

**Appendix A**  
**Dust Definition Feasibility Assessment: Data Resources Table**

The following table provides an example list of potentially-applicable online data, models, and conceptual approaches capable of providing resources required to implement the WRAP Dust Definition.

The table is arranged by the information each resource provides (first column), followed by the name of the resource (second column), and online location or reference for the resource (third column). These three columns are repeated on each page. Due to the number of columns of information provided for each information resource, each row of the table is described over three consecutive pages. For example, wind erosion data provided by the RVDE project is shown on the first row of the first three pages of the table.

Please see the final page of this appendix for an explanation of the dust source data types and the rating systems used to evaluate each information resource.

**Appendix A**  
**Potentially-useful information resources for implementing the WRAP Dust Definition**

<b>Information</b>	<b>Resource</b>	<b>Location</b>	<b>Cost</b>	<b>Organization</b>	<b>Description</b>
<b>Wind Erosion</b>	Recoverability and Vulnerability of Desert Ecosystems (RVDE) project	<a href="http://geography.wr.usgs.gov/mojave/rvde/activ_wind.html">http://geography.wr.usgs.gov/mojave/rvde/activ_wind.html</a>	NA <sup>f</sup>	USGS	The vulnerability of desert surfaces to wind erosion and their recoverability after disturbance has been modeled using data from portable wind-tunnel measurements, soil characteristics (chemical and physical) and vegetative community characteristics (cover, density, and arrangement). This model is being field-tested, using new sites that represent a range of soil surface age, altitude, soil grain size, and parent material.
<b>Dust Emission</b>	Northwest Columbia Plateau Wind Erosion / Air Quality Project; Measurement and Modeling of PM10 from Agricultural Sources	<a href="http://www.pnw-winderosion.wsu.edu/Docs/Current%20Project/Claiborn-Lamb04.pdf">http://www.pnw-winderosion.wsu.edu/Docs/Current%20Project/Claiborn-Lamb04.pdf</a>	NA	Washington State University	Modeling system that accurately describes the emission, transport and dispersion of, and air quality impacts from, windblown dust from the Columbia Plateau. A secondary goal is to develop an air quality modeling system to describe the emission, transport and dispersion of, and air quality impacts from, agricultural field burning in eastern Washington and northern Idaho.
<b>Wind Erosion</b>	Spatially-Explicit Wind Erosion Model (SWEMO)	<a href="http://www.csr1.ars.usda.gov/wewe/icar5/individuals/71.pdf">http://www.csr1.ars.usda.gov/wewe/icar5/individuals/71.pdf</a>	NA	University of Virginia	A spatially explicit wind erosion and dust flux model (SWEMO) that allows estimation of wind erosion and dust flux across a landscape by incorporating spatial distributions of important parameters. This approach provides a powerful basis for trying to understand how vegetation and soil interact in the landscape to create the dust sources. This approach is therefore applicable in trying to understand the most important or persistent dust sources in an area. The goal of SWEMO is to integrate soil and vegetation parameters from field studies or remote sensing in a robust model of dust sources.
<b>Land use</b>	USGS National Map Viewer	<a href="http://nmviewogc.cr.usgs.gov/">http://nmviewogc.cr.usgs.gov/</a>	Free	USEPA and USGS	The National Land Cover Database (NLCD) classification contains 21 different land cover categories. The NLCD was produced as a cooperative effort between the U.S. Geological Survey (USGS) and the U.S. Environmental Protection Agency (US EPA) to produce a consistent, land cover data layer for the conterminous U.S. using early 1990s Landsat thematic mapper (TM) data.
<b>Roads, railroads, and trails</b>	USGS National Map Viewer	<a href="http://nmviewogc.cr.usgs.gov/">http://nmviewogc.cr.usgs.gov/</a>	Free	USGS	Cartographic Feature Files Roads and Trails theme depicts roads, highways, railroads, and trails on the surface of the Earth.
<b>Average Annual Precipitation</b>	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	Free	Natural Resources Conservation Service (NRCS)	The average annual precipitation data for the conterminous United States from 1961 through 1990 were produced through a partnership between the NRCS and the Spatial Climate Analysis Service at Oregon State University (OSU). NRCS provided oversight and funding to OSU for the PRISM Climate Mapping Project. PRISM is a unique modeling system designed to mimic the decision-making process an expert climatologist would use when creating a climate map.
<b>Precipitation, Dew Point, Temperature</b>	PRISM Data Explorer	<a href="http://mistral.oce.orst.edu/www/mapserver/n/index.phtml">http://mistral.oce.orst.edu/www/mapserver/n/index.phtml</a>	Free	Spatial Climate Analysis Service, Oregon State University	Average monthly precipitation, dew point, and temperature data. This OSU SCAS web site provides access to the highest-quality spatial climate data sets currently available. These data sets were created using the PRISM climate mapping system, developed by Dr. Christopher Daly, SCAS director. PRISM is unique in that it incorporates a spatial climate knowledge base that accounts for rain shadows, temperature inversions, coastal effects, and more in the climate mapping process.

Information	Resource	Location	Spatial Extent	User Interface	User Input	Data Format	Spatial Resolution (m)	Data Export	User required for data interpretation and use
Wind Erosion	Recoverability and Vulnerability of Desert Ecosystems (RVDE) project	<a href="http://geography.wr.usgs.gov/mojave/rvde/activ_wind.html">http://geography.wr.usgs.gov/mojave/rvde/activ_wind.html</a>	Mojave National Preserve	Online Acrobat file	NA	Raster	< 1000	Copy and paste from Acrobat	Various experts
Dust Emission	Northwest Columbia Plateau Wind Erosion / Air Quality Project; Measurement and Modeling of PM10 from Agricultural Sources	<a href="http://www.pnw-winderosion.wsu.edu/Docs/Current%20Project/Claiborn-Lamb04.pdf">http://www.pnw-winderosion.wsu.edu/Docs/Current%20Project/Claiborn-Lamb04.pdf</a>	Columbia Plateau	NA	NA	NA	NA	NA	Various experts
Wind Erosion	Spatially-Explicit Wind Erosion Model (SWEMO)	<a href="http://www.csrl.ars.usda.gov/wewc/icar5/individuals/71.pdf">http://www.csrl.ars.usda.gov/wewc/icar5/individuals/71.pdf</a>	NA	GIS	GIS layers of soil and vegetation, wind data	GIS	NA	GIS	Various experts; GIS expert required to manipulate shapefiles
Land use	USGS National Map Viewer	<a href="http://nmviewogc.cr.usgs.gov/">http://nmviewogc.cr.usgs.gov/</a>	United States	Online user-directed map interface with downloadable GIS shapefiles	Selection of area by altitude/Longitude; Manual selection of area by visual map interface	Raster	30	GIS Shapefiles	Various experts; GIS expert required to manipulate shapefiles
Roads, railroads, and trails	USGS National Map Viewer	<a href="http://nmviewogc.cr.usgs.gov/">http://nmviewogc.cr.usgs.gov/</a>	United States	Online user-directed map interface with downloadable GIS shapefiles	Selection of area by altitude/Longitude; Manual selection of area by visual map interface	Line	NA	GIS Shapefiles	Various experts; GIS expert required to manipulate shapefiles
Average Annual Precipitation	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	United States	Online user-directed map interface with downloadable GIS shapefiles	Manual selection of area by visual map interface (Latitude/Longitude visible during selection)	Polygon	~1000	GIS Shapefiles	Various experts; GIS expert required to manipulate shapefiles
Precipitation, Dew Point, Temperature	PRISM Data Explorer	<a href="http://mistral.oce.orst.edu/www/mapserver/nn/index.phtml">http://mistral.oce.orst.edu/www/mapserver/nn/index.phtml</a>	United States	Online user-directed map interface with downloadable GIS shapefiles	Manual selection of area by visual map interface; Latitude/Longitude; Time period	Raster	NA	GIS	Climatological expert; GIS expert required to manipulate shapefiles

Information	Resource	Location	Use of information for dust definition				Score for WRAP Dust Definition Applicability (1 low - 10 high) <sup>e</sup>	Notes
			Dust source geographic distribution <sup>a</sup>	Dust source characterization <sup>b</sup>	Spatially-explicit dust emission <sup>c</sup>	Dust partitioning <sup>d</sup>		
Wind Erosion	Recoverability and Vulnerability of Desert Ecosystems (RVDE) project	<a href="http://geography.wr.usgs.gov/mojave/rvde/activ_wind.html">http://geography.wr.usgs.gov/mojave/rvde/activ_wind.html</a>	✓ <sup>g</sup>	✓	✓		10	Limited to Mojave National Preserve and/or Mojave Desert.
Dust Emission	Northwest Columbia Plateau Wind Erosion / Air Quality Project; Measurement and Modeling of PM10 from Agricultural Sources	<a href="http://www.pnw-winderosion.wsu.edu/Docs/Current%20Project/Claiborn-Lamb04.pdf">http://www.pnw-winderosion.wsu.edu/Docs/Current%20Project/Claiborn-Lamb04.pdf</a>	✓	✓	✓	✓	10	Model and data have not been released. Limited geographic coverage. Applicable to agricultural soils. Also see: <a href="http://www.ecy.wa.gov/pubs/0302014.pdf">http://www.ecy.wa.gov/pubs/0302014.pdf</a>
Wind Erosion	Spatially-Explicit Wind Erosion Model (SWEMO)	<a href="http://www.csrl.ars.usda.gov/wewe/icar5/individuals/71.pdf">http://www.csrl.ars.usda.gov/wewe/icar5/individuals/71.pdf</a>	✓	✓	✓		10	
Land use	USGS National Map Viewer	<a href="http://nmviewogc.cr.usgs.gov/">http://nmviewogc.cr.usgs.gov/</a>	✓		✓	✓	9	Also available via National Atlas.
Roads, railroads, and trails	USGS National Map Viewer	<a href="http://nmviewogc.cr.usgs.gov/">http://nmviewogc.cr.usgs.gov/</a>	✓		✓	✓	9	Also available via National Atlas.
Average Annual Precipitation	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	✓	✓	✓		9	
Precipitation, Dew Point, Temperature	PRISM Data Explorer	<a href="http://mistral.ocs.orst.edu/www/mapserver/n/index.phtml">http://mistral.ocs.orst.edu/www/mapserver/n/index.phtml</a>	✓	✓	✓		9	Also see <a href="http://www.ocs.orst.edu/prism/">http://www.ocs.orst.edu/prism/</a>

Information	Resource	Location	Cost	Organization	Description
Climatological Data	Various	<a href="http://wrcc.dri.edu/">http://wrcc.dri.edu/</a>	Variable	Western Regional Climate Center, Desert Research Institute	Climatology data
Climatological Data	National Climatic Data Center	<a href="http://www.ncdc.noaa.gov/oa/ncdc.html">http://www.ncdc.noaa.gov/oa/ncdc.html</a>	Free	NOAA	NCDC is the world's largest active archive of weather data.
Roads and Railroads	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	Free	USGS	The Major Roads of the United States map layer shows the major roads and ferry crossings in the United States that can be represented at a map scale of 1:2,000,000. Most local streets and small roads cannot be portrayed at this scale. The Railroads of the United States map layer shows the major railroads of the conterminous United States and Alaska that can be represented at a map scale of 1:2,000,000. Some small railroads cannot be portrayed at this scale. Descriptive information includes the name of the railroad and the railroad type.
Surface Water Bodies	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	Free	USGS	The Streams and Water bodies of the United States map layer shows the major water features of the United States that can be represented at a map scale of 1:2,000,000. Water features include streams and rivers, canals, aqueducts, lakes, reservoirs, marshes, glaciers, bays, and oceans, including intermittent and dry water bodies. Some small features cannot be portrayed at this scale. Descriptive information includes the feature name and the type of water feature represented.
Wind Erosion Susceptibility	Eolian Mapping Index (EMI)	<a href="http://geochange.er.usgs.gov/sw/impacts/geology/rainfall/eolianmp.html">http://geochange.er.usgs.gov/sw/impacts/geology/rainfall/eolianmp.html</a>	NA	USGS	Using satellite digital multispectral data, the Eolian model has been developed that allows an image to be generated that emphasizes areas with low vegetation density and high reflectance soils. Generally, this automatically maps two important eolian erosion parameters (i.e., amount of vegetation cover/density and general surface soil type). In arid and semi-arid environments the soils most vulnerable to wind erosion usually have low vegetation cover and bright reflectance. An image is generated using this model that shows areas where these two conditions occur together. Current analysis and field work are evaluating the accuracy of the model by validating and quantifying wind erosion susceptibility.
Soil T-Factor	National Resources Inventory	<a href="http://www.nrcs.usda.gov/Technical/land/erosion.html">http://www.nrcs.usda.gov/Technical/land/erosion.html</a>	Free	USDA NRCS	The National Resources Inventory (NRI) is a statistical survey designed to help gauge natural resource status, conditions, and trends on the Nation's nonfederal land. Data are National STATSGO Interpretive map of the "probability" of soil map units having soils with t-factor (soil loss tolerance, the maximum amount of erosion at which the quality of a soil as a medium for plant growth can be maintained) of 1, 2, 3, 4, and 5. Data presented in tabular form include estimated average annual wind erosion in relation to T value on nonfederal rural land, by land cover/use.
Soil Erosion by Wind	National Resources Inventory	<a href="http://www.nrcs.usda.gov/Technical/land/erosion.html">http://www.nrcs.usda.gov/Technical/land/erosion.html</a>	Free	USDA NRCS	The National Resources Inventory (NRI) is a statistical survey designed to help gauge natural resource status, conditions, and trends on the Nation's nonfederal land. Data are shaded polygon maps where soil erosion by wind on cropland and Conservation Reserve Program (CRP) land is displayed in five shaded classes of tons per acre per year.
Wind Erosion	Wind Erosion Prediction System	<a href="http://www.weru.ksu.edu/weps/wepshome.html">http://www.weru.ksu.edu/weps/wepshome.html</a>	NA	USDA NRCS	The Wind Erosion Prediction System (WEPS) is a process-based, daily time-step model that simulates weather, field conditions, and erosion. The purposes of WEPS are to improve technology for assessing soil loss by wind from agricultural fields and to provide new capabilities such as assessing plant damage, calculating suspension loss, and estimating PM-10 emissions from the field.
Disturbance and Erosion Analysis	Land Condition Index	<a href="http://www.geodec.org/Mendoza_1.pdf">http://www.geodec.org/Mendoza_1.pdf</a>	NA	University of Illinois	Multiple criteria models that can be used to assess land condition in general, and military training areas in particular. Three measures of land condition are used, namely: 1) erosion status, which is estimated based on the Revised Universal Soil Loss Equation (RUSLE), 2) percent vegetative cover, and 3) range condition. The multi-criteria methods are integrated or linked with Geographic Information Systems (GIS) to make land condition assessment geographically specific.

Information	Resource	Location	Spatial Extent	User Interface	User Input	Data Format	Spatial Resolution (m)	Data Export	User required for data interpretation and use
Climatological Data	Various	<a href="http://wrcc.dri.edu/">http://wrcc.dri.edu/</a>	United States	Online	Selection of area by various methods	Various	NA	NA	Climatological expert; GIS expert required to manipulate shapefiles
Climatological Data	National Climatic Data Center	<a href="http://www.ncdc.noaa.gov/oa/ncdc.html">http://www.ncdc.noaa.gov/oa/ncdc.html</a>	United States	Online user-directed map interface with downloadable GIS shapefiles	Manual selection of area by visual map interface (Latitude/Longitude visible during selection)	Various	NA	NA	Climatological expert; GIS expert required to manipulate shapefiles
Roads and Railroads	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	United States	Online user-directed map interface with downloadable GIS shapefiles	Manual selection of area by visual map interface (Latitude/Longitude visible during selection)	Line	NA	GIS Shapefiles	Various experts; GIS expert required to manipulate shapefiles
Surface Water Bodies	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	United States	Online user-directed map interface with downloadable GIS shapefiles	Manual selection of area by visual map interface (Latitude/Longitude visible during selection)	Line and Polygon	NA	GIS Shapefiles	Various experts; GIS expert required to manipulate shapefiles
Wind Erosion Susceptibility	Eolian Mapping Index (EMI)	<a href="http://geochange.er.usgs.gov/sw/impacts/geology/rainfall/eolianmp.html">http://geochange.er.usgs.gov/sw/impacts/geology/rainfall/eolianmp.html</a>	Southwest United States	NA	NA	NA	NA	NA	Various experts
Soil T-Factor	National Resources Inventory	<a href="http://www.nrcs.usda.gov/Technical/land/erosion.html">http://www.nrcs.usda.gov/Technical/land/erosion.html</a>	United States	Online, nationwide maps	None	Acrobat maps (Polygon)	NA	Copy and paste from Acrobat	Various experts
Soil Erosion by Wind	National Resources Inventory	<a href="http://www.nrcs.usda.gov/Technical/land/erosion.html">http://www.nrcs.usda.gov/Technical/land/erosion.html</a>	United States, private cropland only	Online, nationwide maps	None	Acrobat maps (Raster)	NA	Copy and paste from Acrobat	Various experts
Wind Erosion	Wind Erosion Prediction System	<a href="http://www.weru.ksu.edu/weps/wepshome.html">http://www.weru.ksu.edu/weps/wepshome.html</a>	United States	User-interface via model, seven submodels, and four databases	Soil, Climatological, Vegetative data	NA	NA	NA	Various experts
Disturbance and Erosion Analysis	Land Condition Index	<a href="http://www.geodec.org/Mendoza_1.pdf">http://www.geodec.org/Mendoza_1.pdf</a>	NA	GIS	GIS layers of land use, vegetation, soil, etc.	GIS	NA	GIS	Various experts; GIS expert required to manipulate shapefiles

Information	Resource	Location	Use of information for dust definition				Score for WRAP Dust Definition Applicability (1 low - 10 high) <sup>e</sup>	Notes
			Dust source geographic distribution <sup>a</sup>	Dust source characterization <sup>b</sup>	Spatially-explicit dust emission <sup>c</sup>	Dust partitioning <sup>d</sup>		
Climatological Data	Various	<a href="http://wrcc.dri.edu/">http://wrcc.dri.edu/</a>	✓		✓		9	Some data limited to Western United States.
Climatological Data	National Climatic Data Center	<a href="http://www.ncdc.noaa.gov/oa/ncdc.html">http://www.ncdc.noaa.gov/oa/ncdc.html</a>	✓		✓		9	
Roads and Railroads	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	✓		✓	✓	9	
Surface Water Bodies	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	✓		✓		9	Includes spatial information on dry river beds and dry lakes, major natural dust sources.
Wind Erosion Susceptibility	Eolian Mapping Index (EMI)	<a href="http://geochange.er.usgs.gov/sw/impacts/geology/rainfall/eolianmp.html">http://geochange.er.usgs.gov/sw/impacts/geology/rainfall/eolianmp.html</a>	✓	✓	✓		9	Model and data are not yet available, but would be directly applicable.
Soil T-Factor	National Resources Inventory	<a href="http://www.nrcs.usda.gov/Technical/land/erosion.html">http://www.nrcs.usda.gov/Technical/land/erosion.html</a>	✓	✓	✓		9	
Soil Erosion by Wind	National Resources Inventory	<a href="http://www.nrcs.usda.gov/Technical/land/erosion.html">http://www.nrcs.usda.gov/Technical/land/erosion.html</a>	✓	✓		✓	9	Limited to private crop lands. Low resolution of data.
Wind Erosion	Wind Erosion Prediction System	<a href="http://www.weru.ksu.edu/weps/wepshome.html">http://www.weru.ksu.edu/weps/wepshome.html</a>	✓	✓			9	Approach limited to crop lands, although being developed for rangelands.
Disturbance and Erosion Analysis	Land Condition Index	<a href="http://www.geodec.org/Mendoza_1.pdf">http://www.geodec.org/Mendoza_1.pdf</a>	✓	✓	✓	✓	9	

Information	Resource	Location	Cost	Organization	Description
Global Dust Sources	Model of Atmospheric Transport and Chemistry (MATCH)	<a href="http://www.cgd.ucar.edu/cms/match/new_website/">http://www.cgd.ucar.edu/cms/match/new_website/</a>	Free	National Science Foundation	Dust transport model.
Causes for Forest Fragmentation	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	Free	USEPA and USGS	The Causes of Forest Fragmentation map layers were derived from NLCD by the U.S. Environmental Protection Agency and the U.S. Geological Survey (USGS). These map layers are grid maps of the conterminous United States, showing both forest connectivity and whether fragmentation is from human or natural causes. The data are presented in three bands: one each for forest connectivity, human-caused fragmentation, and natural fragmentation.
Fuel Loading	WRAP Fuel Characteristic Classification Systems (FCCS)	<a href="http://www.fs.fed.us/pnw/fera/nfp/haze/mckenzie-et-al-fuel-mapping.pdf">http://www.fs.fed.us/pnw/fera/nfp/haze/mckenzie-et-al-fuel-mapping.pdf</a>	Free	USDA Forest Service, WRAP	Coverage of fuelbed types based on biogeography, dominant vegetation, and disturbance/management history. GIS coverages (1-km) of potential vegetation, current vegetation, land use, historical fire regimes, and structural-stage classes for the western United States. Ecological provinces have been further classified according to climatological model to predict site-specific habitat types (associations between dominant cover and potential vegetation are filtered through gradient variables and fine-tuned by consideration of condition class, change agents, and other attributes). Model includes pre-defined fuel loadings by model-defined habitat type. Data are GIS coverages providing habitat type and fuel loading. Model is dynamic and can be used to reclassify areas based on climatology, land use, fires, etc.
Biological Soil Crusts Prediction Map	Recoverability and Vulnerability of Desert Ecosystems (RVDE) project	<a href="http://geography.wr.usgs.gov/mojave/rvde/activ_biosoil.html">http://geography.wr.usgs.gov/mojave/rvde/activ_biosoil.html</a>	NA	USGS	Prototype models are being developed that predict soil crust distribution (cover of mosses, lichens, and cyanobacteria) and to use these models to create spatially explicit maps to inform land managers about where different crust communities are located and the vulnerability of each community type. One of the key landscape elements that minimizes both wind and water erosion is the presence and types of cryptobiotic crusts mantling soil surfaces. Soil crusts are an important process control on surficial erosion.
Soil Type	Soil Data Mart: Soil Survey Geographic (SSURGO) database	<a href="http://soildatamart.nrcs.usda.gov/">http://soildatamart.nrcs.usda.gov/</a>	Free	USDA NRCS	Spatial distribution of soil types, with slope.
Landforms	Southwest Regional GAP Analysis Project	<a href="http://earth.gis.usu.edu/swgap/landform.html">http://earth.gis.usu.edu/swgap/landform.html</a>	Free	USGS, State Agencies	Ten landform position classes defined by topographic position and slope gradients were modeled using a GIS. The ten landform classes are: 1) Valley flats, 2) Gently sloping toe slopes, 3) Gently sloping ridges, fans and hills, 4) Nearly level terraces and plateaus, 5) Very moist steep slopes, 6) Moderately moist steep slopes, 7) Moderately dry steep slopes, 8) Very dry steep slopes, 9) Cool aspect scarps, cliffs and canyons, and 10) Hot aspect scarps, cliffs and canyons. The GIS model was created using ArcInfo AML and a 30 meter DEM (digital elevation model).
Wildlife and Vegetation Data	Other State and Regional GAP Analysis Projects	<a href="http://www.gap.uidaho.edu/">http://www.gap.uidaho.edu/</a>	Free	USGS, State Agencies	The Gap Analysis Program develops land cover maps from Landsat satellite imagery for each state as a framework for assessing the conservation status of vegetation types and associated target species. Fields housing information on key environmental factors, dynamic processes, landscape relations, and disturbance history are included in each record. Included are predictive maps for forecasting the distribution of species.
Landslide Susceptibility	Preliminary Soil-Slip Susceptibility Maps, Southwestern California	<a href="http://geopubs.wr.usgs.gov/open-file/of03-17/">http://geopubs.wr.usgs.gov/open-file/of03-17/</a>	Free	USGS	This group of maps shows relative susceptibility of hill slopes to the initiation sites of rainfall-triggered soil slip-debris flows in southwestern California. The susceptibility maps were created through an iterative process from two kinds of information. First, locations of sites of past soil slips were obtained from inventory maps of past events. Aerial photographs, taken during six rainy seasons that produced abundant soil slips, were used as the basis for soil slip-debris flow inventory. Second, digital elevation models (DEM) of the areas that were inventoried were used to analyze the spatial characteristics of soil slip locations. These data were supplemented by observations made on the ground. Certain physical attributes of the locations of the soil-slip debris flows were found to be important and others were not. The most important attribute was the mapped bedrock formation at the site of initiation of the soil slip.

Information	Resource	Location	Spatial Extent	User Interface	User Input	Data Format	Spatial Resolution (m)	Data Export	User required for data interpretation and use
Global Dust Sources	Model of Atmospheric Transport and Chemistry (MATCH)	<a href="http://www.cgd.ucar.edu/cms/match/new_website/">http://www.cgd.ucar.edu/cms/match/new_website/</a>	NA	Software	NA	NA	NA	NA	Various experts
Causes for Forest Fragmentation	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	United States, Forested areas only	Online user-directed map interface with downloadable GIS shapefiles	Manual selection of area by visual map interface (Latitude/Longitude visible during selection)	Raster	1000	GIS Shapefiles	Ecological expert; GIS expert required to manipulate shapefiles
Fuel Loading	WRAP Fuel Characteristic Classification Systems (FCCS)	<a href="http://www.fs.fed.us/pnw/fera/nfp/haze/mckenzie-et-al-fuel-mapping.pdf">http://www.fs.fed.us/pnw/fera/nfp/haze/mckenzie-et-al-fuel-mapping.pdf</a>	Western United States	GIS	Selection of area via GIS.	GIS	1000	GIS	Ecological expert; GIS expert required to manipulate shapefiles
Biological Soil Crusts Prediction Map	Recoverability and Vulnerability of Desert Ecosystems (RVDE) project	<a href="http://geography.wr.usgs.gov/mojave/rvde/activ_biosoil.html">http://geography.wr.usgs.gov/mojave/rvde/activ_biosoil.html</a>	Mojave National Preserve	Online Acrobat file	NA	Raster	< 1000	Copy and paste from Acrobat	Various experts
Soil Type	Soil Data Mart: Soil Survey Geographic (SSURGO) database	<a href="http://soildatamart.nrcs.usda.gov/">http://soildatamart.nrcs.usda.gov/</a>	Most of United States, some western areas not covered	Online user-directed interface with downloadable GIS shapefiles and report-generating capabilities	Selection of area by state, county	Raster and Text	NA	GIS Shapefiles	Various experts; GIS expert required to manipulate shapefiles
Landforms	Southwest Regional GAP Analysis Project	<a href="http://earth.gis.usu.edu/swgap/landform.html">http://earth.gis.usu.edu/swgap/landform.html</a>	Arizona, Colorado, Nevada, New Mexico, Utah	Downloadable GIS shapefiles	GIS	Raster	30	GIS	Various experts; GIS expert required to manipulate shapefiles
Wildlife and Vegetation Data	Other State and Regional GAP Analysis Projects	<a href="http://www.gap.uidaho.edu/">http://www.gap.uidaho.edu/</a>	United States	Downloadable GIS shapefiles	GIS	Raster	Variable	GIS	Various experts; GIS expert required to manipulate shapefiles
Landslide Susceptibility	Preliminary Soil-Slip Susceptibility Maps, Southwestern California	<a href="http://geopubs.wr.usgs.gov/open-file/of03-17/">http://geopubs.wr.usgs.gov/open-file/of03-17/</a>	Southwestern California	Downloadable GIS shapefiles	Selection of site by USGS Quadrangle	GIS	10	GIS, Acrobat	Geological expert; GIS expert required to manipulate shapefiles

Information	Resource	Location	Use of information for dust definition				Score for WRAP Dust Definition Applicability (1 low - 10 high) <sup>e</sup>	Notes
			Dust source geographic distribution <sup>a</sup>	Dust source characterization <sup>b</sup>	Spatially-explicit dust emission <sup>c</sup>	Dust partitioning <sup>d</sup>		
Global Dust Sources	Model of Atmospheric Transport and Chemistry (MATCH)	<a href="http://www.cgd.ucar.edu/cms/match/new_website/">http://www.cgd.ucar.edu/cms/match/new_website/</a>	✓	✓	✓		9	
Causes for Forest Fragmentation	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	✓			✓	8	Forest fragmentation causality can be used to identify anthropogenic influences in forested areas. Data can also be used to identify the extent of forests.
Fuel Loading	WRAP Fuel Characteristic Classification Systems (FCCS)	<a href="http://www.fs.fed.us/pnw/fera/nfp/haze/mckenzie-et-al-fuel-mapping.pdf">http://www.fs.fed.us/pnw/fera/nfp/haze/mckenzie-et-al-fuel-mapping.pdf</a>	✓		✓		8	Fuel-loading information of limited value. Refined habitat classifications based on precipitation and other variables (via the model) potentially more useful than other less refined spatial habitat/ecoregion data. Also: <a href="http://coral.cfr.washington.edu/~dmck/feradata/fcc_west2004b2.zip">http://coral.cfr.washington.edu/~dmck/feradata/fcc_west2004b2.zip</a>
Biological Soil Crusts Prediction Map	Recoverability and Vulnerability of Desert Ecosystems (RVDE) project	<a href="http://geography.wr.usgs.gov/mojave/rvde/activ_biosoil.html">http://geography.wr.usgs.gov/mojave/rvde/activ_biosoil.html</a>	✓	✓	✓	✓	8	Limited to Mojave National Preserve and/or Mojave Desert.
Soil Type	Soil Data Mart: Soil Survey Geographic (SSURGO) database	<a href="http://soildatamart.nrcs.usda.gov/">http://soildatamart.nrcs.usda.gov/</a>	✓		✓		8	
Landforms	Southwest Regional GAP Analysis Project	<a href="http://earth.gis.usu.edu/swgap/landform.html">http://earth.gis.usu.edu/swgap/landform.html</a>	✓		✓		8	
Wildlife and Vegetation Data	Other State and Regional GAP Analysis Projects	<a href="http://www.gap.uidaho.edu/">http://www.gap.uidaho.edu/</a>	✓	✓	✓	✓	8	Potentially very useful for investigating anthropogenic influences in an area, identifying major vegetation, investigation land use changes, etc. Also see <a href="http://www.gap.uidaho.edu/Tools/default.htm">http://www.gap.uidaho.edu/Tools/default.htm</a>
Landslide Susceptibility	Preliminary Soil-Slip Susceptibility Maps, Southwestern California	<a href="http://geopubs.wr.usgs.gov/open-file/of03-17/">http://geopubs.wr.usgs.gov/open-file/of03-17/</a>	✓		✓		8	Limited to southwestern-California.

Information	Resource	Location	Cost	Organization	Description
Meteorological Data	Arizona Meteorological Network (AZMET)	<a href="http://ag.arizona.edu/azmet/">http://ag.arizona.edu/azmet/</a>	Free	Arizona Cooperative Extension	The Arizona Meteorological Network (AZMET) provides meteorological data and weather-based information to agricultural and horticultural interests operating in southern and central Arizona. Meteorological data is collected from a network of automated weather stations located in both rural and urban production settings. Meteorological data collected by AZMET include temperature (air and soil), humidity, solar radiation, wind (speed and direction), and precipitation. AZMET also provides a variety of computed variables, including heat units (degree-days), chill hours, and reference crop evapotranspiration (ET <sub>o</sub> ).
Meteorological Data	Hydrometeorological Networks in the United States	<a href="http://www.ofps.ucar.edu/gapp/networks/">http://www.ofps.ucar.edu/gapp/networks/</a>	Free	Joint Office for Science Support (JOSS)	Gateway for a meteorological and surface data sources available from federal, state, and local agencies.
Elevation data	USGS National Map Viewer	<a href="http://nmviewogc.cr.usgs.gov/">http://nmviewogc.cr.usgs.gov/</a>	Free	USGS	The U.S. Geological Survey has developed a National Elevation Dataset (NED). The NED is a seamless mosaic of best-available elevation data. The 7.5-minute elevation data for the conterminous United States are the primary initial source data. In addition to the availability of complete 7.5-minute data, efficient processing methods were developed to filter production artifacts in the existing data, convert to the NAD83 datum, edge-match, and fill slivers of missing data at quadrangle seams. One of the effects of the NED processing steps is a much-improved base of elevation data for calculating slope and hydrologic derivatives.
Ecoregions	Smithsonian National Museum North American Mammals Database	<a href="http://www.mnh2.si.edu/education/mna/main.cfm">http://www.mnh2.si.edu/education/mna/main.cfm</a>	Free	Smithsonian Institution	The Ecoregions layer shows areas that share similar environmental conditions. When the map is zoomed out, generalized ecoregions called biomes are shown, with each biome depicted using a different color (see key below). When the map is zoomed in more closely, the names of specific ecoregions are shown, along with the boundaries between regions.
Ecoregions	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	Free	USDA Forest Service	Different levels of maps identifying areas that share common climatic and vegetation characteristics. Domains are groups of related climates and are differentiated based on precipitation and temperature. Divisions represent the climates within domains and are differentiated based on precipitation levels and patterns as well as temperature. Divisions are subdivided into provinces, which are differentiated based on vegetation or other natural land covers. Mountainous areas that exhibit different ecological zones based on elevation are identified at the province level. The finest level of detail is described by subregions, called sections, which are subdivisions of provinces based on terrain features.
Landslide Incidence and Susceptibility	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	Free	USGS	Data where landslides have occurred and areas susceptible to future landsliding. Produced from a landslide overview map compiled by the USGS National Landslide Hazards Program (NLHP). Landslides are defined to include most types of gravitational mass movement such as rockfalls, debris flows, and the failure of engineered soil materials. Descriptive information includes the type of landslide, location, date, number of deaths, and damages in millions of dollars.
Volcanoes	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	Free	Smithsonian Institution	Analyzing contemporary volcanic activity with historical and geological records of the recent past provides the context for assessing any volcano's benefits and dangers. The Global Volcanism Program (GVP) seeks better understanding of all volcanoes through documenting their eruptions during the last 10,000 years. The large and growing Volcanoes of the World database developed by the GVP contains the geographic, historical, and volcanological characteristics of nearly 3,000 active volcanoes around the world. The map layer features volcanoes in an extended area of the northern hemisphere centered on North America. Descriptive information includes the name of the volcano, the timeframe of the last known eruption, the summit elevation, the type of volcano as described by its shape and size, and the type of evidence used to determine volcanic activity. The National Atlas also includes a multimedia map showing potentially active volcanoes in the United States.

Information	Resource	Location	Spatial Extent	User Interface	User Input	Data Format	Spatial Resolution (m)	Data Export	User required for data interpretation and use
Meteorological Data	Arizona Meteorological Network (AZMET)	<a href="http://ag.arizona.edu/azmet/">http://ag.arizona.edu/azmet/</a>	Arizona	Online user-directed map interface with locations of monitoring stations	Manual selection of monitoring station data	Text	NA	comma-delimited ASCII text files	Climatological expert
Meteorological Data	Hydrometeorological Networks in the United States	<a href="http://www.ofps.ucar.edu/gapp/networks/">http://www.ofps.ucar.edu/gapp/networks/</a>	United States	Online user-directed map interface	Various	Various	NA	NA	Climatological expert
Elevation data	USGS National Map Viewer	<a href="http://nmviewogc.cr.usgs.gov/">http://nmviewogc.cr.usgs.gov/</a>	United States	Online user-directed map interface with downloadable GIS shapefiles	Selection of area by altitude/Longitude; Manual selection of area by visual map interface	Raster	10	GIS Shapefiles	Geological expert; GIS expert required to manipulate shapefiles
Ecoregions	Smithsonian National Museum North American Mammals Database	<a href="http://www.mnh2.si.edu/education/mna/main.cfm">http://www.mnh2.si.edu/education/mna/main.cfm</a>	United States	Online user-directed map interface	Manual selection of area by visual map interface (reports Latitude/Longitude selected)	Polygon	NA	Copy and paste from Internet Browser	Ecological expert
Ecoregions	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	United States	Online user-directed map interface with downloadable GIS shapefiles	Manual selection of area by visual map interface (Latitude/Longitude visible during selection)	Polygon	~1000	GIS Shapefiles	Ecological expert; GIS expert required to manipulate shapefiles
Landslide Incidence and Susceptibility	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	United States	Online user-directed map interface with downloadable GIS shapefiles	Manual selection of area by visual map interface (Latitude/Longitude visible during selection)	Raster	~1000	GIS Shapefiles	Geological expert; GIS expert required to manipulate shapefiles
Volcanoes	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	United States	Online user-directed map interface with downloadable GIS shapefiles	Manual selection of area by visual map interface (Latitude/Longitude visible during selection)	Point, with Text	NA	GIS Shapefiles	Various experts; GIS expert required to manipulate shapefiles

Information	Resource	Location	Use of information for dust definition				Score for WRAP Dust Definition Applicability (1 low - 10 high) <sup>e</sup>	Notes
			Dust source geographic distribution <sup>a</sup>	Dust source characterization <sup>b</sup>	Spatially-explicit dust emission <sup>c</sup>	Dust partitioning <sup>d</sup>		
Meteorological Data	Arizona Meteorological Network (AZMET)	<a href="http://ag.arizona.edu/azmet/">http://ag.arizona.edu/azmet/</a>	✓		✓		8	Local and Regional Mesonets such as this one are available throughout the United States
Meteorological Data	Hydrometeorological Networks in the United States	<a href="http://www.ofps.ucar.edu/gapp/networks/">http://www.ofps.ucar.edu/gapp/networks/</a>	✓	✓	✓		8	
Elevation data	USGS National Map Viewer	<a href="http://nmviewgc.cr.usgs.gov/">http://nmviewgc.cr.usgs.gov/</a>	✓		✓		7	Also available via National Atlas.
Ecoregions	Smithsonian National Museum North American Mammals Database	<a href="http://www.mnh2.si.edu/education/mna/main.cfm">http://www.mnh2.si.edu/education/mna/main.cfm</a>	✓		✓		7	Also available via National Atlas.
Ecoregions	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	✓		✓		7	
Landslide Incidence and Susceptibility	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	✓		✓		7	
Volcanoes	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	✓				7	

Information	Resource	Location	Cost	Organization	Description
<b>Anthropogenic Disturbances</b>	Recoverability and Vulnerability of Desert Ecosystems (RVDE) project	<a href="http://wrgis.wr.usgs.gov/MojaveEco/">http://wrgis.wr.usgs.gov/MojaveEco/</a>	NA	USGS	Prototype models are being developed for soil compaction (both vulnerability and recovery), wind erosion vulnerability, soil crust predictions, and vegetation recovery for a part of the Mojave Desert. As these models are refined and additional models developed, they will be combined into a suite of tools that can be used by land managers to provide input for decision-making.
<b>Ecological Site Description</b>	Ecological Site Information System	<a href="http://esis.sc.egov.usda.gov/Welcome/pgESDWelcome.aspx">http://esis.sc.egov.usda.gov/Welcome/pgESDWelcome.aspx</a>	NA	USDA NRCS	The Ecological Site Description (ESD) database is an internet based program for entering, storing, and retrieving ecological site description information. Ecological site descriptions for rangeland and forestland can be entered into the database. Ecological site is defined as "a distinctive kind of land with specific characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation". ESD is the official repository for all data associated with the development of forestland and rangeland ecological site descriptions by the Natural Resources Conservation Service. Data include Site Characteristics (identifies the site and describes the physiographic, climate, soil, and water features associated with the site), Plant Communities (describes the ecological dynamics and the common plant communities comprising the various vegetation states of the site, including disturbances that cause a shift from one state to another), Site Interpretations (interpretive information pertinent to the use and management of the site and its related resources), and
<b>Wildlife Data</b>	California Wildlife Habitats Relationships (CWHR)	<a href="http://www.dfg.ca.gov/whdab/html/cwhr.html">http://www.dfg.ca.gov/whdab/html/cwhr.html</a>	Free	California Department of Fish and Game	California Wildlife Habitat Relationships (CWHR) is a state-of-the-art information system for California's wildlife. CWHR contains life history, management, and habitat relationships information on 675 species of amphibians, reptiles, birds, and mammals known to occur in the state. Also included are habitat suitability ratings for each species, based on vegetative characteristics (percent cover, vegetative structure, etc.).
<b>Wildlife and Habitat Data</b>	NatureServe Explorer	<a href="http://www.natureserve.org/explorer/">http://www.natureserve.org/explorer/</a>	Free	NatureServe	NatureServe Explorer contains information on approximately 32,953 species and subspecies of plants, 25,928 species and subspecies of animals, and 7,065 ecological associations and alliances and 601 ecological systems. The Comprehensive Report for each species includes available information in the following categories: classification; conservation status; status rank factors; distribution; ecological and life history; economic attributes; management summary; authors and contributors; and references. The Comprehensive Report for ecological units contains available information in the following categories: classification; related names; global conservation status; distribution; environmental setting; vegetation structure; dynamic processes; authors and contributors; and references.
<b>Geology</b>	Southwest Regional GAP Analysis Project	<a href="http://earth.gis.usu.edu/swgap/">http://earth.gis.usu.edu/swgap/</a>	Free	USGS, State Agencies	This data set is a seamless 1:500,000 scale surficial geologic coverage for the states of Arizona, Colorado, Nevada, New Mexico and Utah. The coverage was compiled and edge matched from existing digital versions of the 1:500,000 scale state geologic maps
<b>Wildlife and Habitat Data</b>	South Dakota GAP Analysis Project	<a href="http://wfs.sdstate.edu/sdgap/sdgap.htm">http://wfs.sdstate.edu/sdgap/sdgap.htm</a>	Free	USGS, State Agencies	Digital maps illustrating existing native vegetation, predicted distributions of native vertebrate species, and current protected lands are created for each state using geographical information systems (GIS) and remote sensing technology.
<b>Vegetation</b>	National Park Service Vegetation Mapping Program	<a href="http://biology.usgs.gov/npsveg/products/state.html">http://biology.usgs.gov/npsveg/products/state.html</a>	Free	USGS NPS	The National Park Service (NPS), in conjunction with the Biological Resources Division (BRD) of the U.S. Geological Survey (USGS), has implemented a program to "develop a uniform hierarchical vegetation methodology" at a national level. The program will also create a geographic information system (GIS) database for the parks under its management. The purpose of the data is to document the state of vegetation within the NPS service area during the 1990's, thereby providing a baseline study for further analysis at the Regional or Service-wide level. The vegetation units of this map were determined through stereoscopic interpretation of aerial photographs supported by field sampling and ecological analysis. The vegetation boundaries were identified on the photographs by means of the photographic signatures and collateral information on slope, hydrology, geography, and vegetation in accordance with the Standardized National Vegetation Classification System
<b>Global Dust Sources</b>	Georgia Institute of Technology-Goddard Ozone Chemistry Aerosol Radiation and Transport (GOCART) Model	<a href="http://www.gfdl.noaa.gov/reference/bibliography/2002/mchinn0201.pdf">http://www.gfdl.noaa.gov/reference/bibliography/2002/mchinn0201.pdf</a>	NA	NASA	The GOCART model uses a dust emission algorithm that quantifies the dust source as a function of the degree of topographic depression. Included aerosols are sulfate, dust, organic carbon, black carbon, and sea salt.

Information	Resource	Location	Spatial Extent	User Interface	User Input	Data Format	Spatial Resolution (m)	Data Export	User required for data interpretation and use
<b>Anthropogenic Disturbances</b>	Recoverability and Vulnerability of Desert Ecosystems (RVDE) project	<a href="http://wrgis.wr.usgs.gov/MojaveEco/">http://wrgis.wr.usgs.gov/MojaveEco/</a>	Mojave National Preserve	Online Acrobat file	NA	Raster	< 1001	Copy and paste from Acrobat	Various experts
<b>Ecological Site Description</b>	Ecological Site Information System	<a href="http://esis.sc.egov.usda.gov/Welcome/pgESDWelcome.aspx">http://esis.sc.egov.usda.gov/Welcome/pgESDWelcome.aspx</a>	United States	Online interface	Selection of site by state, Major Land Resource Areas (MLRA)	Text	NA	Access Files	Ecological experts
<b>Wildlife Data</b>	California Wildlife Habitats Relationships (CWHHR)	<a href="http://www.dfg.ca.gov/whdab/html/cwhhr.html">http://www.dfg.ca.gov/whdab/html/cwhhr.html</a>	California	Software	County, Species, Habitat	Text	NA	Text	Ecological experts
<b>Wildlife and Habitat Data</b>	NatureServe Explorer	<a href="http://www.natureserve.org/explorer/">http://www.natureserve.org/explorer/</a>	United States	Online user-directed interface with downloadable GIS files	Wildlife or plant species; Habitat	Text, GIS	NA	Copy and paste from Internet Browser; GIS files	Ecological expert; GIS expert required to manipulate shapefiles
<b>Geology</b>	Southwest Regional GAP Analysis Project	<a href="http://earth.gis.usu.edu/swgap/">http://earth.gis.usu.edu/swgap/</a>	Arizona, Colorado, Nevada, New Mexico, Utah	Downloadable GIS shapefiles	GIS	Polygon	NA	GIS	Various experts; GIS expert required to manipulate shapefiles
<b>Wildlife and Habitat Data</b>	South Dakota GAP Analysis Project	<a href="http://wfs.sdstate.edu/sdgap/sdgap.htm">http://wfs.sdstate.edu/sdgap/sdgap.htm</a>	South Dakota	Online statewide maps	NA	Raster	NA	graphics files	Various experts; GIS expert required to manipulate shapefiles
<b>Vegetation</b>	National Park Service Vegetation Mapping Program	<a href="http://biology.usgs.gov/npsveg/products/state.html">http://biology.usgs.gov/npsveg/products/state.html</a>	Some National Parks	Online user-directed interface with downloadable GIS files	Selection of site by state, national park	GIS	1	GIS	Ecological experts; GIS expert required to manipulate shapefiles
<b>Global Dust Sources</b>	Georgia Institute of Technology-Goddard Ozone Chemistry Aerosol Radiation and Transport (GOCART) Model	<a href="http://www.gfdl.noaa.gov/reference/bibliography/2002/mchn0201.pdf">http://www.gfdl.noaa.gov/reference/bibliography/2002/mchn0201.pdf</a>	NA	NA	Goddard Earth Observing System Data Assimilation System (meteorology, soil data)	NA	~ 250,000	NA	Various experts

Information	Resource	Location	Use of information for dust definition				Score for WRAP Dust Definition Applicability (1 low - 10 high) <sup>e</sup>	Notes
			Dust source geographic distribution <sup>a</sup>	Dust source characterization <sup>b</sup>	Spatially-explicit dust emission <sup>c</sup>	Dust partitioning <sup>d</sup>		
Anthropogenic Disturbances	Recoverability and Vulnerability of Desert Ecosystems (RVDE) project	<a href="http://wrgis.wr.usgs.gov/MojaveEco/">http://wrgis.wr.usgs.gov/MojaveEco/</a>	✓			✓	7	Limited to Mojave National Preserve and/or Mojave Desert.
Ecological Site Description	Ecological Site Information System	<a href="http://esis.sc.egov.usda.gov/Welcome/pgESDWelcome.aspx">http://esis.sc.egov.usda.gov/Welcome/pgESDWelcome.aspx</a>	✓		✓	✓	7	Data may not be available for all locations. Databases may be incomplete for some locations. Not user friendly. More details at <a href="http://www.glti.nrcs.usda.gov/technical/presentations/st-tran-workshop/mendenhall.html">http://www.glti.nrcs.usda.gov/technical/presentations/st-tran-workshop/mendenhall.html</a> and <a href="http://esis.sc.egov.usda.gov/ESIS/About.aspx">http://esis.sc.egov.usda.gov/ESIS/About.aspx</a>
Wildlife Data	California Wildlife Habitats Relationships (CWHR)	<a href="http://www.dfg.ca.gov/whdab/html/cwhr.html">http://www.dfg.ca.gov/whdab/html/cwhr.html</a>	✓	✓	✓	✓	7	Limited to California.
Wildlife and Habitat Data	NatureServe Explorer	<a href="http://www.natureserve.org/explorer/">http://www.natureserve.org/explorer/</a>	✓	✓	✓		7	
Geology	Southwest Regional GAP Analysis Project	<a href="http://earth.gis.usu.edu/swgap/">http://earth.gis.usu.edu/swgap/</a>	✓		✓		7	
Wildlife and Habitat Data	South Dakota GAP Analysis Project	<a href="http://wfs.sdstate.edu/sdgap/sdgap.htm">http://wfs.sdstate.edu/sdgap/sdgap.htm</a>	✓		✓		7	
Vegetation	National Park Service Vegetation Mapping Program	<a href="http://biology.usgs.gov/npsveg/products/state.html">http://biology.usgs.gov/npsveg/products/state.html</a>	✓		✓		7	Some data on national parks not yet available.
Global Dust Sources	Georgia Institute of Technology-Goddard Ozone Chemistry Aerosol Radiation and Transport (GOCART) Model	<a href="http://www.gfdl.noaa.gov/reference/bibliography/2002/mchinn0201.pdf">http://www.gfdl.noaa.gov/reference/bibliography/2002/mchinn0201.pdf</a>	✓	✓	✓		7	Low spatial resolution.

Information	Resource	Location	Cost	Organization	Description
<b>Recent Surficial Deposits</b>	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	Free	USGS	Surficial deposits and other surface materials that accumulated or formed during the past 2+ million years, such as soils, alluvium, and glacial deposits. Potential uses of the information in the map layer include studies to evaluate hazards such as earthquakes, landslides, swelling clay, floods, and volcanic eruptions; studies to identify areas of intense erosion.
<b>Habitats</b>	Southwest Regional GAP Analysis Project	<a href="http://earth.gis.usu.edu/swgap/">http://earth.gis.usu.edu/swgap/</a>	Free	USGS, State Agencies	Multi-season satellite imagery (Landsat ETM+) from 1999-2001 were used in conjunction with digital elevation model (DEM) derived datasets (e.g. elevation, landform, aspect, etc.) to model natural and semi-natural vegetation. The minimum mapping unit for this dataset is approximately 1 acre. Landcover classes are drawn from NatureServe's Ecological System concept, with 109 of the 125 total classes mapped at the system level. For the majority of classes, a decision tree classifier was used to discriminate landcover types, while a minority of classes (e.g. urban classes, sand dunes, burn scars, etc.) were mapped using other techniques. Twenty mapping areas, each characterized by similar ecological and spectral characteristics, were modeled independently of one another. Specifically, this dataset was created for regional terrestrial biodiversity assessment.
<b>USGS Current Greenness, Normalized Difference Vegetation Index (NDVI)</b>	USGS National Map Viewer	<a href="http://nmviewogc.cr.usgs.gov/">http://nmviewogc.cr.usgs.gov/</a>	Free	USGS	Since 1989, the USGS EROS Data Center has been mapping the vegetation condition of the conterminous United States (lower 48 states) using satellite information. The vegetation condition maps, or more commonly called "greenness" maps, are produced every week using the latest information on the growth and condition of the vegetation. The greenness maps show the health and vigor of the vegetation. The greenness maps are used by government agencies and private industry for a wide variety of applications. Some examples are agricultural assessment, grazing land management, grassland and forest fire danger assessment, and drought monitoring. One of the most important aspects of the USGS greenness mapping is the more than 10-year history of information. Over the last 10 years, droughts have come and gone, there have been years when the vegetation has been lush from ample rain, and there have been the "normal" years. From all of this information it is possible to determine the departure from normal for vegetation condition, much like is done for precipitation.
<b>Air Releases</b>	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	Free	USEPA and USGS	The locations of over 149,000 air emissions sites.
<b>Mineral Operations</b>	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	Free	USEPA and USGS	Spatial location and description of various surface and adit mine operations.
<b>Sea Spray</b>	Marine and Air-Sea Interaction Research Group	<a href="http://www.etl.noaa.gov/et6/air-sea/">http://www.etl.noaa.gov/et6/air-sea/</a>	NA	NOAA	The Marine and Air-Sea Interaction Research Group is primarily an experimental group investigating various issues in air-sea/ice interaction associated with the transfer of momentum, heat, moisture, trace gases, and particles at the wavy interface of the ocean. Through these widely distributed field programs, NOAA has assembled a unique database of surface fluxes, boundary-layer physical properties, and cloud information that represents a major resource for anyone working on marine atmospheric problems.
<b>Species list of mammals</b>	Smithsonian National Museum North American Mammals Database	<a href="http://www.mnh2.si.edu/education/mna/main.cfm">http://www.mnh2.si.edu/education/mna/main.cfm</a>	Free	Smithsonian Institution	The interactive map of the North American Continent allows the user to search for all of the mammals that occur at a specific location or in a selected ecoregion. The map provides a variety of optional overlays to assist in this search: topography, states and province boundaries, cities, rivers, and US interstate highways.

Information	Resource	Location	Spatial Extent	User Interface	User Input	Data Format	Spatial Resolution (m)	Data Export	User required for data interpretation and use
Recent Surficial Deposits	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	Eastern United States	Online user-directed map interface with downloadable GIS shapefiles	Manual selection of area by visual map interface (Latitude/Longitude visible during selection)	Polygon	~1000	GIS Shapefiles	Geological expert; GIS expert required to manipulate shapefiles
Habitats	Southwest Regional GAP Analysis Project	<a href="http://earth.gis.usu.edu/swgap/">http://earth.gis.usu.edu/swgap/</a>	Arizona, Colorado, Nevada, New Mexico, Utah	Online user-directed map interface with downloadable GIS shapefiles	Manual selection of area by visual map interface	Raster	30	GIS	Various experts; GIS expert required to manipulate shapefiles
USGS Current Greenness, Normalized Difference Vegetation Index (NDVI)	USGS National Map Viewer	<a href="http://nmviewogc.cr.usgs.gov/">http://nmviewogc.cr.usgs.gov/</a>	United States	Online user-directed map interface with downloadable GIS shapefiles	Selection of area by altitude/Longitude; Manual selection of area by visual map interface	Raster	~1000	GIS Shapefiles	Ecological expert; GIS expert required to manipulate shapefiles
Air Releases	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	United States	Online user-directed map interface with downloadable GIS shapefiles	Manual selection of area by visual map interface (Latitude/Longitude visible during selection)	NA	NA	GIS Shapefiles	
Mineral Operations	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	United States	Online user-directed map interface with downloadable GIS shapefiles	Manual selection of area by visual map interface (Latitude/Longitude visible during selection)	NA	NA	GIS Shapefiles	Various experts; GIS expert required to manipulate shapefiles
Sea Spray	Marine and Air-Sea Interaction Research Group	<a href="http://www.etl.noaa.gov/et6/air-sea/">http://www.etl.noaa.gov/et6/air-sea/</a>	United States	NA	NA	NA	NA	NA	Climatological experts.
Species list of mammals	Smithsonian National Museum North American Mammals Database	<a href="http://www.mnh2.si.edu/education/mna/main.cfm">http://www.mnh2.si.edu/education/mna/main.cfm</a>	United States	Online user-directed map interface	Manual selection of area by visual map interface (reports Latitude/Longitude selected)	Text	NA	Copy and paste from Internet Browser	Ecological expert

Information	Resource	Location	Use of information for dust definition				Score for WRAP Dust Definition Applicability (1 low - 10 high) <sup>e</sup>	Notes
			Dust source geographic distribution <sup>a</sup>	Dust source characterization <sup>b</sup>	Spatially-explicit dust emission <sup>f</sup>	Dust partitioning <sup>g</sup>		
Recent Surficial Deposits	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	✓	✓	✓		7	Not in WRAP area, but could be used if developed for Western US.
Habitats	Southwest Regional GAP Analysis Project	<a href="http://earth.gis.usu.edu/swgap/">http://earth.gis.usu.edu/swgap/</a>	✓	✓	✓	✓	7	
USGS Current Greenness, Normalized Difference Vegetation Index (NDVI)	USGS National Map Viewer	<a href="http://nmviewogc.cr.usgs.gov/">http://nmviewogc.cr.usgs.gov/</a>	✓		✓	✓	7	
Air Releases	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	✓	✓	✓	✓	7	Provides information for major point-source emissions, particularly useful for areas without state/local emission information
Mineral Operations	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	✓				7	Potentially useful in determining the extent of mining and related activities in remote areas
Sea Spray	Marine and Air-Sea Interaction Research Group	<a href="http://www.etl.noaa.gov/et6/air-sea/">http://www.etl.noaa.gov/et6/air-sea/</a>	✓	✓	✓		7	Useful if an area needs to assess sea spray impacts.
Species list of mammals	Smithsonian National Museum North American Mammals Database	<a href="http://www.mnh2.si.edu/education/mna/main.cfm">http://www.mnh2.si.edu/education/mna/main.cfm</a>	✓		✓		6	

Information	Resource	Location	Cost	Organization	Description
Species Life History for Mammals	Cumulative Index for the Mammalian Species	<a href="http://www.science.smith.edu/departments/Biology/VHAYS/SEN/msi/">http://www.science.smith.edu/departments/Biology/VHAYS/SEN/msi/</a>	\$30.00 per year, or Free if Accessed indirectly via Smithsonian National Museum North American Mammals Database	American Society of Mammalogists	Mammalian Species is published regularly by the American Society of Mammalogists with 25-30 new accounts issued each year. Each account summarizes the current understanding of the biology of a single species, including systematics, distribution, fossil history, genetics, anatomy, physiology, behavior, ecology, and conservation. The accounts vary from 2-14 pages.
Wind Erosion and Deposition	Desert Winds Project	<a href="http://www.flag.wr.usgs.gov/USGSFlag/Land/desert/html/techinfo.html">http://www.flag.wr.usgs.gov/USGSFlag/Land/desert/html/techinfo.html</a>	NA	USEPA	The primary purpose of the Desert Winds Project is to obtain high resolution meteorological data and related surface geological and vegetation data for natural (e.g., uncultivated) desert sites where wind is or has been a major erosive or depositional force. The objectives are twofold: (1) to provide the detailed field measurements needed to carry out quantitative studies of wind as an agent of surface geologic change; and (2) to establish a baseline for defining the "normal" range of climatic conditions that can be expected to occur on a decadal time scale, in areas considered representative of the major American deserts. The long-term goal for acquiring and analyzing the Desert Winds Project data is to use them to address problems of land resource degradation by wind, whether resulting from climatic variation (aridification) or human activities (desertification), or both.
Vegetation Dynamics	Recoverability and Vulnerability of Desert Ecosystems (RVDE) project	<a href="http://geography.wr.usgs.gov/mojave/rvde/activ_vege.html">http://geography.wr.usgs.gov/mojave/rvde/activ_vege.html</a>	NA	USGS	Model and data that quantitatively define and spatially describe the vulnerability and recoverability of desert perennial vegetation in the Mojave Desert.
Rangeland Grazing Animal Data	Grazing Land Applications Software (GLA)	<a href="http://www.glti.nrcs.usda.gov/projects/gla-info.html">http://www.glti.nrcs.usda.gov/projects/gla-info.html</a>	NA	USDA NRCS	GLA is a user-friendly decision support software package developed for the grazing land planner/operator to aid in the inventory of land units, calculate stocking rates, calculate multiple species stocking rates (livestock and wildlife), determine nutritional requirements for grazing livestock and analyze the economic value of treatment alternatives. Each database portion of the program requires population of information which is localized to the area in which it is to be used. The program contains two database modules used to localize specific information for an area and client. These database modules include Animal Resources Database and Plant/Soil Resources Databases. Databases include animal specific information, feedstuff information, soils, plant species, preferences, production levels, etc. The Client module selects from databases to customize and include information on soils, land use, species, production levels specific to an individuals operation to calculate stocking rates
Landscape Level Ecosystem Analysis	Landscape Analyst	<a href="http://canaanvi.org/gis/landscapeanalyst.asp">http://canaanvi.org/gis/landscapeanalyst.asp</a>	NA	Canaan Valley Institute	The Landscape Analyst is an ArcView GIS (version 3.x) 3rd party extension. ArcView extensions add more functionality to the core software. The Landscape Analyst allows users to assess the current conditions of watersheds, counties and/or regions both visually and quantitatively. It also allows users to simulate potential impacts of future changes to the landscape. The Landscape Analyst depends on users of ArcView having the ESRI created Spatial Analyst Extension loaded on their system. Many of the tools, models and processes in the Landscape Analyst can be performed using the core ArcView software with the Spatial Analyst extension alone but the expertise, time and complexity required to perform such actions would be prohibitive. The Landscape Analyst simplifies and organizes such specialized functions into an interface that can be used by the intermediate ArcView users to make policy decisions regarding the Earth's landscape.

Information	Resource	Location	Spatial Extent	User Interface	User Input	Data Format	Spatial Resolution (m)	Data Export	User required for data interpretation and use
Species Life History for Mammals	Cumulative Index for the Mammalian Species	<a href="http://www.science.smith.edu/departments/Biology/VHAYS/SEN/msi/">http://www.science.smith.edu/departments/Biology/VHAYS/SEN/msi/</a>	United States	Online database	Selection of mammal species by taxonomy.	Text	NA	PDF Files	Ecological expert
Wind Erosion and Deposition	Desert Winds Project	<a href="http://www.flag.wr.usgs.gov/USGSFlag/Land/desert/html/techinfo.html">http://www.flag.wr.usgs.gov/USGSFlag/Land/desert/html/techinfo.html</a>	Gold Spring Area of Great Basin Desert	NA	NA	NA	NA	NA	Various experts
Vegetation Dynamics	Recoverability and Vulnerability of Desert Ecosystems (RVDE) project	<a href="http://geography.wr.usgs.gov/mojave/rvde/activ_vege.html">http://geography.wr.usgs.gov/mojave/rvde/activ_vege.html</a>	Mojave National Preserve	Online Acrobat file	NA	Raster	NA	NA	Ecological experts
Rangeland Grazing Animal Data	Grazing Land Applications Software (GLA)	<a href="http://www.glti.nrcs.usda.gov/projects/gla-info.html">http://www.glti.nrcs.usda.gov/projects/gla-info.html</a>	United States	Software	NA	NA	NA	NA	Various experts; Ecological experts
Landscape Level Ecosystem Analysis	Landscape Analyst	<a href="http://canaanvi.org/gis/landscapeanalyst.asp">http://canaanvi.org/gis/landscapeanalyst.asp</a>	United States	Software	GIS layers of land use and vegetation	GIS	NA	GIS	Various experts; GIS expert required to manipulate shapefiles

Information	Resource	Location	Use of information for dust definition				Score for WRAP Dust Definition Applicability (1 low - 10 high) <sup>e</sup>	Notes
			Dust source geographic distribution <sup>a</sup>	Dust source characterization <sup>b</sup>	Spatially-explicit dust emission <sup>c</sup>	Dust partitioning <sup>d</sup>		
Species Life History for Mammals	Cumulative Index for the Mammalian Species	<a href="http://www.science.smith.edu/departments/Biology/VHAYS/SEN/msi/">http://www.science.smith.edu/departments/Biology/VHAYS/SEN/msi/</a>	✓	✓			6	
Wind Erosion and Deposition	Desert Winds Project	<a href="http://www.flag.wr.usgs.gov/USGSFlag/Land/desert/html/techinfo.html">http://www.flag.wr.usgs.gov/USGSFlag/Land/desert/html/techinfo.html</a>	✓	✓	✓		6	Potentially useful, but spatial extent of data and model is limited and data may not be readily available.
Vegetation Dynamics	Recoverability and Vulnerability of Desert Ecosystems (RVDE) project	<a href="http://geography.wr.usgs.gov/mojave/rvde/activ_vege.html">http://geography.wr.usgs.gov/mojave/rvde/activ_vege.html</a>	✓			✓	6	Limited to Mojave National Preserve and/or Mojave Desert.
Rangeland Grazing Animal Data	Grazing Land Applications Software (GLA)	<a href="http://www.glti.nrcs.usda.gov/projects/gla-info.html">http://www.glti.nrcs.usda.gov/projects/gla-info.html</a>	✓		✓	✓	6	Software may not yet be available.
Landscape Level Ecosystem Analysis	Landscape Analyst	<a href="http://canaanvi.org/gis/landscapeanalyst.asp">http://canaanvi.org/gis/landscapeanalyst.asp</a>				✓	6	

Information	Resource	Location	Cost	Organization	Description
Seasonal Sea Surface Temperature Averages	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	Free	National Oceanic and Atmospheric Administration (NOAA), National Oceanographic Data Center (NODC), and the University of Miami's Rosenstiel School of Marine and Atmospheric Science (RSMAS)	Sea surface temperature (SST) averages indicate the temperature in degrees Celsius at the surface of the ocean and other large water bodies for the years 1985-2001, as determined from Advanced Very High Resolution Radiometer (AVHRR) data from the NOAA-9, NOAA-11, NOAA-14, and NOAA-16 satellites.
Ecological Site Inventory	Ecological Site Information System	<a href="http://esis.sc.egov.usda.gov/">http://esis.sc.egov.usda.gov/</a>	NA	USDA NRCS	The Ecological Site Inventory (ESI) application provides the capability to enter, edit, and retrieve rangeland, forestry, and agroforestry plot data. ESI is the official repository for all plot data collected via the Soil-Woodland Correlation Field Data Sheet (ECS-005), the Windbreak-Soil-Species Evaluation Data Sheet (ECS-004) and the Production and Composition Record For Native Grazing Lands (RANGE-417). Inventory data collected on rangeland plots includes the total annual production of all plant species of a plant community, as well as the production (by weight measurement) and composition of individual plant species comprising the plant community. The inventory data collected on forestland plots includes: composition and relative abundance of the overstory and understory plant species; stand densities (basal area); and site productivity, as measured by site index.
Landscape Level Ecosystem Analysis	Ecosystem Management Decision Support	<a href="http://www.fsl.orst.edu/emds/">http://www.fsl.orst.edu/emds/</a>	NA	USDA Forest Service	The Ecosystem Management Decision Support (EMDS) system is an application framework for knowledge-based decision support of ecological assessments at any geographic scale. The system integrates state-of-the-art geographic information system (GIS) as well as knowledge-based reasoning and decision modeling technologies in the Microsoft Windows environment to provide decision support for a substantial portion of the adaptive management process of ecosystem management.
Drought Monitoring	Drought Monitoring Data and Model	<a href="http://edc2.usgs.gov/phenological/drought/">http://edc2.usgs.gov/phenological/drought/</a>	NA	USGS	Previous studies have established significant relationships between climate variables and satellite-derived vegetation indices (such as the Normalized Difference Vegetation Index) over non-irrigated croplands and grasslands. In this project, we are researching methods for integrating information provided by satellite-derived measures of growing season vegetation performance and climate-based drought indicators to produce a timely and spatially-detailed drought monitoring product. Eventually, this information, coupled with map products of key drought indicators, will be available to many end users for making critical and timely decisions, from farm to regional scale.
Topographical Shaded Relief	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	Free	USGS	A shaded-relief image shows terrain. The North America Shaded Relief image was derived from the GTOPO30 elevation data, which constitute a global digital elevation model with elevation values measured approximately 1 kilometer apart. Each grid cell in the model has a value that represents the average height above sea level within that cell. The image was created by grouping the elevation values into ranges and then assigning colors to the different elevation ranges.
Plant Distribution	NRCS PLANTS Database	<a href="http://plants.usda.gov/">http://plants.usda.gov/</a>	Free	USDA NRCS	The PLANTS Database provides standardized information about the vascular plants, mosses, liverworts, hornworts, and lichens of the U.S. and its territories. It includes names, plant symbols, checklists, distributional data, species abstracts, characteristics, images, plant links, references, crop information, and automated tools. PLANTS reduces costs by minimizing duplication and making information exchange possible across agencies and disciplines.

Information	Resource	Location	Spatial Extent	User Interface	User Input	Data Format	Spatial Resolution (m)	Data Export	User required for data interpretation and use
Seasonal Sea Surface Temperature Averages	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	United States	Online user-directed map interface with downloadable GIS shapefiles	Manual selection of area by visual map interface (Latitude/Longitude visible during selection)	Raster	~1000	GIS Shapefiles	Climatological expert; GIS expert required to manipulate shapefiles
Ecological Site Inventory	Ecological Site Information System	<a href="http://esis.sc.egov.usda.gov/">http://esis.sc.egov.usda.gov/</a>	United States	Online interface	Selection of site by state, Major Land Resource Areas (MLRA)	Text	NA	Copy and paste from Internet Browser	Ecological experts
Landscape Level Ecosystem Analysis	Ecosystem Management Decision Support	<a href="http://www.fsl.orst.edu/emds/">http://www.fsl.orst.edu/emds/</a>	NA	GIS, software	GIS	GIS	NA	GIS, other	Various experts; GIS expert required to manipulate shapefiles
Drought Monitoring	Drought Monitoring Data and Model	<a href="http://edc2.usgs.gov/phenological/drought/">http://edc2.usgs.gov/phenological/drought/</a>	United States	NA	NA	NA	NA	NA	Various experts
Topographical Shaded Relief	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	United States	Online user-directed map interface with downloadable GIS shapefiles	Manual selection of area by visual map interface (Latitude/Longitude visible during selection)	Raster	1000	GIS Shapefiles	Various experts; GIS expert required to manipulate shapefiles
Plant Distribution	NRCS PLANTS Database	<a href="http://plants.usda.gov/">http://plants.usda.gov/</a>	United States	Online	Selection of area by state	Text	NA (State level)	Comma-delimited text for import into Excel spreadsheets	Ecological expert

Information	Resource	Location	Use of information for dust definition				Score for WRAP Dust Definition Applicability (1 low - 10 high) <sup>e</sup>	Notes
			Dust source geographic distribution <sup>a</sup>	Dust source characterization <sup>b</sup>	Spatially-explicit dust emission <sup>c</sup>	Dust partitioning <sup>d</sup>		
Seasonal Sea Surface Temperature Averages	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	✓		✓		5	
Ecological Site Inventory	Ecological Site Information System	<a href="http://esis.sc.egov.usda.gov/">http://esis.sc.egov.usda.gov/</a>	✓		✓		5	Data may not be available for all locations. Databases may be incomplete for some locations. Not user friendly. More details at <a href="http://esis.sc.egov.usda.gov/ESIS/About.aspx">http://esis.sc.egov.usda.gov/ESIS/About.aspx</a> .
Landscape Level Ecosystem Analysis	Ecosystem Management Decision Support	<a href="http://www.fsl.orst.edu/emds/">http://www.fsl.orst.edu/emds/</a>				✓	5	Potentially useful for investigating anthropogenic influences in an area.
Drought Monitoring	Drought Monitoring Data and Model	<a href="http://edc2.usgs.gov/phenological/drought/">http://edc2.usgs.gov/phenological/drought/</a>	✓		✓		5	In progress. May be useful to investigate effects of climate on vegetation distributions.
Topographical Shaded Relief	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	✓		✓		4	
Plant Distribution	NRCS PLANTS Database	<a href="http://plants.usda.gov/">http://plants.usda.gov/</a>	✓				4	

<b>Information</b>	<b>Resource</b>	<b>Location</b>	<b>Cost</b>	<b>Organization</b>	<b>Description</b>
<b>Wildlife Data</b>	Wildlife Exposure Factors Handbook	<a href="http://cfpub2.epa.gov/ncea/cfm/wefh.cfm">http://cfpub2.epa.gov/ncea/cfm/wefh.cfm</a>	Free	USEPA	The Wildlife Exposure Factors Handbook provides data, references, and guidance for conducting exposure assessments for wildlife species exposed to toxic chemicals in their environment. Potentially useful information include life history for wildlife (birds, mammals, reptiles), including reproduction rates, density, home range and daily movement patterns, and behavioral activities such as nesting, burrowing, and migration.
<b>Volcanic Ash Data</b>	USGS Ash Website	<a href="http://volcanoes.usgs.gov/ash/">http://volcanoes.usgs.gov/ash/</a>	Free	USGS	Information on volcanic ash.
<b>Various land use and vegetation data products</b>	USGS National Map Viewer	<a href="http://nmviewogc.cr.usgs.gov/">http://nmviewogc.cr.usgs.gov/</a>	Free	USGS and NASA	The Landsat Project is a joint initiative of the U.S. Geological Survey (USGS) and the National Aeronautics and Space Administration (NASA) to gather Earth resource data using a series of satellites. NASA was responsible for developing and launching the spacecrafts, while the USGS is responsible for flight operations, maintenance, and management of all ground data reception, processing, archiving, product generation, and distribution. The Enhanced Thematic Mapper Plus (ETM+) is a multispectral scanning radiometer that is carried on board the Landsat 7 satellite. The ETM+ instrument provides image data from eight spectral bands.
<b>Agricultural Operations</b>	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	Free	USDA and National Agricultural Statistics Service (NASS)	The Agriculture Census of the United States - 1997 map layer portrays the data for all fifty States, collected at the county level. The 25 categories of data in this map layer contain statistics on land use and ownership, operator characteristics, acreage, machinery and equipment, crops, livestock and poultry, and farming economics.
<b>Forest Connectivity</b>	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	Free	USEPA and USGS	The Classification of Forest Fragmentation map layer is a grid map of North America, including the Caribbean and most of Mexico, showing the amount of forest and the connectivity between patches of forest. The map portrays continental patterns at a relatively coarse scale and is considered a first step toward quantifying forest fragmentation and its potential impacts on biodiversity. Data were originally created as part of a global analysis of forest fragmentation and other land cover patterns that was based on digital land cover maps derived from remote sensing and produced by the Global Land Cover Characteristics (GLCC) project. However, no distinction is drawn between natural and human-caused fragmentation. The primary data source for the underlying GLCC land cover maps is Advanced Very High Resolution Radiometer (AVHRR) satellite imagery from the early 1990s.

<b>Information</b>	<b>Resource</b>	<b>Location</b>	<b>Spatial Extent</b>	<b>User Interface</b>	<b>User Input</b>	<b>Data Format</b>	<b>Spatial Resolution (m)</b>	<b>Data Export</b>	<b>User required for data interpretation and use</b>
<b>Wildlife Data</b>	Wildlife Exposure Factors Handbook	<a href="http://cfpub2.epa.gov/ncea/cfm/wefh.cfm">http://cfpub2.epa.gov/ncea/cfm/wefh.cfm</a>	United States	Online Acrobat files	Wildlife species	Text	NA	Copy and paste from Acrobat	Ecological expert
<b>Volcanic Ash Data</b>	USGS Ash Website	<a href="http://volcanoes.usgs.gov/ash/">http://volcanoes.usgs.gov/ash/</a>	NA	Online interface	NA	Text	NA	Copy and paste from Internet Browser	Geological expert
<b>Various land use and vegetation data products</b>	USGS National Map Viewer	<a href="http://nmviewogc.cr.usgs.gov/">http://nmviewogc.cr.usgs.gov/</a>	United States	Online user-directed map interface with downloadable GIS shapefiles	Selection of area by altitude/Longitude; Manual selection of area by visual map interface	Raster	10-60	GIS Shapefiles	Remote sensing expert; Ecological expert
<b>Agricultural Operations</b>	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	United States	Online user-directed map interface with downloadable GIS shapefiles	Manual selection of area by visual map interface (Latitude/Longitude visible during selection)	Polygon	Variable (county level)	GIS Shapefiles	Various experts; GIS expert required to manipulate shapefiles
<b>Forest Connectivity</b>	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	United States, Forested areas only	Online user-directed map interface with downloadable GIS shapefiles	Manual selection of area by visual map interface (Latitude/Longitude visible during selection)	Raster	1000	GIS Shapefiles	Ecological expert; GIS expert required to manipulate shapefiles

Information	Resource	Location	Use of information for dust definition				Score for WRAP Dust Definition Applicability (1 low - 10 high) <sup>e</sup>	Notes
			Dust source geographic distribution <sup>a</sup>	Dust source characterization <sup>b</sup>	Spatially-explicit dust emission <sup>c</sup>	Dust partitioning <sup>d</sup>		
Wildlife Data	Wildlife Exposure Factors Handbook	<a href="http://cfpub2.epa.gov/ncea/cfm/wefh.cfm">http://cfpub2.epa.gov/ncea/cfm/wefh.cfm</a>		✓			4	
Volcanic Ash Data	USGS Ash Website	<a href="http://volcanoes.usgs.gov/ash/">http://volcanoes.usgs.gov/ash/</a>		✓			4	
Various land use and vegetation data products	USGS National Map Viewer	<a href="http://nmviewogc.cr.usgs.gov/">http://nmviewogc.cr.usgs.gov/</a>	✓		✓	✓	3	Difficult to use without well-defined model translating hyperspectral information to ecological metrics or dust emission estimates.
Agricultural Operations	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	✓			✓	3	
Forest Connectivity	National Atlas	<a href="http://nationalatlas.gov/">http://nationalatlas.gov/</a>	✓			✓	2	Forest connectivity may be useful to identify anthropogenic influences in forested areas. Data can also be used to identify the extent of forests.




Information	Resource	Location	Cost	Organization	Description
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**Notes**

- <sup>a</sup> Data needed to define the geographic distribution of dust sources which vary spatially. Once the geographic distribution of dust sources are known, an inventory of dust sources can be developed for any given site. Examples: spatial extent (distribution) of: ephemeral lakes in the United States, disturbed areas in the Mojave Desert, burrowing animal species in the United States, and populations of large mammal species in the United States.
- <sup>b</sup> Data and conceptual information required to construct new dust emission models or modify existing dust emission models. Models will be used to estimate dust emissions by a dust source using site-specific data. Examples: ranges of soil moisture content of ephemeral lakes, average wind speed and direction for the United States, approaches with which to estimate the population densities of large animal species using land cover information, understanding of the scale of climate data needed to predict the effects of precipitation on wind erosion from dry lake beds, understanding of the most important meteorological factors affecting the formation of aerosols from sea spray.
- <sup>c</sup> Site-specific spatial data needed to produce site-specific dust emission estimates using the appropriate dust source model. Examples: percentage of bare ground coverage in southwestern Kern County, California, dominant vegetation types in Grand Canyon National Park, average monthly precipitation for northwestern Montana, physical soil structure (percent sand-silt-clay) at a site in central Idaho, number of active volcanoes within 100 miles of Yosemite National Park.
- <sup>d</sup> Site-specific information required to identify and quantify site-specific natural and anthropogenic portions of Category 3 dust emissions. Information may include data with which to evaluate the anthropogenic influences in the area via modeling, comparison with suitable natural reference areas, and/or investigating natural background (pre-industrial) dust emissions. Examples: sediment coring data with which to estimate pre-industrial dust emissions in Rocky Mountain National Park, range of bare ground cover in healthy mountain big sagebrush compared to bare ground cover in areas of mountain big sagebrush in Bridger-Teton National Forest, area estimate of unpaved roads in Larimer County, Colorado, information on land use to identify a reference site with minimal anthropogenic influence within 20 miles of Santa Fe, New Mexico
- <sup>e</sup> Scoring criteria
  - 10: Data source directly applicable to estimation of dust emission and/or dust partitioning between natural and anthropogenic sources.
  - 9: Data may be easily converted for estimation of dust emission and/or dust partitioning between natural and anthropogenic sources.
  - 6-8: Data may be converted for estimation of dust emission and/or dust partitioning between natural and anthropogenic sources, with some effort (modeling, additional study, etc.)
  - 3-5: Data could be converted for estimation of dust emission and/or dust partitioning between natural and anthropogenic sources, but with significant effort.
  - 1-2: Data unlikely to be feasible for estimation of dust emission and/or dust partitioning between natural and anthropogenic sources.

<sup>f</sup> NA: Not Available

<sup>g</sup> Resource characterization

-  : Very useful for fulfilling or understanding data need.
-  : Useful for fulfilling or understanding data need.
-  : Possibly useful for fulfilling or understanding data need.