☑	☐

Input Data:

DataName	*FileName*
Big Game Migration Routes/Corridors	ant12mc_draft; bhs12mc_draft; elk12mc_draft; mdr12mc_dra; wtd12mc_draft
Lake Havasu Field Office Wildlife Corridors	wildlife_corridors.shp

Area Types: State Mapped Wildlife Corridor; State Mapped Wildlife Corridor; State Mapped Wildlife Corridor

Unique Tools: Merge

Process Steps:

1. Merge the source shapefiles (polygons) into a single feature class.
2. Project the merged feature class to Albers projection.
3. Clip merged, projected data layer to WECC boundary.
4. Add and calculate the risk category field.
5. Convert polygons to raster.
6. Convert raster to polygons.
7. Add and calculate the risk category field.
8. Add and calculate the type field.

Notes: The ‘Merge’ tool should be used to merge the nine unique shapefiles into one.

Model Name: Cat4 - Agricultural Lands (Canada)

Risk Class:

1	2	3	4
☐	☐	☐	☑

Input Data:

DataName	*FileName*
Agricultural Land	bcab

Area Types: Agricultural Land

Unique Tools: Select

Process Steps:

1. Select from the data where: “F_CODE” = 9 or “F_CODE” = 10
2. Project the feature class to Albers projection.
3. Clip to WECC boundary.
4. Covernt polygons to raster.
5. Convert raster to polygons.
6. Add and calculate the risk category field.
7. Add and calculate the type field.

Model Name: Cat4 - Canada - AB Eastern Slope Zones 1 and 2

Risk Class:

1	2	3	4
☐	☐	☐	☑

Input Data:

DataName	*FileName*
Eastern Slopes Land Use Zoning	BF_EASTRN_SLPS_LUZ_POLYGON

Area Types: Alberta Eastern Slopes Zones 1 & 2

Unique Tools: Select

Process Steps:

1. Project the feature class to Albers projection.
2. Select the data where "ESLUZ_CODE" = 'Zone 1' and "ESLUZ_CODE" = 'Zone 2'.
3. Convert polygons to raster.
4. Convert raster to polygons.
5. Add and calculate the risk category field.
6. Add and calculate the type field.

Model Name: Cat4 - Canada - AB Ecological Reserves

Risk Class:

1	2	3	4
☐	☐	☐	☑

Input Data:

DataName	*FileName*
Ecological Reserves	BF_ECO_RESERVE_POLYGON

Area Types: Alberta Ecological Reserve

Unique Tools: None

Process Steps:

1. Project the feature class to Albers projection.
2. Convert polygons to raster.
3. Convert raster to polygons.
4. Add and calculate the risk category field.
5. Add and calculate the type field.

Model Name: Cat4 - Canada - AB Heritage Rangelands

Risk Class:

1	2	3	4
☐	☐	☐	☑

Input Data:

DataName	*FileName*
Heritage Rangelands	BF_HERITAGE_RGELAND_POLYGON

Area Types: Alberta Heritage Rangeland

Unique Tools: None

Process Steps:

1. Project the feature class to Albers projection.
2. Convert polygons to raster.
3. Convert raster to polygons.
4. Add and calculate the risk category field.
5. Add and calculate the type field.

Model Name: Cat4 - Canada - AB Natural Areas

Risk Class:

1	2	3	4
☐	☐	☐	☑

Input Data:

DataName	*FileName*
Natural Areas	BF_NATURAL_AREA_POLYGON

Area Types: Alberta Natural Area

Unique Tools: None

Process Steps:

1. Project the feature class to Albers projection.
2. Convert polygons to raster.
3. Convert raster to polygons.
4. Add and calculate the risk category field.
5. Add and calculate the type field.

Model Name: Cat4 - Canada - AB Prov Recreation Areas

Risk Class:

1	2	3	4
☐	☐	☐	☑

Input Data:

DataName	*FileName*
Protected Areas	Parks_and_Protected_Areas_Alberta
Provincial Recreation Area	BF_PRA_POLYGON

Area Types: Alberta Provincial Recreation Area

Unique Tools: Select

Process Steps:

1. Project the feature class to Albers projection.
2. Select the data where "TYPE" = "PRA".
3. Convert polygons to raster.
4. Convert raster to polygons.
5. Add and calculate the risk category field.
6. Add and calculate the type field.

Model Name: Cat4 - Canada - AB Provincial Parks

Risk Class:

1	2	3	4
☐	☐	☐	☑

Input Data:

DataName	*FileName*
Provincial Parks	BF_PROVINCIAL_PARK_POLYGON

Area Types: Alberta Provincial Park

Unique Tools: Select

Process Steps:

1. Project the feature class to Albers projection.
2. Select the data where "TYPE" = "PP".
3. Convert polygons to raster.
4. Convert raster to polygons.
5. Add and calculate the risk category field.
6. Add and calculate the type field.

Model Name: Cat4 - Canada - AB Rocky Mountain Forest Reserve

Risk Class:

1	2	3	4
☐	☐	☐	☑

Input Data:

DataName	*FileName*
Rocky Mountain Forest Reserve	BF_ROCKY_MTN_FOR_POLYGON

Area Types: Alberta Rocky Mountains Forest Reserve

Unique Tools: None

Process Steps:

1. Project the feature class to Albers projection.
2. Convert polygons to raster.
3. Convert raster to polygons.
4. Add and calculate the risk category field.
5. Add and calculate the type field.

Model Name: Cat4 - Canada - AB Wilderness Areas

Risk Class:

1	2	3	4
☐	☐	☐	☑

Input Data:

DataName	*FileName*
Wilderness Areas	BF_WILDERNESS_AREA_POLYGON

Area Types: Alberta Wilderness Area

Unique Tools: None

Process Steps:

1. Project the feature class to Albers projection.
2. Convert polygons to raster.
3. Convert raster to polygons.
4. Add and calculate the risk category field.
5. Add and calculate the type field.

Model Name: Cat4 - Canada - AB Wilderness Parks

Risk Class:

1	2	3	4
☐	☐	☐	☑

Input Data:

DataName	*FileName*
Willmore Wilderness Park	BF_WILDERNESS_PARK_POLYGON

Area Types: Alberta Wilderness Parks, or Willmore Wilderness Park

Unique Tools: None

Process Steps:

1. Project the feature class to Albers projection.
2. Convert polygons to raster.
3. Convert raster to polygons.
4. Add and calculate the risk category field.
5. Add and calculate the type field.

Model Name: Cat4 - Canada - AB Wildland Parks

Risk Class:

1	2	3	4
☐	☐	☐	☑

Input Data:

DataName	*FileName*
Wildlands Parks	BF_WILDLAND_PARK_POLYGON

Area Types: Alberta Wildlands Park

Unique Tools: None

Process Steps:

1. Project the feature class to Albers projection.
2. Convert polygons to raster.
3. Convert raster to polygons.
4. Add and calculate the risk category field.
5. Add and calculate the type field.

Model Name: Cat4 - Canada - BC Ecological Reserves

Risk Class:

1	2	3	4
☐	☐	☐	☑

Input Data:

DataName	*FileName*
Parks, Ecological Reserves, and Protected Areas	TA_PEP_SVW_polygon

Area Types: British Columbia Ecological Reserve

Unique Tools: Select

Process Steps:

1. Project the feature class to Albers projection.
2. Select the data where "PROTECTE_1" = 'Ecological Reserve'.
3. Convert polygons to raster.
4. Convert raster to polygons.
5. Add and calculate the risk category field.
6. Add and calculate the type field.

Model Name: Cat4 - Canada - BC Protected Areas

Risk Class:

1	2	3	4
☐	☐	☐	☑

Input Data:

DataName	*FileName*
Parks, Ecological Reserves, and Protected Areas	TA_PEP_SVW_polygon

Area Types: British Columbia Protected Area

Unique Tools: Select

Process Steps:

1. Project the feature class to Albers projection.
2. Select the data where "PROTECTE_1" = 'PROTECTED AREA'.
3. Clip to WECC boundary.
4. Convert polygons to raster.
5. Convert raster to polygons.
6. Add and calculate the risk category field.
7. Add and calculate the type field.

Model Name: Cat4 - Protected Areas (Canada)

Risk Class:

1	2	3	4
☐	☐	☐	☑

Input Data:

DataName	*FileName*
Protected Areas - National Parks, Migratory Bird Sanctuaries, National Wildlife Area	protarea.shp

Area Types: Migratory Bird Sanctuary; National Park; National Wildlife Area

Unique Tools: Select

Process Steps:

1. Project the feature class to Albers projection.
2. Select the data where "TYPE" = "PA" OR "MBS" OR "NWA" OR "NP".
3. Convert polygons to raster.
4. Convert raster to polygons.
5. Add and calculate the risk category field.
6. Add and calculate the type field.

Attachment C - Environmental and Cultural Area Type Summary
WECC Environmental Data Task Force
December 22, 2014

Attachment C summarizes WECC's current list of environmental Area Types. The table below includes the following information about each Area Type: the Area Type's Risk Classification Category (1, 2, 3, or 4), the coverage area (US, Canada, or both), a brief description of the Area Type, the designating and administering agency (the agency or group responsible for determining, respectively, the geographic boundaries of the Area Type and how it is managed), and the Preferred Data Set and WECC GIS model used to include the Area Type in the Environmental Data Layer.

For additional information on the Preferred Data Sets, please refer to **Attachment A - Preferred Data Set Inventory**. For a detailed description of the GIS models used to create the Environmental Data Layer, please refer to **Attachment B - Methodology for Assembling the Environmental Data Layer.**

Area Type ID	Risk Class	Area Type	Coverage Area	Description	Designation Authority	Adminstering Agency	Model	Data Layer(s)
001	1	Area Following Existing Linear Corridor	US and Canada	Existing transmission lines and state, federal, and national highways	Federal Highway Administration and Canadian Transportation Agency and applicable state/provincial agencies	Federal Highway Administration and Canadian Transportation Agency and applicable state/provincial agencies	Cat1/2 - Linear Corridor	Railroads; Transmission Line Data; USA Major Highways
002	1	Designated Federal Energy Corridor	US (where available)	BLM ROW/Utility corridors designated through Land Use Plans	BLM	BLM	Cat1-3-4 - BLM ROW	BLM Buffalo FO Right-of-Way Corridors; BLM Casper FO Right-of-Way Corridors and Restrictions; BLM Idaho State Office Right-of-Way Corridors; BLM Idaho State Office Right-of-Way Exclusion and Avoidance Areas; BLM Oregon and Washington State Office Rights-of-Way Corridors, Open, Avoidance, and Exclusion Areas; BLM Pinedale FO Right-of-Way Corridors; BLM Rawlins Field Office Designated Rights-of-Way; BLM Worland Field Office Rights-of-Way Corridors, Open, Avoidance, and Exclusion Areas
003	2	Area Following Existing Railroad Corridor	US and Canada	Existing linear railroad corridors.	Federal Railroad Administration and Canadian Transportation Agency and applicable state/provinvial agencies and local government	Federal Railroad Administration and Canadian Transportation Agency and applicable state/provincial agencies and local government	Cat1/2 - Linear Corridor	Railroads; Transmission Line Data; USA Major Highways
004	2	Scenic Highway, Scenic Byways, and All-American Roads	US	Includes both state and federal designations and their viewsheds.	FWHA and state departments of transportation	FWHA and state departments of transportation	Cat2 - Scenic Highways	America's Byways; Arizona Scenic Roads; California Scenic Highways; Colorado Scenic and Historic Byways; New Mexico State and National Scenic Byways; Oregon Scenic Byways; Scenic Byways of Idaho; Washington Scenic Highways; Wyoming Scenic Highways and Byways

Area Type ID	Risk Class	Area Type	Coverage Area	Description	Designation Authority	Adminstering Agency	Model	Data Layer(s)
005	2	Agricultural Land (excluding Prime Farmland)	US	Some states and provinces have laws regarding the preferential assessment of agricultural land. This means that farm and ranch assessments are usually based on the land's capability to produce agricultural products. States and provinces use varying criteria to define agricultural lands.	Applicable state agency	Applicable local government	Cat2 - Ag Land	Gap Analysis Program - Land Cover Data v2.2
006	2	Agricultural Land	Canada	Some states and provinces have laws regarding the preferential assessment of agricultural land. This means that farm and ranch assessments are usually based on the land's capability to produce agricultural products. States and provinces use varying criteria to define agricultural lands.	Applicable provincial agency	Applicable local government	Cat4 - Agricultural Lands (Canada)	Agricultural Land
007	2	Areas that contain ecosystems or species that are at moderate risk	US and Canada	Areas that contain ecosystems or species that are “vulnerable” (NatureServe Global Rank of G3 or equivalent based upon state-supplied criteria or data).	NatureServe	N/A	Cat2/3 - Multi-Jurisdictional	National Heritage Program Species Occurrence Data, Multi-Jurisdictional Database of Species Occurrence
008	2	Areas that contain ecosystems or species that are at moderate risk	US	Areas that contain ecosystems or species that are “vulnerable” (NatureServe Global Rank of G3 or equivalent based upon state-supplied criteria or data).	NatureServe	N/A	Cat2 - Landscape Condition	Landscape Conditions
009	2	Areas that contain ecosystems or species that are at moderate risk	Montana	Areas that contain ecosystems or species that are “vulnerable” (NatureServe Global Rank of G3 or equivalent based upon state-supplied criteria or data).	Montana Department of Fish and Wildlife	Montana Department of Fish and Wildlife	Cat2 - MT Forest Carnivore	Forest Carnivore Habitat
012	2	Areas that contain ecosystems or species that are at moderate risk	Washington	Areas that contain ecosystems or species that are “vulnerable” (NatureServe Global Rank of G3 or equivalent based upon state-supplied criteria or data).	Washington Wildlife Habitat Connectivity Working Group	N/A	Cat2 - WA CHAT	Landscape Integrity, Columbia Plateau Ecoregion
013	2	Areas that contain ecosystems or species that are at moderate risk	Washington	Areas that contain ecosystems or species that are “vulnerable” (NatureServe Global Rank of G3 or equivalent based upon state-supplied criteria or data).	Washington Wildlife Habitat Connectivity Working Group	N/A	Cat2 - WA CHAT	Landscape Integrity, Columbia Plateau Ecoregion
014	2	Areas that contain ecosystems or species that are at moderate risk	Washington	Areas that contain ecosystems or species that are “vulnerable” (NatureServe Global Rank of G3 or equivalent based upon state-supplied criteria or data).	Washington Wildlife Habitat Connectivity Working Group	N/A	Cat2 - WA CHAT	Landscape Integrity, Columbia Plateau Ecoregion
015	2	Areas that contain ecosystems or species that are at moderate risk	Washington	Areas that contain ecosystems or species that are “vulnerable” (NatureServe Global Rank of G3 or equivalent based upon state-supplied criteria or data).	Washington Wildlife Habitat Connectivity Working Group	N/A	Cat2 - WA CHAT	Landscape Integrity, Columbia Plateau Ecoregion
016	2	Areas that contain ecosystems or species that are at moderate risk	Washington	Areas that contain ecosystems or species that are “vulnerable” (NatureServe Global Rank of G3 or equivalent based upon state-supplied criteria or data).	Washington Wildlife Habitat Connectivity Working Group	N/A	Cat2 - WA CHAT	Landscape Integrity, Columbia Plateau Ecoregion

Area Type ID	Risk Class	Area Type	Coverage Area	Description	Designation Authority	Adminstering Agency	Model	Data Layer(s)
017	2	Areas that contain ecosystems or species that are at moderate risk	Washington	Areas that contain ecosystems or species that are “vulnerable” (NatureServe Global Rank of G3 or equivalent based upon state-supplied criteria or data).	Washington Wildlife Habitat Connectivity Working Group	N/A	Cat2 - WA CHAT	Landscape Integrity, Columbia Plateau Ecoregion
018	2	Areas that contain ecosystems or species that are at moderate risk	Washington	Areas that contain ecosystems or species that are “vulnerable” (NatureServe Global Rank of G3 or equivalent based upon state-supplied criteria or data).	Washington Wildlife Habitat Connectivity Working Group	N/A	Cat2 - WA CHAT	Landscape Integrity, Columbia Plateau Ecoregion
019	2	Areas that contain ecosystems or species that are at moderate risk	California	Areas that contain ecosystems or species that are “vulnerable” (NatureServe Global Rank of G3 or equivalent based upon state-supplied criteria or data).	California Department of Fish and Game	N/A	Cat2/3 - CA CHAT	Statewide rare species richness/Statewide rarity-weighted richness
020	2	Areas that contain ecosystems or species that are at moderate risk	California	Areas that contain ecosystems or species that are “vulnerable” (NatureServe Global Rank of G3 or equivalent based upon state-supplied criteria or data).	California Department of Fish and Game	N/A	Cat2/3 - CA CHAT	Statewide rare species richness/Statewide rarity-weighted richness
021	2	Greater Sage-Grouse Preliminary General Habitats	US	BLM and the USFS are amending land use plans to include regionally appropriate, science-based conservation measures for greater sage-grouse. As part of this process, the states and the BLM have delineated two habitat types: Preliminary Priority Habitat – Areas with the highest conservation value for maintaining GSG populations; and Preliminary General Habitat – Other Areas of occupied GSG habitat	BLM in coordination with cooperating federal and state agencies	Varies by state	Cat2/3 - Sgrouse	General Sage Grouse Habitat; Greater Sage Grouse Core Areas; Greater Sage-Grouse Habitat Categorization; Greater Sage-Grouse Occupied Habitat Areas; Greater Sage-Grouse Preliminary General and Priority Habitats; Greater Sage-grouse Preliminary General Habitat; Greater Sage-grouse Preliminary Priority Habitat; Greater sage-grouse, Preliminary Priority Habitat (PPH), Preliminary General Habitat (PGH); Sage Grouse Core Areas; Distribution - Sage Grouse (Habitat); Sage Grouse Core Manaegment Areas, Version 3; Sage Grouse General and Priority Habitats; Sage-grouse - General Habitat
022	2	Conservation Easements for “recreation” or “education,” purposes, or those for “unknown” purposes no	US	Conservation easements are a legal agreement voluntarily entered into by a property owner and a qualified conservation organization such as a land trust or government agency. The easement contains permanent restrictions on the use or development of land in order to protect its conservation values. Conservation easements held by various agencies and organizations that should be considered in transmission planning, but are unlikely to change transmission routes.	Various non-governmental organizations and private individuals	N/A	Cat2/3 - NCED	Conservation Easements

Area Type ID	Risk Class	Area Type	Coverage Area	Description	Designation Authority	Adminstering Agency	Model	Data Layer(s)
023	2	U.S. Army Corps of Engineers Land	US	Lands maintained to provide river and harbor navigation, flood damage reduction, water supply, hydroelectric power, recreation, environmental restoration, and wildlife protection.	U.S. Army Corps of Engineers	U.S. Army Corps of Engineers	Cat2/3/4 - CBI 20130703	Protected Areas Database of the US, PAD-US (CBI Edition)
024	2	Flood Zones	US	Geographic areas, regardless of ownership, that the Federal Emergency Management Agency has defined according to varying levels of flood risk. These zones are depicted on a community's Flood Insurance Rate Map or Flood Hazard Boundary Map. Each zone reflects the severity or type of flooding in the area (e.g., 100 year flood zone).	Federal Emergency Management Agency	Applicable local government	Cat2 - Flood Zone	National Flood Hazard Layer Database
025	2	Important Bird Area (IBA)	US	Important Bird Areas are sites identified by the National Audubon Society that provide essential habitat for one or more species of bird. This network of sites is comprised of continental- and state-level Important Bird Areas.	National Audubon Society	N/A	Cat2/3 - IBA	Important Bird Areas
026	2	National Historic Trails and other National Trails	US	Included in the National Trails System, a network of trails created by the National Trails System Act of 1968.	Statutory	Bureau of Land Management, National Park Service, U.S. Forest Service	Cat2 - NHT	NPS boundaries - National Historic Trails
027	2	Native Allotment	US	Native Allotments provide for the division of tribally held lands into individually-owned parcels.	Tribes/Bureau of Indian Affairs	Tribes/Bureau of Indian Affairs	Cat2/3/4 - CBI 20130703	Protected Areas Database of the US, PAD-US (CBI Edition)
028	2	Other Land Administered by US Federal Agencies	US	Land administered by federal agencies without specific special designations or applicable policy or regulations beyond general administrative statutes (e.g., lands administered by the BLM's Shoshone, Idaho District without special designation, specified use, or legal status).	Bureau of Land Management, U.S. Forest Service, Bureau of Reclamation, Bureau of Indian Affairs , U.S. Department of Defense	Bureau of Land Management, U.S. Forest Service, Bureau of Reclamation, Bureau of Indian Affairs , U.S. Department of Defense	Cat2/3/4 - CBI 20130703	Protected Areas Database of the US, PAD-US (CBI Edition)
029	2	Other Private Non-profit Land	US	Land held by private non-profit entities (e.g., land trusts or conservancies).	N/A	N/A	Cat2/3/4 - CBI 20130703	Protected Areas Database of the US, PAD-US (CBI Edition)
030	2	Other Public Land	US	Land held by a public entity (e.g., county, municipality, university).	N/A	N/A	Cat2/3/4 - CBI 20130703	Protected Areas Database of the US, PAD-US (CBI Edition)
031	2	Other Water District Land	US	Land held by a water district (e.g., Los Angeles Department of Water & Power).	Various	Various	Cat2/3/4 - CBI 20130703	Protected Areas Database of the US, PAD-US (CBI Edition)
032	2	Private Land – Unknown Restrictions	US	Land held by a private entity with unknown development restrictions.	N/A	N/A	Cat2/3/4 - CBI 20130703	Protected Areas Database of the US, PAD-US (CBI Edition)
033	2	Private Land – Unrestricted for Development	US	Land held by a private entity that has no development restrictions.	NA	N/A	Cat2/3/4 - CBI 20130703	Protected Areas Database of the US, PAD-US (CBI Edition)
034	2	Private University Land	US	Land held by private universities.	N/A	N/A	Cat2/3/4 - CBI 20130703	Protected Areas Database of the US, PAD-US (CBI Edition)

Area Type ID	Risk Class	Area Type	Coverage Area	Description	Designation Authority	Adminstering Agency	Model	Data Layer(s)
035	2	Urban Fringe Area	US	Urban Fringe Areas include U.S. Census Bureau Designated Places (closely settled, unincorporated communities that are locally recognized and identified by name) with a 0.25-mile buffer.	U.S. Census Bureau	N/A	Cat2 - Urban Areas	2010 Census Urban Areas Boundary
036	2	USDA Agricultural Research Center	US	The U.S. Department of Agriculture uses these lands for agricultural and ecological research.	U.S. Department of Agriculture	U.S. Department of Agriculture	Cat2/3/4 - CBI 20130703	Protected Areas Database of the US, PAD-US (CBI Edition)
037	2	USDA Experimental Range	US	The U.S. Department of Agriculture uses these lands for agricultural and ecological research.	U.S. Department of Agriculture	U.S. Department of Agriculture	Cat2/3/4 - CBI 20130703	Protected Areas Database of the US, PAD-US (CBI Edition)
038	2	Wetlands	US	Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification, wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports hydrophytes; (2) the substrate is predominantly undrained, hydric soil; and (3) the substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year.[6]	U.S. Fish and Wildlife Service (National Wetlands Inventory), U.S. Army Corps of Engineers (jurisdictional)	U.S. Army Corps of Engineers, U.S. Environmental Protection Agency	Cat2 - NWI	National Wetlands Inventory
039	2	Wetlands	Montana	Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification, wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports hydrophytes; (2) the substrate is predominantly undrained, hydric soil; and (3) the substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year.15	U.S. Fish and Wildlife Service (National Wetlands Inventory), U.S. Army Corps of Engineers (jurisdictional), Montana Natural Heritage Program	U.S. Army Corps of Engineers, U.S. Environmental Protection Agency	Cat2 - MT Wetlands	Wetland Areas
040	2	Wetlands	Canada	Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification, wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports hydrophytes; (2) the substrate is predominantly undrained, hydric soil; and (3) the substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year.	Environment Canada	Environment Canada	Cat2 - Wetland (Canada)	Freshwater Atlas Wetlands; Peat Lands
041	2	American Indian/Native American Reservation	US	Federal territory managed by Native American tribes for the Bureau of Indian Affairs.	Statutory	Tribes/Bureau of Indian Affairs	Cat2/3/4 - CBI 20130703	Protected Areas Database of the US, PAD-US (CBI Edition)
044	2	Area with irreplaceable natural or cultural resources	Montana	Areas that contain ecosystems or species that are “vulnerable” (NatureServe Global Rank of G3 or equivalent based upon state-supplied criteria or data).	Montana Department of Fish and Wildlife	N/A	Cat2 - MT Forest Carnivore	Forest Carnivore Habitat
106	2	Important Bird Area	Canada	Important Bird Areas are a network of sites that provide essential habitat for significant bird populations.	BirdLife International	N/A	Cat2 - IBA Canada	Important Bird Areas

Area Type ID	Risk Class	Area Type	Coverage Area	Description	Designation Authority	Adminstering Agency	Model	Data Layer(s)
042	3	Area of Critical Environmental Concern	US	Areas designated by the BLM to protect and prevent irreparable damage to “important historic, cultural, or scenic values, fish and wildlife resources or other natural systems or processes, or to protect life and safety from natural hazards.”	Bureau of Land Management	Bureau of Land Management	Cat2/3/4 - CBI 20130703	Protected Areas Database of the US, PAD-US (CBI Edition)
043	3	Area with irreplaceable natural or cultural resources	US	Areas with irreplaceable natural or cultural resources such as “critically imperiled” or “imperiled” ecosystems or species (NatureServe Global Rank of G1, G2, or equivalent based upon state-supplied criteria or data), Natural Heritage Program Conservation Sites, or National Historic Preservation Sites.	NatureServe	N/A	Cat2/3 - Multi-Jurisdictional	National Heritage Program Species Occurrence Data, Multi-Jurisdictional Database of Species Occurrence
045	3	Area with irreplaceable natural or cultural resources	California	Areas that contain ecosystems or species that are “vulnerable” (NatureServe Global Rank of G3 or equivalent based upon state-supplied criteria or data).	California Department of Fish and Game	N/A	Cat2/3 - CA CHAT	Statewide rare species richness/Statewide rarity-weighted richness
046	3	Greater Sage-Grouse Preliminary Priority Habitats	US	BLM and the USFS are amending land use plans to include regionally appropriate, science-based conservation measures for greater sage-grouse. As part of this process, the states and the BLM have delineated two habitat types: Preliminary Priority Habitat- Areas with the highest conservation value for maintaining GSG populations; Preliminary General Habitat – Other Areas of occupied GSG habitat	BLM in coordination with cooperating federal and state agencies	Varies by state	Cat2/3 - Sgrouse	General Sage Grouse Habitat; Greater Sage Grouse Core Areas; Greater Sage-Grouse Habitat Categorization; Greater Sage-Grouse Occupied Habitat Areas; Greater Sage-Grouse Preliminary General and Priority Habitats; Greater Sage-grouse Preliminary General Habitat; Greater Sage-grouse Preliminary Priority Habitat; Greater sage-grouse, Preliminary Priority Habitat (PPH), Preliminary General Habitat (PGH); Sage Grouse Core Areas; Distribution - Sage Grouse (Habitat); Sage Grouse Core Manaegment Areas, Version 3; Sage Grouse General and Priority Habitats; Sage-grouse - General Habitat
047	3	Conservation Easements for “environmental system,” “historic preservation,” “open space” purposes, o	US	Conservation easements are a legal agreement voluntarily entered into by a property owner and a qualified conservation organization such as a land trust or government agency. The easement contains permanent restrictions on the use or development of land in order to protect its conservation values. Conservation easements for habitat, open space, and cultural resource conservation secured by federal agencies under various authorities, or state/local government or NGOs.	Various federal agencies	Various federal agencies	Cat3 - NRCS Easements	Easements

Area Type ID	Risk Class	Area Type	Coverage Area	Description	Designation Authority	Adminstering Agency	Model	Data Layer(s)
048	3	California State Wetland	California (Central Valley region)	Wetlands are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. These areas generally include swamps, marshes, bogs, and similar areas large enough to be mapped at the regional scale. (Note: Multiple California state laws and policies having varying definitions of wetlands.)	State of California	California Coastal Commission, California Department of Fish and Game	Cat3 - CA Wetlands	Central Valley Wetland and Riparian Areas
049	3	Critical Habitat	US	Defined by the Endangered Species Act, a specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. Critical habitat can be designated on state, federal, or private land.	U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration, National Marine Fisheries Service	U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration, National Marine Fisheries Service	Cat3 - Critical Habitat	Critical Habitat for Threatened and Endangered Species Composite Layer
050	3	Habitat Areas for Candidate or Listed Wildlife Species Mapped by State, Provincial, or Federal Agenc	Montana	Areas that have been delineated by state or federal agencies as containing habitat elements critical to the survival of species that are candidates for listing or listed for protection under the Endangered Species Act.	Montana Department of Fish and Wildlife	N/A	Cat3 - Other Habitat	Desert Wildlife Management Areas in California Desert Conservation Area; Prairie Grouse Habitat
051	3	Habitat Areas for Candidate or Listed Wildlife Species Mapped by State, Provincial, or Federal Agenc	Montana	Areas that have been delineated by state or federal agencies as containing habitat elements critical to the survival of species that are candidates for listing or listed for protection under the Endangered Species Act.	Montana Department of Fish and Wildlife	N/A	Cat3 - MT Bighorn Shp and Mtn Gt Habitat	Bighorn Sheep & Mountain Goat Habitat
052	3	Habitat Areas for Candidate or Listed Wildlife Species Mapped by State, Provincial, or Federal Agenc	US (where present)	Areas that have been delineated by state or federal agencies as containing habitat elements critical to the survival of species that are candidates for listing or listed for protection under the Endangered Species Act.	University of Kansas with input from various federal and state agencies	N/A	Cat3 - SGP CHAT	Lesser Prairie Chicken Crucial Habitat
053	3	Military Range/Installation	US	A grouping of facilities or land administered by the U.S. Department of Defense that supports particular military functions.	Statutory	U.S. Department of Defense	Cat2/3/4 - CBI 20130703	Protected Areas Database of the US, PAD-US (CBI Edition)
054	3	National Conservation Area	US	Designated by U.S. Congress, these lands feature scientific, cultural, ecological, historical, and recreational values.	Statutory	Bureau of Land Management	Cat2/3/4 - CBI 20130703	Protected Areas Database of the US, PAD-US (CBI Edition)
055	3	National Monument	US	Authorized by the Antiquities Act of 1906, the President of the United States may, by proclamation, declare landmarks, structures, and other objects of historic or scientific interest situated on lands owned or controlled by the government to be National Monuments.	Presidential Proclamation	Bureau of Land Management	Cat2/3/4 - CBI 20130703	Protected Areas Database of the US, PAD-US (CBI Edition)

Area Type ID	Risk Class	Area Type	Coverage Area	Description	Designation Authority	Adminstering Agency	Model	Data Layer(s)
056	3	National Recreation Area	US	A designation for a protected area in the United States, often centered on large reservoirs and emphasizing water-based recreation. Areas with this designation are established by Congress and managed by different federal agencies, most of which operate within the U.S. Department of the Interior or U.S. Department of Agriculture.	Statutory	Bureau of Land Management, National Park Service, U.S. Forest Service	Cat2/3/4 - CBI 20130703	Protected Areas Database of the US, PAD-US (CBI Edition)
057	3	Research Natural Area	US	Research Natural Areas are permanently protected and maintained in natural conditions for the purposes of conserving biological diversity, conducting non-manipulative research and monitoring, and fostering education.	Bureau of Land Management, National Park Service, U.S. Forest Service, U.S. Fish and Wildlife Service	Bureau of Land Management, National Park Service, U.S. Forest Service, U.S. Fish and Wildlife Service	Cat2/3/4 - CBI 20130703	Protected Areas Database of the US, PAD-US (CBI Edition)
058	3	Research Natural Area – Proposed	US	Managed to maintain their natural conditions for the purposes of conserving biological diversity, conducting non-manipulative research and monitoring, and fostering education.	Bureau of Land Management, National Park Service, U.S. Forest Service, U.S. Fish and Wildlife Service	Bureau of Land Management, National Park Service, U.S. Forest Service, U.S. Fish and Wildlife Service	Cat2/3/4 - CBI 20130703	Protected Areas Database of the US, PAD-US (CBI Edition)
059	3	Special Interest Area	US	The Regional Forester administratively designates Special Interest Areas to protect and manage for public use and enjoyment those special recreation areas with scenic, geological, botanical, zoological, paleontological, archaeological, or other special characteristics or unique values.	U.S. Forest Service	U.S. Forest Service	Cat2/3/4 - CBI 20130703	Protected Areas Database of the US, PAD-US (CBI Edition)
060	3	Special Management Area	US	Established in land use plans, these lands are managed to preserve special values, including recreation, wildlife, and geological features.	Bureau of Land Management, U.S. Forest Service	Bureau of Land Management, U.S. Forest Service	Cat2/3/4 - CBI 20130703	Protected Areas Database of the US, PAD-US (CBI Edition)
061	3	State Mapped Crucial Big Game Winter Range/Severe Winter Range	Colorado	Crucial winter habitat for big game (e.g., elk, deer, pronghorn, or bighorn sheep) identified and mapped by state game and fish agencies.	Colorado Parks and Wildlife	Applicable Federal, State, or Local Government	Cat3 - Big Game	Big Game Crucial Habitat; Big Game Priority Habitat; Big Game Winter Range Habitat; Elk and Deer Winter Range; Species Activitiy Data: Severe Winter Range, Winter Concentration, Winter Range, Migration Patters, and Migration Corrid
062	3	State Mapped Crucial Big Game Winter Range/Severe Winter Range	New Mexico	Crucial winter habitat for big game (e.g., elk, deer, pronghorn, or bighorn sheep) identified and mapped by state game and fish agencies.	New Mexico Department of Game and Fish	Applicable Federal, State, or Local Government	Cat3 - Big Game	Big Game Crucial Habitat; Big Game Priority Habitat; Big Game Winter Range Habitat; Elk and Deer Winter Range; Species Activitiy Data: Severe Winter Range, Winter Concentration, Winter Range, Migration Patters, and Migration Corrid

Area Type ID	Risk Class	Area Type	Coverage Area	Description	Designation Authority	Adminstering Agency	Model	Data Layer(s)
063	3	State Mapped Crucial Big Game Winter Range/Severe Winter Range	Oregon	Crucial winter habitat for big game (e.g., elk, deer, pronghorn, or bighorn sheep) identified and mapped by state game and fish agencies.	Oregon Department of Fish and Wildlife	Designation: Applicable State AgencyAdministration: Applicable Federal, State, or Local Government	Cat3 - Big Game	Big Game Crucial Habitat; Big Game Priority Habitat; Big Game Winter Range Habitat; Elk and Deer Winter Range; Species Activitiy Data: Severe Winter Range, Winter Concentration, Winter Range, Migration Patters, and Migration Corrid
064	3	State Mapped Crucial Big Game Winter Range/Severe Winter Range	Wyoming	Crucial winter habitat for big game (e.g., elk, deer, pronghorn, or bighorn sheep) identified and mapped by state game and fish agencies.	Wyoming Game and Fish Department	Applicable Federal, State, or Local Government	Cat3 - Big Game	Big Game Crucial Habitat; Big Game Priority Habitat; Big Game Winter Range Habitat; Elk and Deer Winter Range; Species Activitiy Data: Severe Winter Range, Winter Concentration, Winter Range, Migration Patters, and Migration Corrid
065	3	State Mapped Crucial Big Game Winter Range/Severe Winter Range	Montana	Crucial winter habitat for big game (e.g., elk, deer, pronghorn, or bighorn sheep) identified and mapped by state game and fish agencies.	Montana Department of Fish and Wildlife	Applicable Federal, State, or Local Government	Cat3 - Big Game	Big Game Crucial Habitat; Big Game Priority Habitat; Big Game Winter Range Habitat; Elk and Deer Winter Range; Species Activitiy Data: Severe Winter Range, Winter Concentration, Winter Range, Migration Patters, and Migration Corrid
066	3	State Mapped Wildlife Corridor	Arizona (Bureau of Land Management Lake Havasu Field Office)	Migration or movement corridors for wildlife mapped by state wildlife agencies.	Bureau of Land Management	Applicable Federal, State, or Local Government	Cat3 - Wildlife Corridor	Big Game Migration Routes/Corridors; Lake Havasu Field Office Wildlife Corridors
067	3	State Mapped Wildlife Corridor	Colorado	Migration or movement corridors for wildlife mapped by state wildlife agencies.	Colorado Parks and Wildlife	Applicable Federal, State, or Local Government	Cat3 - Wildlife Corridor	Big Game Migration Routes/Corridors; Lake Havasu Field Office Wildlife Corridors
068	3	State Mapped Wildlife Corridor	Wyoming	Migration or movement corridors for wildlife mapped by state wildlife agencies.	Wyoming Game and Fish Department	Applicable Federal, State, or Local Government	Cat3 - Wildlife Corridor	Big Game Migration Routes/Corridors; Lake Havasu Field Office Wildlife Corridors
069	3	State Forest	US	State forests are owned by states and generally managed to provide economic, environmental, and social benefits to state residents. Revenue from timber sales may go to state or local governments.	Applicable State Legislation	Applicable State Agency	Cat2/3/4 - CBI 20130703	Protected Areas Database of the US, PAD-US (CBI Edition)
070	3	State Park	US	State parks protect and preserve a collection of culturally and environmentally sensitive structures and habitats, threatened plant and animal species, ancient Native American sites, and historic structures and artifacts important to each state's heritage.	Applicable State Legislation	Applicable State Agency	Cat2/3/4 - CBI 20130703	Protected Areas Database of the US, PAD-US (CBI Edition)

Area Type ID	Risk Class	Area Type	Coverage Area	Description	Designation Authority	Adminstering Agency	Model	Data Layer(s)
071	3	State Wildlife Area	US	State wildlife management areas are managed by state agencies for wildlife habitat values, often providing for hunting, fishing, and other public enjoyment of wildlife habitat.	Applicable State Agency	Applicable State Agency	Cat2/3/4 - CBI 20130703	Protected Areas Database of the US, PAD-US (CBI Edition)
072	3	US Forest Service Roadless Area	US	Roadless areas are inventoried federal land with prohibitions on road construction, road reconstruction, and timber harvesting on National Forest System lands.	U.S. Forest Service	U.S. Forest Service	Cat3 - Roadless	National Inventoried Roadless Areas
073	3	Wild and Scenic River, National Rivers and Wild and Scenic Riverways	US	Designated by Congress as part of the National Wild and Scenic River System for their outstanding natural, cultural, or recreational values.	Statutory	National Park Service, Bureau of Land Management, U.S. Forest Service	Cat3 - Wild and Scenic Rivers	Wild and Scenic Rivers
080	3	British Columbia Endangered Species and Ecosystems –Sensitive Occurrence and Non-sensitive Occurrenc	British Columbia	Occurrences of endangered species and ecosystems as mapped by the BC Ministry of Environment.	BC Ministry of Environment	N/A	Cat3 - Canada - BC Endangered Species or Ecosystems	Endangered Species and Ecosystems - Non-Confidential Occurrences; Endangered Species and Ecosystems Masked Sensitive Occurrences
081	3	British Columbia Old Growth Management Area	British Columbia	Legally established and spatially defined areas of old growth forest that are identified during landscape unit planning or an operational planning process.	BC Ministry of Forests, Lands and Natural Resource Operations	BC Ministry of Forests, Lands and Natural Resource Operations	Cat3 - Canada - BC Old Growth Management Areas	Old growth Management Areas
082	3	British Columbia Conservancy	British Columbia	A conservancy is Crown land, designated under the Park Act or by the Protected Areas of British Columbia Act, whose management and development is constrained by the Park Act.	BC Ministry of Forests, Lands and Natural Resource Operations	BC Ministry of Forests, Lands and Natural Resource Operations	Cat3 - Canada - BC Conservancy Areas	Conservancy Areas
083	3	British Columbia Parks: Class B	British Columbia	British Columbia's Parks are protected Crown lands that contain nationally and internationally significant natural and cultural features and outdoor experiences.	BC Ministry of Forests, Lands and Natural Resource Operations	BC Ministry of Forests, Lands and Natural Resource Operations	Cat3 - Canada - BC Park Class B	Parks, Ecological Reserves, and Protected Areas
084	3	British Columbia Recreational Area	British Columbia	A recreation area is defined as Crown land reserved or set aside for public recreational use.	Statutory	BC Parks, British Columbia Ministry of Environment	Cat3 - Canada - BC Recreation Areas	Parks, Ecological Reserves, and Protected Areas; Recreation Polygon
085	3	British Columbia Ungulate Winter Range	British Columbia	British Columbia Ungulate Winter Range is an area containing habitat necessary to meet the winter habitat requirements of various ungulate species.	BC Ministry of Environment	BC Ministry of Environment	Cat3 - Canada - BC Ungulate Winter Range	Ungulate Winter Range
086	3	British Columbia Wildlife Management Area	British Columbia	A conservation land requiring a special level of protection and management may sometimes be designated as a "wildlife management area" under Section 4 of the BC Wildlife Act.	Statutory	BC Parks, BC Ministry of Environment	Cat3 - Canada - BC Wildlife Management Areas	Wildlife Management Areas
087	3	Existing Conservation and Mitigation Bank	Canada	This area type include various types/classes of land secured for fish, wildlife, and habitat conservation purposes. It includes also Wildlife Management Areas (WMA) designated by Order in Council (OIC).	Order in Council and other entities	Various	Cat3 - Canada - Conservancy and Mitigation Banks	Conservation Lands

Area Type ID	Risk Class	Area Type	Coverage Area	Description	Designation Authority	Adminstering Agency	Model	Data Layer(s)
088	3	Habitat Areas for Candidate or Listed Wildlife Species Mapped by State, Provincial, or Federal Agenc	Alberta	A combination of key wildlife habitat from both uplands and major watercourse valleys. The basis of this zone was determined using major river corridors, valley topography, valley slope breaks and ungulate winter densities. The Key Wildlife and Biodiversity Zone is intended to prevent loss and fragmentation of habitat; prevent short and long-term all-weather public vehicle access; prevent sensory disturbance during periods of thermal or nutritional stress on wildlife; and prevent the development of barriers to wildlife corridors (e.g. stream crossings).	Government of Alberta, Alberta Environment and Sustainable Resource Development	Various	Cat3 - Canada - AB Habitat Areas for Candidate or Listed	Key Wildlife and Biodiversity Zones
095	3	Alberta Public Land Recreation Areas	Alberta	Public Land Recreation Areas within the Province of Alberta.	Government of Alberta, Alberta Environment and Sustainable Resource Development	Government of Alberta, Alberta Environment and Sustainable Resource Development	Cat3 - Canada - AB Public Land Recreation Areas	Public Land Recreation Areas; Public Land Recreation Trail
074	4	National Primitive Area	US	A National Primitive Area is a land designation previously used by the U.S. Forest Service. Although there are still lands with this title, most are now known as Wilderness Areas and are administered in the same manner as Wilderness Areas.	U.S. Forest Service	U.S. Forest Service	Cat2/3/4 - CBI 20130703	Protected Areas Database of the US, PAD-US (CBI Edition)
075	4	National Wildlife Refuge	US	The National Wildlife Refuge System, managed by the U.S. Fish and Wildlife Service, is a system of public lands and waters set aside to conserve fish, wildlife, and plants.	U.S. Forest Service	U.S. Forest Service	Cat2/3/4 - CBI 20130703	Protected Areas Database of the US, PAD-US (CBI Edition)
076	4	Units of the National Parks System (excluding National Recreation Areas and National Trails)	US	Units of the National Park System are established to “conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.”	Statutory	National Park Service	Cat2/3/4 - CBI 20130703	Protected Areas Database of the US, PAD-US (CBI Edition)
077	4	Wilderness Area	US	Designated by the U.S. Congress, Wilderness Areas are places where the earth and its community of life are essentially undisturbed. They retain a primeval character without permanent improvements and generally appear to have been affected primarily by the forces of nature.	Statutory	National Park Service	Cat2/3/4 - CBI 20130703	Protected Areas Database of the US, PAD-US (CBI Edition)
078	4	Wilderness Area (Recommended)	US	Recommended Wilderness Areas are those areas (generally identified during the preparation or revision of land management plans) that the administering agency recommends to Congress as candidates for designation as Wilderness. Although they are typically subject to strict controls, only Congress can designate Wilderness Areas.	U.S. Forest Service, Bureau of Land Management, National Park Service	U.S. Forest Service, Bureau of Land Management, National Park Service	Cat2/3/4 - CBI 20130703	Protected Areas Database of the US, PAD-US (CBI Edition)
079	4	Wilderness Study Area	US	Areas determined to contain wilderness characteristics by the BLM or U.S. Forest Service.	Bureau of Land Management, U.S. Forest Service	Bureau of Land Management, U.S. Forest Service	Cat2/3/4 - CBI 20130703	Protected Areas Database of the US, PAD-US (CBI Edition)

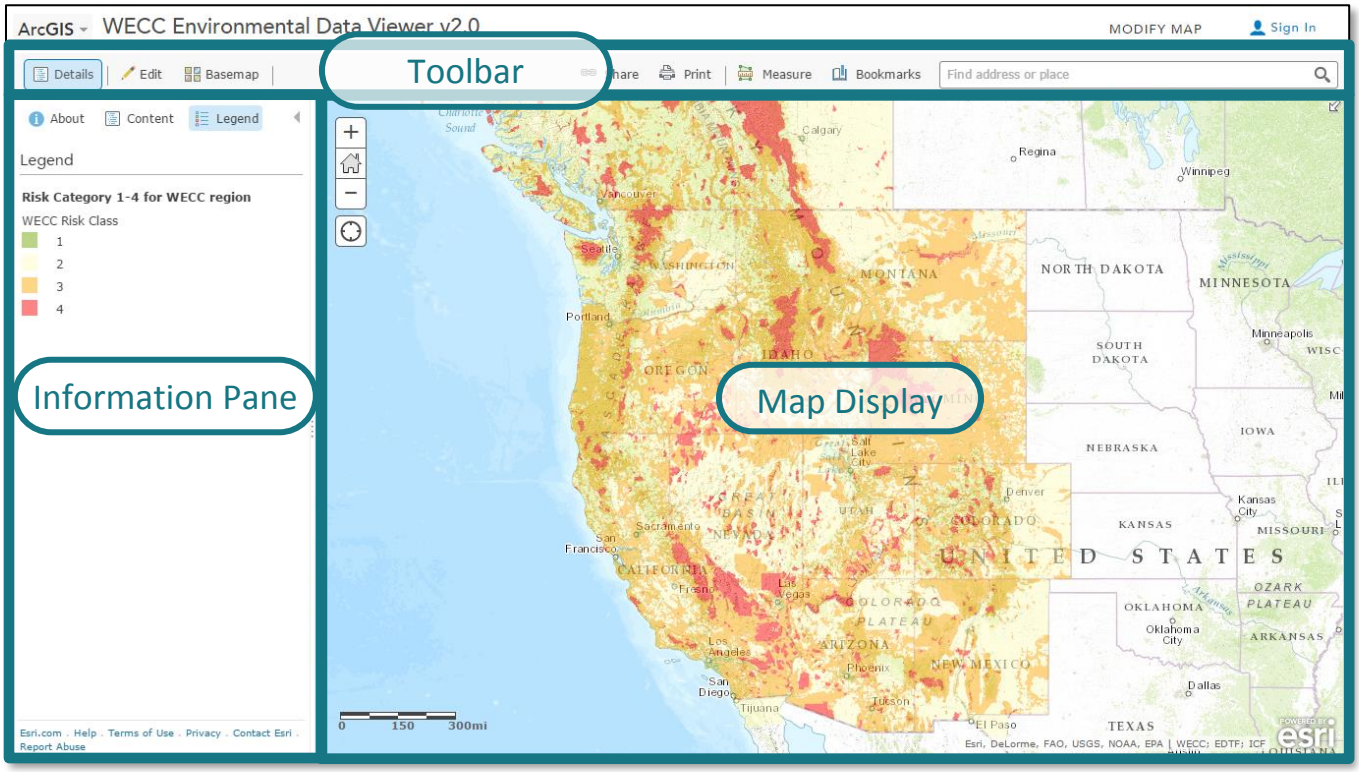
Area Type ID	Risk Class	Area Type	Coverage Area	Description	Designation Authority	Adminstering Agency	Model	Data Layer(s)
089	4	Alberta Ecological Reserve	Alberta	The primary intent of an Ecological Reserve is strict preservation of natural ecosystems, habitats and features, and associated biodiversity. These areas contain representative, rare and fragile landscapes, plants, animals and geological features.	Statutory	Alberta Tourism, Parks and Recreation	Cat4 - Canada - AB Ecological Reserves	Ecological Reserves
090	4	Alberta Eastern Slopes Zones 1 & 2	Alberta	The Eastern Slopes of Alberta's Rocky Mountains cover an area of approximately 35,000 square miles of mainly forest-covered mountains and foothills. A Policy for Resource Management of the Eastern Slopes defines eight zones to emphasize realizing resource opportunities in the area. Zone 1 is the Prime Protection Zone and Zone 2 is the Critical Wildlife Zone.	Province of Alberta	Province of Alberta	Cat4 - Canada - AB Eastern Slope Zones 1 and 2	Eastern Slopes Land Use Zoning
091	4	Alberta Heritage Rangeland	Alberta	Alberta Heritage Rangelands are areas that preserve and protect natural features that are representative of Alberta's prairies where grazing is used to maintain their ecological integrity grassland ecology. Carefully managed cattle grazing has contributed to the ecological integrity of very large tracts of these areas; heritage rangelands ensure ongoing protection while continuing the traditional grazing approach that has preserved these grasslands for many years.	Statutory	Alberta Tourism, Parks and Recreation	Cat4 - Canada - AB Heritage Rangelands	Heritage Rangelands
092	4	Alberta Natural Area	Alberta	Natural areas include natural and near-natural landscapes of regional and local importance protected for nature-based recreation and heritage appreciation.	Statutory	Alberta Tourism, Parks and Recreation	Cat4 - Canada - AB Natural Areas	Natural Areas
093	4	Alberta Provincial Park	Alberta	Alberta Provincial Parks protect both natural and cultural landscapes and features. They also support a range of outdoor activities in natural, modified and man-made settings.	Statutory	Alberta Tourism, Parks and Recreation	Cat4 - Canada - AB Provincial Parks	Provincial Parks
094	4	Alberta Provincial Recreation Area	Alberta	Alberta Provincial Recreation Areas support a range of outdoor activities in natural, modified and man-made settings, with outdoor recreation as their primary purpose.	Statutory	Alberta Tourism, Parks and Recreation	Cat4 - Canada - AB Prov Recreation Areas	Protected Areas; Provincial Recreation Area
096	4	Alberta Rocky Mountains Forest Reserve	Alberta	An area designated through a Legislature Act in 1948 that provides the conservation of the forests and the protection of the watersheds and rivers on the eastern slope of the Rocky Mountains. The purpose is to protect and conserve forests and watersheds and rivers on the eastern slope of the Rocky Mountains.	Statutory	Alberta Tourism, Parks and Recreation	Cat4 - Canada - AB Rocky Mountain Forest Reserve	Rocky Mountain Forest Reserve
097	4	Alberta Wilderness Area	Alberta	Wilderness areas preserve and protect natural heritage, where visitors are provided with opportunities for non-consumptive, nature based outdoor recreation.	Statutory	Alberta Tourism, Parks and Recreation	Cat4 - Canada - AB Wilderness Areas	Wilderness Areas
098	4	Alberta Wildlands Park	Alberta	Wildland parks are large, undeveloped natural landscapes that retain their primeval character to preserve and protect natural heritage and provide opportunities for backcountry recreation.	Statutory	Alberta Tourism, Parks and Recreation	Cat4 - Canada - AB Wildland Parks	Wildlands Parks
099	4	Alberta Wilderness Parks, or Willmore Wilderness Park	Alberta	Though similar in its intent to Wildland Parks, this area was established under its own legislation in 1959.	Statutory	Alberta Tourism, Parks and Recreation	Cat4 - Canada - AB Wilderness Parks	Willmore Wilderness Park

Area Type ID	Risk Class	Area Type	Coverage Area	Description	Designation Authority	Adminstering Agency	Model	Data Layer(s)
100	4	British Columbia Ecological Reserve	British Columbia	Ecological Reserves are Crown lands set aside for ecological purposes, reserved from further disposition that might otherwise be granted under any other Act or law in British Columbia.	Statutory	BC Parks, British Columbia Ministry of Environment	Cat4 - Canada - BC Ecological Reserves	Parks, Ecological Reserves, and Protected Areas
102	4	British Columbia Protected Area	British Columbia	Protected area designations under the Environment and Land Use Act are by order in council.	Statutory	BC Parks, British Columbia Ministry of Environment	Cat4 - Canada - BC Protected Areas	Parks, Ecological Reserves, and Protected Areas
103	4	Migratory Bird Sanctuary	Canada	While Environment Canada is the agency responsible for Migratory Bird Sanctuaries, the actual properties can be owned federally, provincially, or privately.	Statutory	Canadian Wildlife Service, Environment Canada	Cat4 - Protected Areas (Canada)	Protected Areas - National Parks, Migratory Bird Sanctuaries, National Wildlife Area
104	4	National Park	Canada	Canadian National Parks are a country-wide system of representative natural areas of Canadian significance.	Statutory	Parks Canada	Cat4 - Protected Areas (Canada)	Protected Areas - National Parks, Migratory Bird Sanctuaries, National Wildlife Area
105	4	National Wildlife Area	Canada	National Wildlife Areas are created and managed for the purposes of wildlife research, conservation, and interpretation.	Statutory	Canadian Wildlife Service, Environment Canada	Cat4 - Protected Areas (Canada)	Protected Areas - National Parks, Migratory Bird Sanctuaries, National Wildlife Area

Attachment D – Environmental Data Viewer v2.0: Quick Start Guide
WECC Environmental Data Task Force
December 22, 2014

Overview

The link to the WECC Environmental Data Viewer v2.0 is located here. After clicking the application link, a web page consisting of a Map Display, Information Pane, and Toolbar will appear. The EDTF Data Layer is available for download from the following location under "Environmental and Cultural Datasets" for users who wish to use the data directly in their own geographic information system (GIS) software:



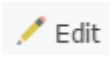
WECC

WESTERN ELECTRICITY COORDINATING COUNCIL
155 North 400 West, Suite 200
Salt Lake City, Utah 84103-1114

Information Pane

With the  button active in the Toolbar, you can display the following tabs in the information pane.

About	Provides a summary of the application and includes a "More Details" link to a page containing additional information.
Content	Lists the data layers visible in the map display and allows the user to turn on and off their visibility with the checkbox next to the layer name. Clicking on the small arrow to the right of one of the data layer names will expose a set of options for displaying the data; the casual user of the Data Viewer will not need to change these options, but they are available for advanced users to customize the map display to their liking.
Legend	Displays the symbology used on the map display for each visible data layer.

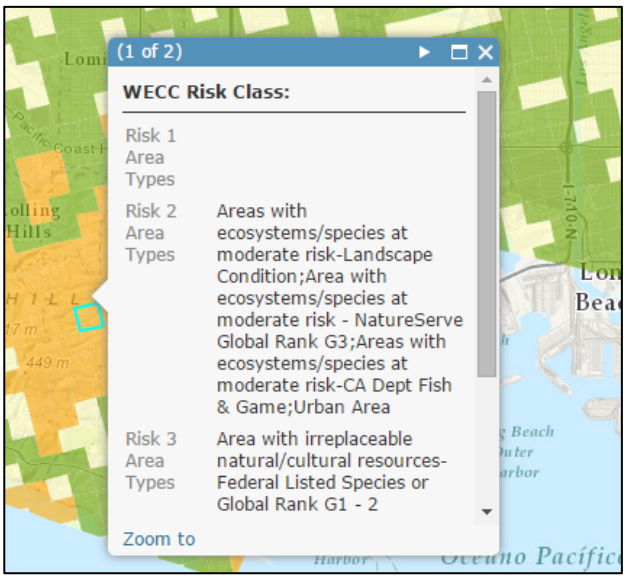
With the  button active in the Toolbar, the information pane will display an Add Features menu.

Map Display

You can use the following navigational tools, or alternatively, a mouse wheel or touch pad/screen, to zoom and pan around the map.

+	Zoom in
−	Zoom out
	Return to default extent
	Find your location

After zooming into a local area of interest, click the map to reveal a popup window that displays the risk classification at that location, as well as the Area Type features associated with that location that contributed to the risk classification.



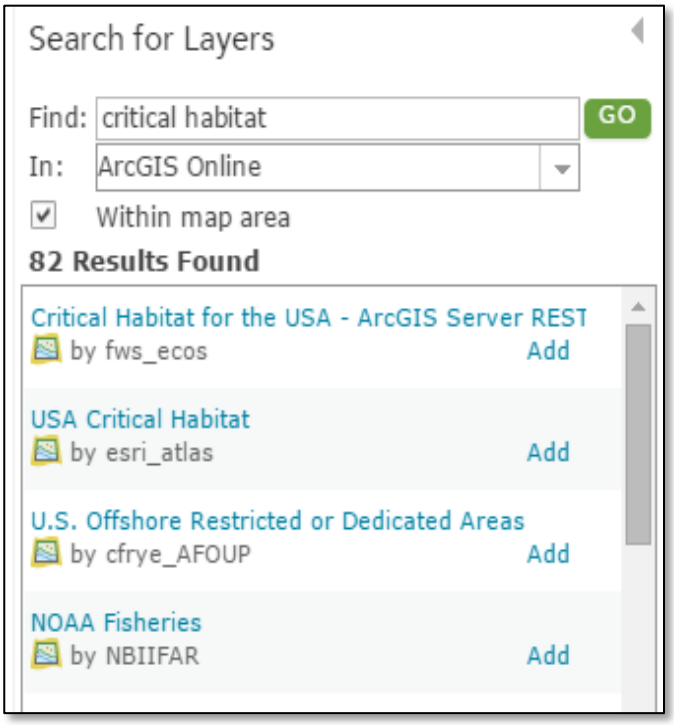
Toolbar

Details	Provides a summary of the application and includes a "More Details" link to a page containing additional information

In order to add layers or notes to the map, first click MODIFY MAP *in the top right-hand side of the browser window.*

Add	This menu provides a rich set of tools to add data layers from various web resources to the map, as well as other content directly from the user
– Search for Layers	Search the web for data layers of interest to add to the map
– Add Layer from Web	Enter the URL of a data layer of interest to add it to the map
– Add Layer from File*	Add geospatial data from your organization to the map

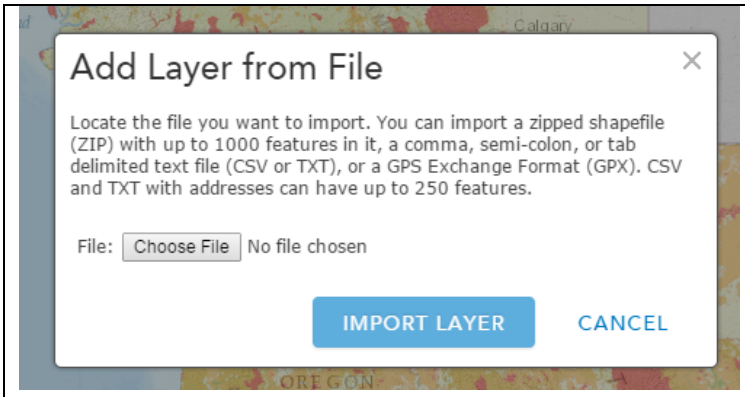
Toolbar (continued)



The **Search for Layers** tool in the **Add** dropdown menu allows you to discover geospatial data layers that are published by various organizations and that may be added to the map. First, enter a keyword or phrase in the **Find** box. Next, select an item from the dropdown list provided in the **In** box (ArcGIS Online; The Web; or A GIS Server). In the example shown at left, the user has searched for content related to "critical habitat" that may be provided by the ArcGIS Online community; partial results from that search are shown. A similar search could be performed to find data layers available from The Web, or from a specific server. Once you have located a data layer of interest, click **Add** next to the layers name to display it on the map.

Note: any data added in this manner is viewable in the current Viewer online session only and will not be automatically loaded when the viewer is closed and reopened. The added data will not be visible to any other user other than those viewing the map in which it was added.

Toolbar (continued)



The **Add Layer from File** tool in the **Add** dropdown menu allows you to add geospatial data from your organization to the map. For example, a potential transmission line could be added to the map to help you explore potential risks associated with environmental features along its route. If your organization has an ESRI shapefile of some features of interest, use a compression utility to create a .zip file and use this tool to add it to the map.

Note: any data added in this manner is viewable in the current Viewer online session only and will not be automatically loaded when the viewer is closed and reopened. The added data will not be visible to any other user other than those viewing the map in which it was added.

– Add Map Notes	Add various graphics and text to the map
Edit	Click to activate the Add Features function in the Information Pane
Basemap	Change the background basemap of the map
Share	Display the URL address for this application for sharing with others
Print	Print the map
Measure	Measure areas or distances on the map, or get the latitude/longitude of locations
Bookmarks	Add and reference bookmarks for quickly zooming into areas of interest

Use the Find Address or Place tool to type in a street address, zip code, city, county, or point of interest (e.g. “Rocky Mountain National Park”) to locate and zoom into that location.

Attachment E - Cultural Resources Data Analysis Approach
WECC Environmental Data Task Force
August 7, 2014

Contents

Note to Reader: As of the publication of this document, WECC had not reached an agreement to publically release the results of this approach in the several test states. In future, WECC may release results from this effort via the Environmental Data Viewer or some other method.

Overview

This document provides an overview of an approach[1] for processing cultural resources GIS data for use in the Western Electricity Coordinating Council's (WECC's) regional transmission planning effort. WECC's approach uses data commonly available from State Historic Preservation Offices (SHPO) and some federal agencies to determine the relative risk to electrical transmission development from cultural resources. WECC defines potential "risk" to electrical transmission development as something that increases a developer's costs, has the potential to result in project delays, or generally increases the uncertainty a project will be successfully permitted and/or completed. The objective of this data processing is to produce a seamless geospatial dataset depicting cultural risk across the WECC region that can be made available to WECC and electrical transmission stakeholders and other interested parties through a web mapping application known as the WECC Data Viewer.

The technical approach was developed for use with the ESRI™ suite of ArcGIS software and was applied as a series of test applications using geospatial data supplied by the Colorado, Nevada, Utah, and Wyoming SHPOs. For purposes of this document, the terms "survey" and "inventory" areas are used interchangeably to indicate geographic areas that are recorded as being surveyed for cultural resources.

This document contains two appendices that provide detailed information directed towards technical implementation of the modeling approach; this information may be used by GIS staff to support the process of delivering, modeling, and using the geospatial data, but is not required for a general understanding of the process and its implementation.

[1] The draft approach is based on direction received from WECC's Environmental Data Task Force (EDTF) Cultural Resources sub-committee on September 13, 2013, and approved for further review by the EDTF on October 7, 2013. This approach has also been substantially informed by data and recommendations supplied by the Utah and Nevada SHPOs.

General Approach

The general approach is to characterize the relative risk or uncertainty from cultural resources on potential new transmission modeled across the Western Interconnection. This characterization of uncertainty or risk for any given location is based, for purposes of this application, on two factors: the relative density of known cultural sites in the vicinity of that location; and the indication of whether the location has or has not been surveyed for cultural sites (and, if surveyed, when the survey occurred). Based on these factors, locations are assigned a "Cultural Risk Category" using the system described in **Table E-1**.

Table E-1. Draft Cultural Resource Data Approach[2]

Category Name		Description
Category A	***Lowest* Cultural Resource Risk or Uncertainty**	This category includes areas with a "Low Density" of sites that have been surveyed in the last 10 years. This category is intended to reflect the notion that recently surveyed areas where few sites were found decrease the risk and uncertainty associated with planning transmission.
Category B	***Moderate* Cultural Resource Risk or Uncertainty**	This category includes areas where a "Low Density" of sites has been identified, but where the survey information is older (>10 years). This category is intended to reflect the notion that new sites become "historic" over time, and areas found to have a low density of sites in the past may have new sites in the present. These older surveys increase the overall uncertainty associated with planning transmission through the area.
Category C*	***High* Cultural Resource Risk or Uncertainty**	Areas with a "Moderate Site Density" (regardless of when or if a survey has been conducted in the area). This category is intended to reflect the notion that an increasing number of sites in an area will increase the risk and difficult in siting a project, as well as to acknowledge that not having any survey information creates its own type of risk by substantially increasing the uncertainty around what resources will be found in a given area.

2 Note, Table E-1 classifies areas into categories A, B, C, D, and E. This strategy supersedes an older draft version, which classified areas into categories A, B, C1, C2, and D. The Cultural Resources Data Viewer currently displays these superseded categories, and will be updated to reflect the current category names to agree with the approach presented in this document.

Table E-1. Draft Cultural Resource Data Approach[2]

Category Name		Description
Category D	***Highest* Cultural Resource Risk or Uncertainty**	This category includes areas with a "High Site Density" regardless of when or if a survey has been conducted in the area. This category is intended to reflect the notion an area surrounded by identified sites will substantially increase the risk and difficult in siting a project.
Category E**	***Unknown* Cultural Resource Risk or Uncertainty**	Areas with a zero site density and where no surveys have been conducted. In this case, zero-site density is interpreted as being "unknown" site density, due to the lack of surveying performed at that location.

* Same as Superseded Category C1 (see page footnote above)

** Same as Superseded Category C2 (see page footnote above)

Table E-2 presents the same information as shown in Table E-1 in a cross tabulation format. This table represents how the approach was implemented as a map overlay in GIS.

Table E-2. WECC Cultural Risk Classification Assignments

Site Density++	Area Surveyed Within Last 10 Years	Area Surveyed Prior to Last 10 Years	Outside Surveyed Area
0	A	B	E
Low (1-3)	A	B	C
Moderate (4-6)	C	C	C
High (7-9)	D	D	D
Any cell listed as TCP/sacred site	D	D	D

++Number of grid cells found within the neighborhood

To implement the above strategy, the source site and inventory datasets are converted into ESRI™ raster (grid cell) files according to specifications that conform to WECC's standard raster (500m x 500m grid cells), as described in **Appendix E-1**. A value of 0 is applied to grid cells that are not prominently represented by cultural sites, and a value of 1 to all cells that are prominently represented by sites. (The term "prominently represented" is where a grid cell's land area is occupied 50 percent or more by a combination of one or more cultural sites.)

For any given grid cell, a measurement of neighborhood cultural site density is performed within a 3-cell by 3-cell neighborhood, according to the following rules:

"Low Density" Grid Cell = 0 – 3 adjacent grid cells are prominently represented by cultural sites

"Moderate Density" Grid Cell = 4 – 6 adjacent grid cells are prominently represented by cultural sites

"High Density" Grid Cell = 7 – 9 adjacent grid cells are prominently represented by cultural sites

The result of this measurement is a new raster data file representing neighborhood site density. The inventory/survey data is also represented as a raster grid cell file, where grid cells are coded as: *not a survey area*; *survey area < 10 years ago*; or *survey area > 10 years ago*. Finally, an overlay operation is performed on the site density and inventory/survey raster data layers to derive a new raster data layer representing cultural risk, according to the method shown in Table E-2.

Test Application Results

The following maps illustrate selected products of the modeling process through application of data sets received from Nevada SHPO.

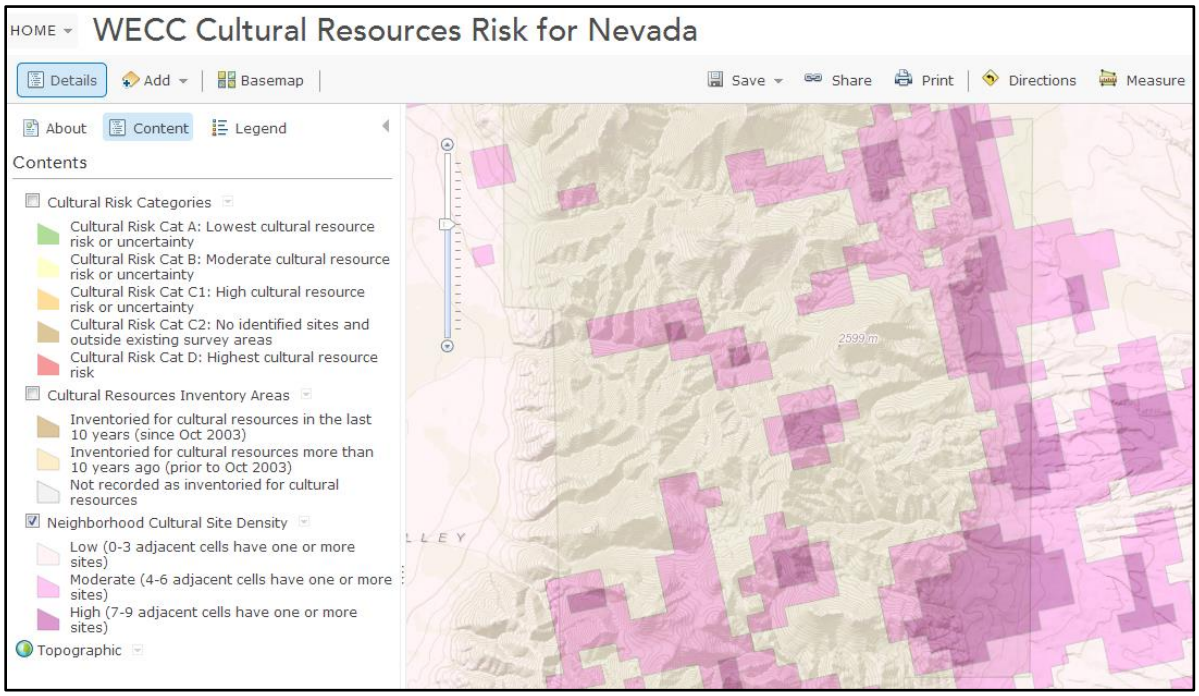


Figure E-1 Neighborhood cultural site density

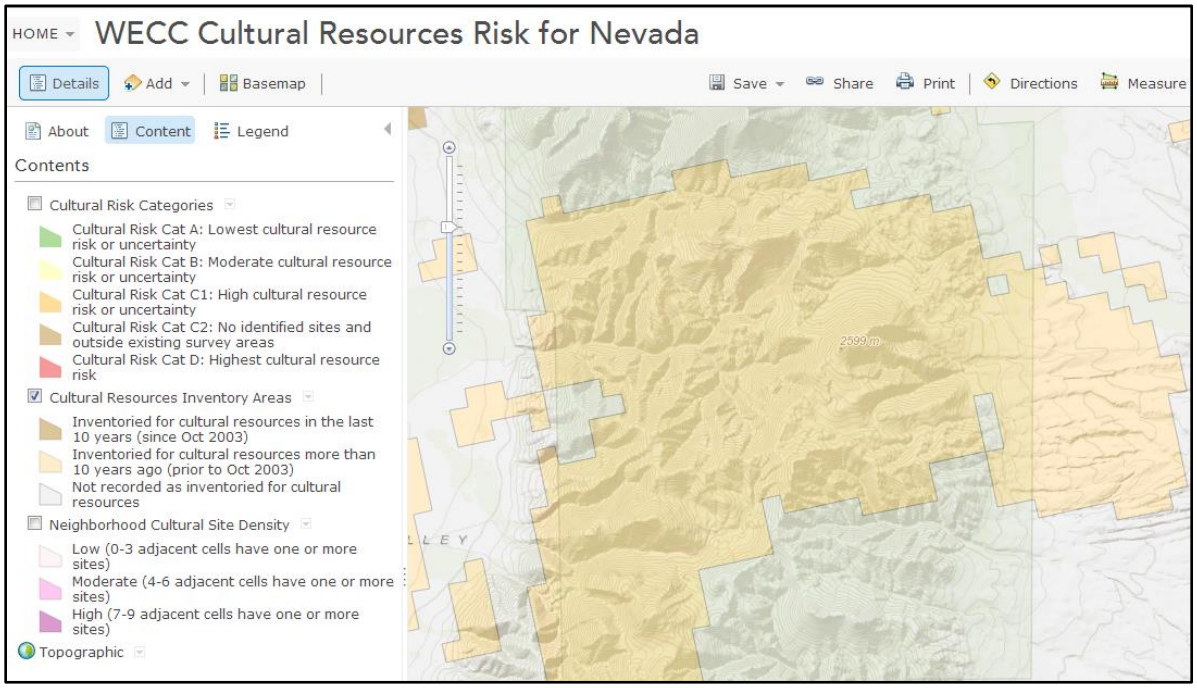


Figure E-2 Cultural resources inventory areas

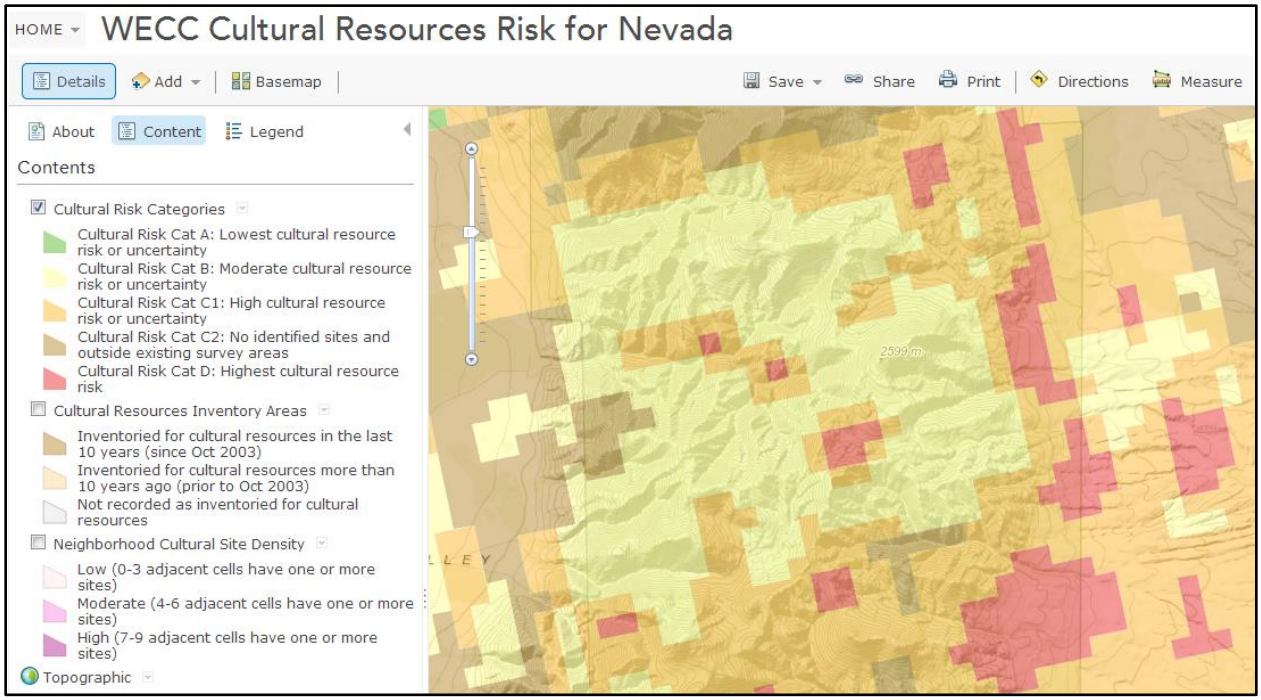


Figure E-3 cultural risk categories

Cultural Risk Data Viewer

Results of modeling cultural resources risk using Colorado, Nevada, Utah, and Wyoming SHPO data have been implemented in a web-based Cultural Resources Data Viewer application (see **Figure E-4**). It is anticipated that as new source datasets are provided to WECC by additional SHPOs, new modeling results for other states will be incorporated into the Cultural Risk Data Viewer. The Cultural Risk Data Viewer will be enhanced and updated by WECC as needed, and may become available to WECC stakeholders and other interested parties as a public website. Future development of the Cultural Risk Data Viewer will occur with the cooperation and approval of the participating SHPOs. It is further anticipated that the results of cultural risk modeling may be incorporated into the overall WECC Environmental Data Viewer, which currently presents risk categories based on a set of natural resources and land protection criteria.

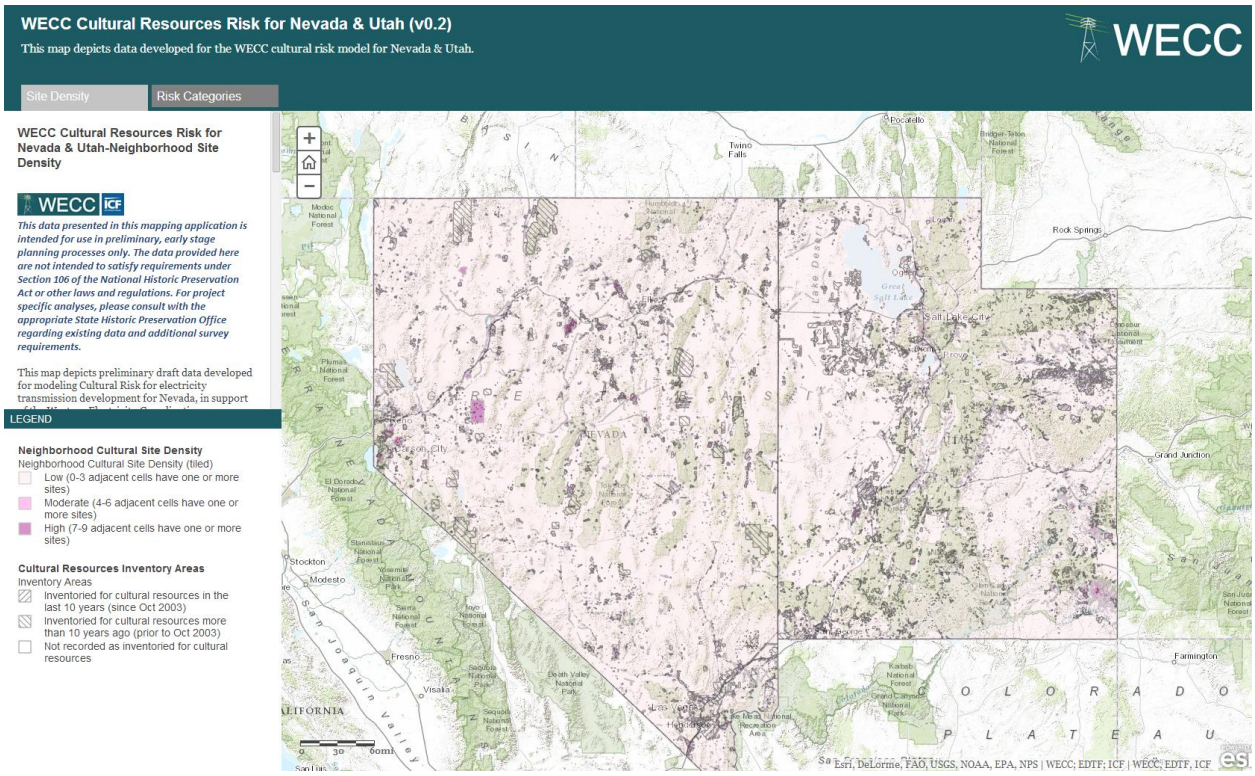


Figure E-4. WECC Cultural resources data viewer

Appendix E-1: Technical Geoprocessing Steps

This appendix provides additional detailed information on the geoprocessing steps performed within ESRI™ ArcGIS software to implement the cultural resources risk model. This information may be useful to GIS practitioners interested in replicating or modifying the geoprocessing steps that were performed to generate the results shown in this document, or to those interested in understanding the mechanics of geoprocessing.

The following steps implement the model.

1. *Data Compilation*. Obtain the following geospatial datasets from the SHPO, in ESRI shape file or geodatabase format:

    a. The locations of known cultural sites. These may be represented as points, lines, and/or polygons.

    b. The surveyed (inventoried) areas, including a survey date (in date format) for each feature.

    Appendix E-2 provides a more detailed specification of the datasets that are requested of the SHPOs.

2. *Perform a map projection of the source data* to the WECC standard georeferencing system, USA_Contiguous_Albers_Equal_Area_Conic_USGS_version, as described below.

3. *Convert all sites into an ESRI™ raster (grid cell) file* that conform to the WECC standard raster (500m x 500m grid cells), and applying a value of 0 to non-site cells and 1 to site cells to a field in the attribute table. The conversion of cultural sites into raster uses a "fat cell" approach, where any grid cell that contains any part of a cultural site (whether point, line, or polygon) gets coded as a site. (Note: the process of converting vector data into raster data abstracts and reduces the detail of the source data to bring it into a representation consistent with other EDTF data and to speed geoprocessing. This approach may tend to *overrepresent* the geographic areas of sites.)

    - See the section below, Specifications for Converting Vector Data into Raster, for more detail. If a SHPO prefers to deliver the data to WECC in raster rather than vector format, the SHPO will be asked to provide raster data that conforms to these specifications.

4. *Run the ArcMap™ Spatial Analyst™ Focal Statistics tool on the cultural site raster layer* to calculate the relative density of sites occurring within a user-defined neighborhood around each grid cell. (The user-defined neighborhood suggested by the SHPOs is a 9-cell (3 cell X 3 cell) area, centered on the grid cell being solved.) The result is a new raster whose values are the number of cultural site grid cells found within the 9-cell neighborhood; possible values range from 0 – 9.
5. *Review* the range and distribution of resultant site area values. For review and display purposes, group the values into discreet categories: 0-3 cells = low density; 4-6 cells = moderate density; 7-9 cells = high density.
6. For each inventory area feature, identify if the area was surveyed within the prior ten years, or before the prior ten years, and code accordingly. If no data is present for a given feature, assume that the site was surveyed before the prior ten years.
7. *Convert the surveyed (inventory) areas into an ESRI™ raster (grid cell) file*. The conversion of inventory areas into raster uses a moderately "skinny cell" approach, where most of the grid cell must be occupied by inventory areas in order to be coded as an inventory area. (Note: the process of converting vector data into raster data abstracts and reduces the detail of the source data to bring it into a representation consistent with other EDTF data and to speed geoprocessing. This approach may tend to *underrepresent* the geographic areas of surveys, especially in the case of linear transects.) *Reclass* the grid cell values so that: 0 = not an inventory area; 10 = inventory area surveyed before prior 10 years; 20 = inventory area surveyed within prior 10 years. See the section below, Specifications for Converting Vector Data into Raster, for more detail.
8. Overlay the rasterized inventory areas (from Step 7) with the rasterized site density layer (from Steps 4 and 5) and perform a *pairwise comparison* of site areas with surveyed/non-surveyed areas. The specific tool used in ESRI software is the Spatial Analyst Raster Calculator, which adds the values of the two raster files, and saves the result as a grid code (a combination code to store both inventory area value and site density value).
9. *Calculate WECC Cultural Risk Category* by assigning a cultural risk value (A, B, C, D, or E) to all grid codes, i.e. all combinations of site density with inventory area status, for example as shown in Table E-3.

Table E-3. Pairwise comparison of inventory areas and site density, and assignment of cultural risk class (grid code / risk class)

Inventory Area	Inventory Grid Code	Site Density (number of site grid cells within a 3x3 neighborhood - values range from 0 – 9)			
		Low 0	Low 1-3	Moderate 4-6	High 7-9
Not inventory	0	0 / E	1-3 / C	4-6 / C	7-9 / D
Inventory, date unknown or before the prior 10 year period	10	10 / B	11-13 / B	14-16 / C	17-19 / D
Inventory area, date within the prior 10 year period	20	20 / A	21-13 / A	24-26 / C	27-29 / D
Risk Class	Description				
A	Lowest cultural resource risk or uncertainty				
B	Moderate cultural resource risk or uncertainty				
C	High cultural resource risk or uncertainty				
D	Highest cultural resource risk				
E	Unknown risk: no identified sites and outside existing survey areas				

10. *Reclassify all grid cells that are coded as a TCP/Sacred Site into Cultural Risk Classification D* (placeholder for future deployment; not yet implemented in the Nevada and Utah models).
11. *Distribute* the model output results to EDTF, SHPOs, and other interested stakeholders.

The above processing steps have been incorporated into two models, run in sequence, that were built in the ESRI™ Model Builder™ environment. The models are currently designed to operate on data supplied by the Colorado, Nevada, Utah, and Wyoming SHPOs for testing and demonstration purposes. Typically, these models need modification to address the specific geoprocessing needs of individual states' data.

The first model, shown in Figure E-5 below, prepares the SHPO data for modeling and performs three main functions: data layers supplied by the SHPO are projected to the WECC standard projection and coordinate system (if needed); vector data layers are converted into raster files; data layers are "masked" by the state boundary.

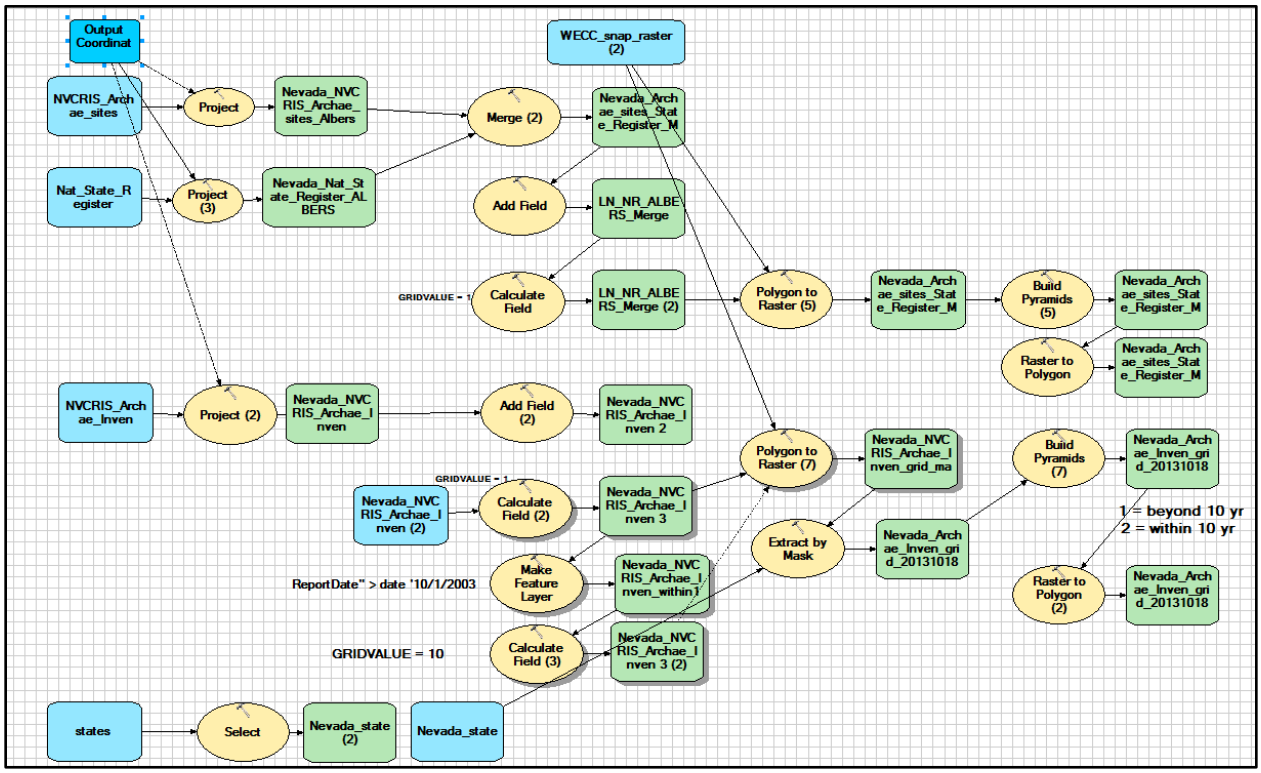


Figure E-5. Model 1 - Prepare SHPO data for modeling

The second model, shown in Figure E-6 below, performs the modeling functions to create a new raster file representing cultural risk. This model calculates neighborhood site density, performs a pairwise comparison of the inventory area raster with the site density raster through a Raster Calculator addition operation to create a combination numeric code, and calculates cultural risk class values. The pairwise comparison is implemented as Python code in the Calculate tool, as shown in Figure E- 7 below.

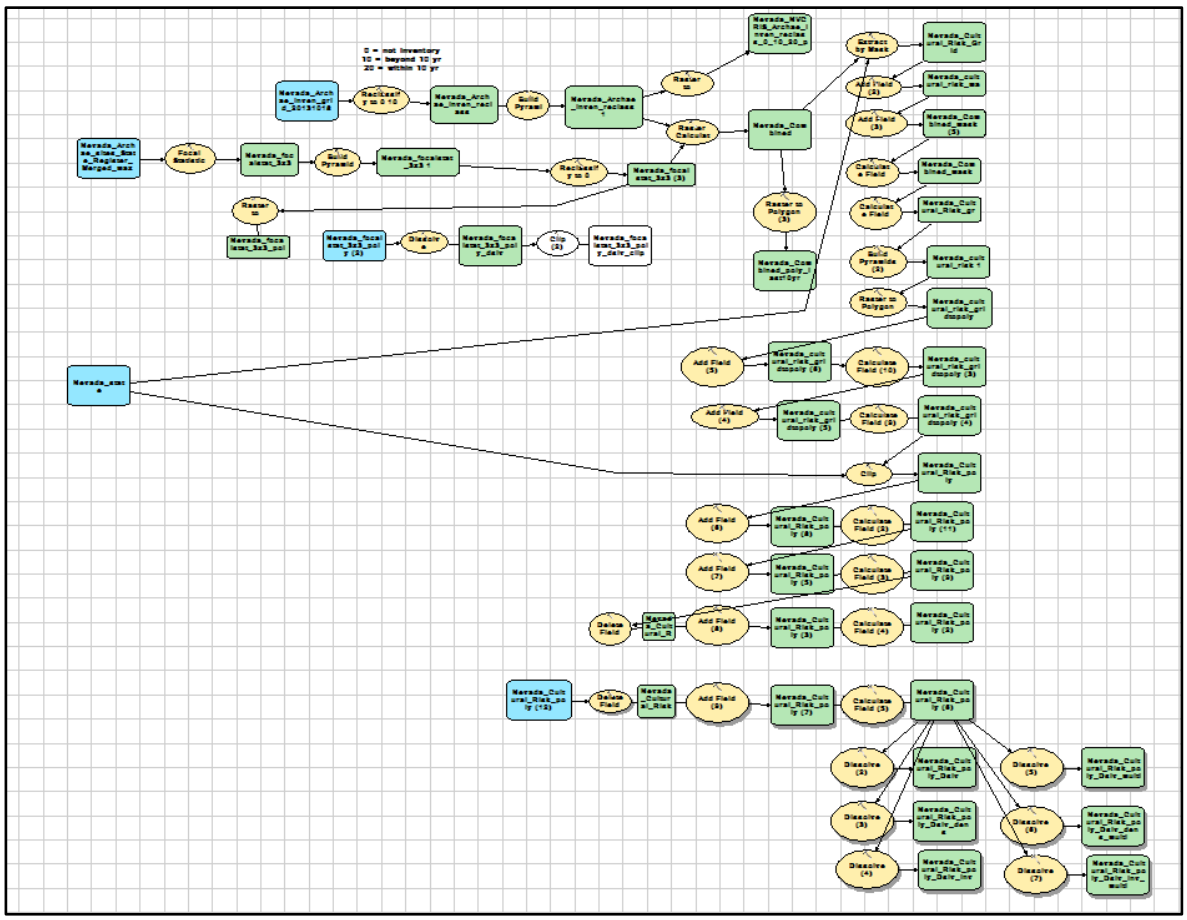


Figure E-6. Model 2 – Calculate Cultural Risk

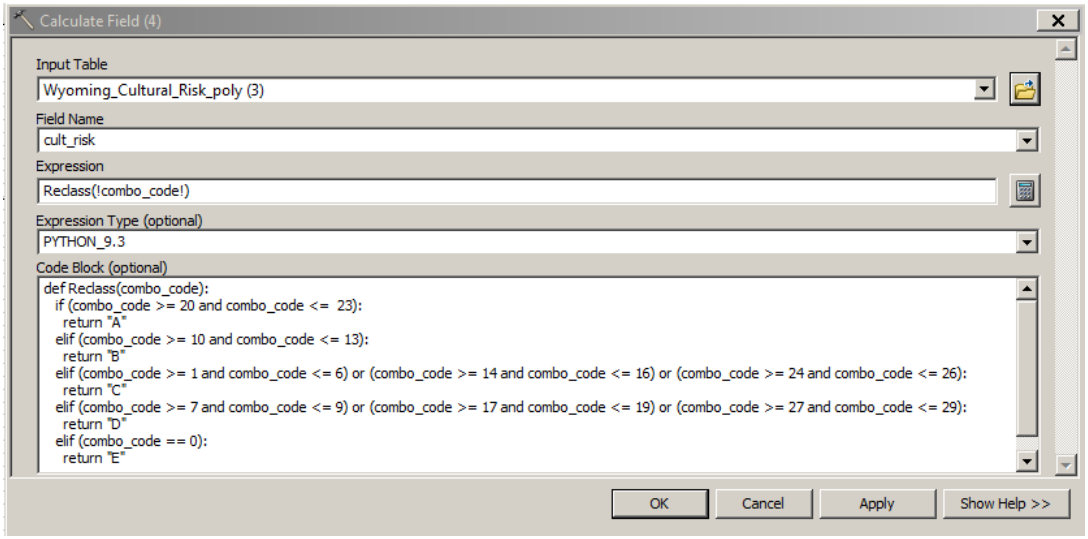


Figure E-7. Implementation of Pairwise Comparison

E.1.1 Specifications for Converting Vector Data to the Standard WECC Map Projection and Coordinate System

1. Prior to conversion into raster, all vector data should be projected into a common projection with the following parameters:
    - **USA_Contiguous_Albers_Equal_Area_Conic_USGS_version**
    -

Projection: Albers

False_Easting: 0.000000

False_Northing: 0.000000

Central_Meridian: -96.000000

Standard_Parallel_1: 29.500000

Standard_Parallel_2: 45.500000

Latitude_Of_Origin: 23.000000

Linear Unit: Meter (1.000000)

-

Geographic Coordinate System: GCS_North_American_1983

Angular Unit: Degree (0.0174532925199433299)

Prime Meridian: Greenwich (0.000000000000000000)

Datum: D_North_American_1983

Spheroid: GRS_1980
Semimajor Axis: 6378137.000000000000000000

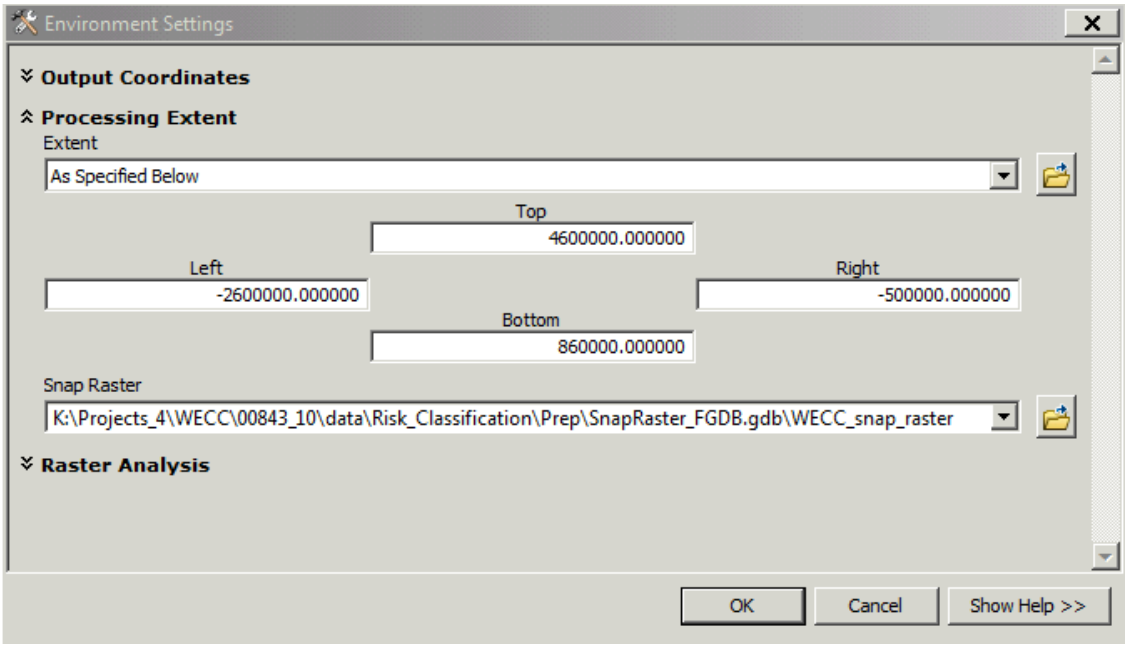
Semiminor Axis: 6356752.314140356100000000

Inverse Flattening: 298.257222101000020000

E.1.2 Specifications for Converting Vector Data to Raster

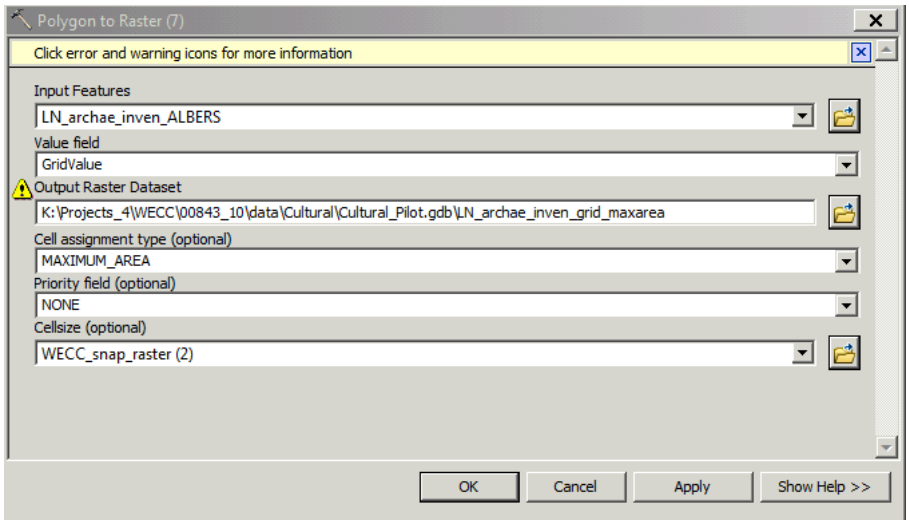
This section provides instructions for specifying the vector-to-raster conversion parameters for use in the WECC cultural risk classification analysis. This information is provided to SHPOs or other parties who may wish to convert vector data into raster for delivery to WECC or for their own purposes.

1. All vector data should be converted into ESRI raster files using the following specifications. The ArcMap and Model Builder (if used) environment settings should be set so that the Processing Extent uses the WECC Snap Raster (the WECC Snap Raster is available upon request from ICF). This setting ensures that all rasterized data line up and possess the same map extents and cell size as the other data used for WECC environmental risk modeling. Once the Snap Raster is set in the Environment Settings, the Extent values should display an exact match to those shown below (the Snap Raster file location will vary depending upon your organization's file organization configuration):



2. Conversion of vector data files to raster should also use the WECC Snap Raster data file as the "Cellsize" entry in the user dialog. An example of the Polygon to Raster dialog is shown below. This setting will set the cell size to 500 x 500 meters. The Cell assignment type should be set to "CENTER" except in the case for cultural resources data. For cultural resources sites, the Cell assignment type should be set to "MAXIMUM_COMBINED_AREA" and the Priority Field set to a value that is constant for all site features (in the example screenshot below, the field GRIDVALUE has been calculated to a constant value of 1 for all features, prior to running the

conversion to raster). For cultural resources survey areas, the Cell assignment type should be set to “MAXIMUM_AREA” and the Priority field set to “NONE”.



Appendix E-2: Information on Data Provided by SHPOs

This appendix provides specifications that may be provided to SHPOs to facilitate their provision of geospatial data necessary for WECC and its contractors to perform cultural risk modeling as described in this document.

What to Provide

The requested data is comprised of two types of data: known cultural site locations; and survey/inventory locations.

1. Deliver one or more data layers that represent the locations of known cultural resources sites. These sites may be represented as points, lines, and/or polygons; deliver each of these feature types, as applicable, as separate files (shapefiles or geodatabase feature classes).
2. Deliver one or more data layers that represent the locations of cultural resources inventory or surveys. These sites may be represented as points, lines, and/or polygons; deliver each of these feature types, as applicable, as separate files (shapefiles or geodatabase feature classes). Include an attribute that represents the date that the survey was performed, if available; the date field should be of type "Date" in the ESRI database.

How to Prepare the Data

3. Provide the requested data in ESRI format, i.e. either as shapefilles or as feature classes in a file geodatabase or a personal geodatabase. Please ensure that projection information is included with the data set (the ESRI ArcMap tool "Define Projection" can be used for this purpose, if needed). Compress the files into a .zip file or folder using any standard file compression software, such as Winzip, 7-Zip, or similar.

How to Deliver the Data

4. Deliver the data through any of the following methods:
    a. As an attachment to email (if the size of the zip file is small enough to successfully be attached to an email).
    b. Written to CD or DVD, and delivered to ICF (see below for contact info).
    c. Uploaded to a designated ftp site. Upon request, an ICF-sponsored ftp site can be used for this purpose.
    d. Uploaded to a free public cloud-based file hosting site, such as Google Drive.

Data Security

Any data supplied by a SHPO to WECC and its technical contractor ICF, will be treated as confidential and will be secured by industry-standard methods to maintain data security and protection. The data will be viewed and used by selected authorized WECC and ICF staff for purposes specific to this project, and will not be displayed or distributed to external parties. The derivative products of modeling described in this document, such as data representing neighborhood site density and cultural risk, will be displayed through a web mapping application in methods coordinated with, and approved by, participating SHPOs.

Contact Information

Please send data, or address any general questions on WECC and its transmission planning process to:

Byron B. Woertz, Jr., PMP
Senior Project Manager
Western Electricity Coordinating Council
155 North 400 West , Suite 200
Salt Lake City, Utah 84103-1114
Desk: (801) 883-6841
bwoertz@wecc.biz

For Additional Information on the development of this cultural resources analysis process, please contact the following:

Karyn de Dufour
Deputy State Historic Preservation Officer
Nevada State Historic Preservation Office
901 S. Stewart St., Ste 5004
Carson City, NV 89701
Desk: (775) 684-3447
kdedufour@shpo.nv.gov

-or-

Kristen Jensen
Electronic Business Project Manager
Utah Department of Heritage and Arts
300 S Rio Grande Street
Salt Lake City, UT 84101
Desk: (801) 245-7243
kjensen@utah.gov