

WESTERN AREA POWER ADMINISTRATION ENVIRONMENTAL OPPORTUNITY/CONSTRAINT MAP

Introduction

On September 16, 2010, Western Area Power Administration (Western) contracted with ICF International (ICF) to develop an Environmental Opportunity/Constraint Map. By identifying areas of existing environmental and land use constraints, the map is intended to aid in the long-term development of future energy corridors. The study area for the Environmental Opportunity/Constraint Map included the following eight Wyoming counties:

- Albany
- Carbon
- Converse
- Goshen
- Laramie
- Natrona
- Niobrara
- Platte

ICF used the protocol and the Opportunities and Constraints for Energy Corridors in Southeast Wyoming table from section 2.7 of the Wyoming Wind Collector System and Integration Study¹ and consulted publically available information from eight other relevant projects to create the Environmental Opportunity/Constraint Map. Other relevant projects consulted included:

- Bureau of Land Management (BLM) Southern Idaho Infrastructure Development Conflict Map²
- California Renewable Energy Transmission Initiative (RETI) – Renewable Energy Transmission Initiative RETI Phase 2B³
- High Plains Express Opportunity/Constraint Table⁴
- NationalGrid 2006, Appendix C, Wyoming Extra-High Voltage Transmission Corridor Study⁵

¹ ICF International. 2010. Wyoming Wind Collector System and Integration Study.

² Bureau of Land Management. 2009. Bureau of Land Management Southern Idaho Infrastructure Development Conflict Map Priority Biological, Cultural and Land-Use Concern Assumptions. October. Available at: http://www.blm.gov/id/st/en/prog/energy/conflict_map.html.

³ Black and Veatch. 2010. Final Phase 2B Report. California Renewable Energy Transmission Initiative – Renewable Energy Transmission Initiative RETI Phase 2B. Available at: <http://www.energy.ca.gov/reti/documents/index.html>.

⁴ Xcel Energy. 2010. High Plains Express Opportunity/Constraint Table. March 17.

⁵ National Grid US. 2006. Transmission Roadmap for the State of Wyoming, Appendix C. Prepared for the Wyoming Infrastructure Authority. August.

- New Mexico Renewable Energy Transmission Authority – Transmission Corridor Committee – Review of “Draft Corridors” Public Comments⁶
- SunZia Southwest Transmission Project⁷
- Western Renewable Energy Zones Phase 1 Report⁸
- West-wide Energy Corridor Programmatic Environmental Impact Statement⁹

Using the completed Environmental Opportunity/Constraint Map ICF digitized a Geographic Information System (GIS) shapefile identifying areas where energy corridors could be located. The intent was to discuss the areas delineated in the shapefile at a meeting between Western, ICF, the Wyoming Infrastructure Authority, and the Wyoming Collector and Transmission System Task Force to make adjustments as needed and use that edited shapefile to create a Future Potential Energy Corridors Map.

Data Collection

In the Wyoming Wind Collector System and Integration Study¹, Table 7 identifies environmental and infrastructure data that could be included for the Environmental Opportunity/Constraint Map, if these types of data occur in the study area. ICF collected data from the following Federal and State agencies as well as non-governmental organizations:

- | | |
|--|---|
| • Bureau of Land Management | • Wyoming Game and Fish Department |
| • Environmental Systems Research Institute | • Wyoming Geographic Information Science Center |
| • National Park Service | • Wyoming Natural Diversity Database |
| • U.S. Fish and Wildlife Service | • Wyoming State Parks |
| • U.S. Forest Service | |

ICF also included information from other agencies; however, ICF obtained their geographic data from the Wyoming Geographic Information Science Center dataset so the individual agency names are not identified in the previous list.

⁶ New Mexico Renewable Energy Transmission Authority. 2010. Corridor Committee – Review of “Draft Corridors” Public Comments. July 28.

⁷ EPG. 2010. SunZia Transmission Line Project Resource Maps. Available at: http://www.blm.gov/nm/st/en/prog/more/lands_realty/sunzia_southwest_transmission/sunzia_resource_maps.html.

⁸ Western Governors Association and U.S. Department of Energy. 2008. Western Renewable Energy Zones, Phase 1 Report. Available at: http://www.westgov.org/index.php?option=com_content&view=article&id=219&Itemid=81.

⁹ U.S. Department of Energy, U.S. Department of the Interior Bureau of Land Management, U.S. Department of Agriculture Forest Service, and U.S. Department of Defense. 2008. West-wide Energy Corridor Programmatic Environmental Impact Statement. Available at: <http://corridoreis.anl.gov/>.

A few data sets identified in Table 7 of the Wyoming Wind Collector System and Integration Study¹ were not included in the Final Environmental Opportunity/Constraint Map for one of the following reasons:

- The resource existed within the study area, but GIS data was not available.
- The resource existed within the study area, but the GIS data was too general for inclusion (e.g., the GIS data identified township and range, but not specific locations).

Datasets not incorporated into the Final Environmental Opportunity/Constraint Map include Critical Habitat, Wild and Scenic Rivers, and Known Occurrences for Ute Ladies'-tresses Orchid, Colorado Butterfly Plant, and Blowout Penstemon.

Map Creation

The Wyoming Wind Collector System and Integration Study¹ identified the following four steps as a protocol for the creation of the Environmental Opportunity/Constraint Map:

- Collect geospatial information system data
- Convert data to a consistent format
- Assign level of constraint to data
- Combine opportunity data

ICF followed this protocol in the creation of the Environmental Opportunity/Constraint Map for Western. ICF submitted a Draft Environmental Opportunity/Constraint Map and a Draft Future Potential Energy Corridors Map to Western on October 29.

On November 3, ICF participated in a meeting at Western's offices in Loveland, Colorado to discuss the draft maps. Western staff requested that several highways and key features be added to the maps. ICF staff made the requested changes and submitted the revised maps to Western on November 10.

New Direction on Final Map Deliverables

On November 29, staff from Western, ICF, the Wyoming Infrastructure Authority, and the Wyoming Collector and Transmission System Task Force met to discuss the two maps. During that meeting ICF received the following direction for the final map deliverables:

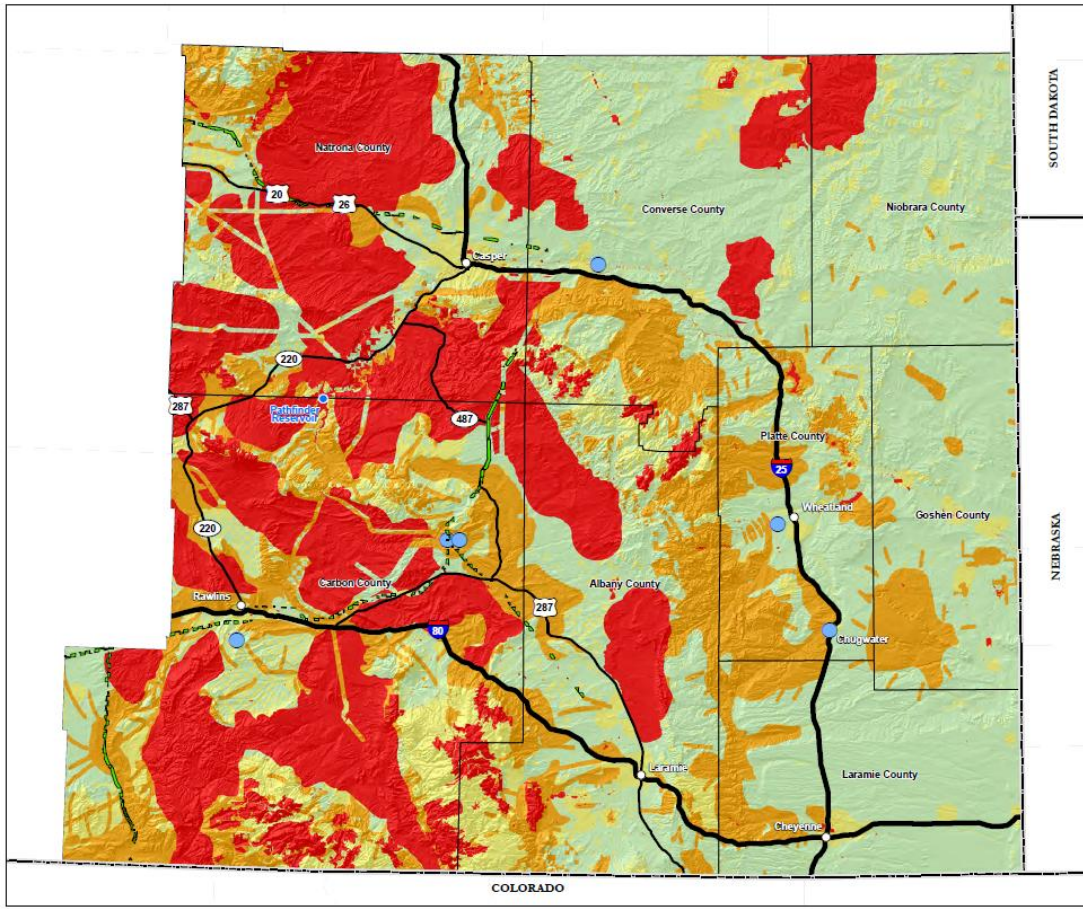
- No opportunities shall be displayed on any map
- A short narrative shall be delivered with the final map products
- Five maps shall be created that contain the following
 - Constraints
 - The constraints and the Transmission Export Hubs from the Wyoming Collector and Transmission System Conceptual Design

- The constraints and the Transmission Export Hubs from the Wyoming Collector and Transmission System Conceptual Design map, with the National Renewable Energy Laboratory's 50-meter hub height wind data displaying the 5, 6, and 7 wind power class levels
- The constraints and the Transmission Export Hubs from the Wyoming Collector and Transmission System Conceptual Design map, with the NREL 50-meter wind data, and transmission line data greater than 115 kilovolts
- The constraints and the Transmission Export Hubs from the Wyoming Collector and Transmission System Conceptual Design map, with the NREL 50-meter wind data, transmission line data greater than 115 kilovolts, and the 6-inch diameter and greater pipeline data

ICF delivered the five maps to Western on December 31.

For more information or to obtain copies of the maps please contact:

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Loveland, CO 80538
970-461-7272



Constraints on Future Infrastructure Development in Southeast Wyoming with Transmission Export Hubs

Legend:

- State Park
- West-wide Energy Corridor
- Transmission Export Hub

Constraints:

- Area of very high constraint:** Area of potential resource or land use conflict is unsuitable for energy corridor due to unique, high-value, complex, or legally protected resources.
- Area of high constraint:** Area of potential resource or land use conflict is less suitable due to unique, high-value, complex, or legally protected resources.
- Area of moderate constraint:** Area of potential resource or land use conflict due to valued resources including resources assigned special status.
- Area of low constraint:** Area where the resource conflicts are relatively minor or the area is not covered by a specific resource or land use constraint; could include areas identified as opportunities.

NOTE: Resource data and constraint category levels are based on the Wyoming Wind Collector System and Integration Study, Phase 2 report. The constraint categories used in that report and shown on this map are not absolute, and substantial variability may be experienced at the local level and during the siting process.

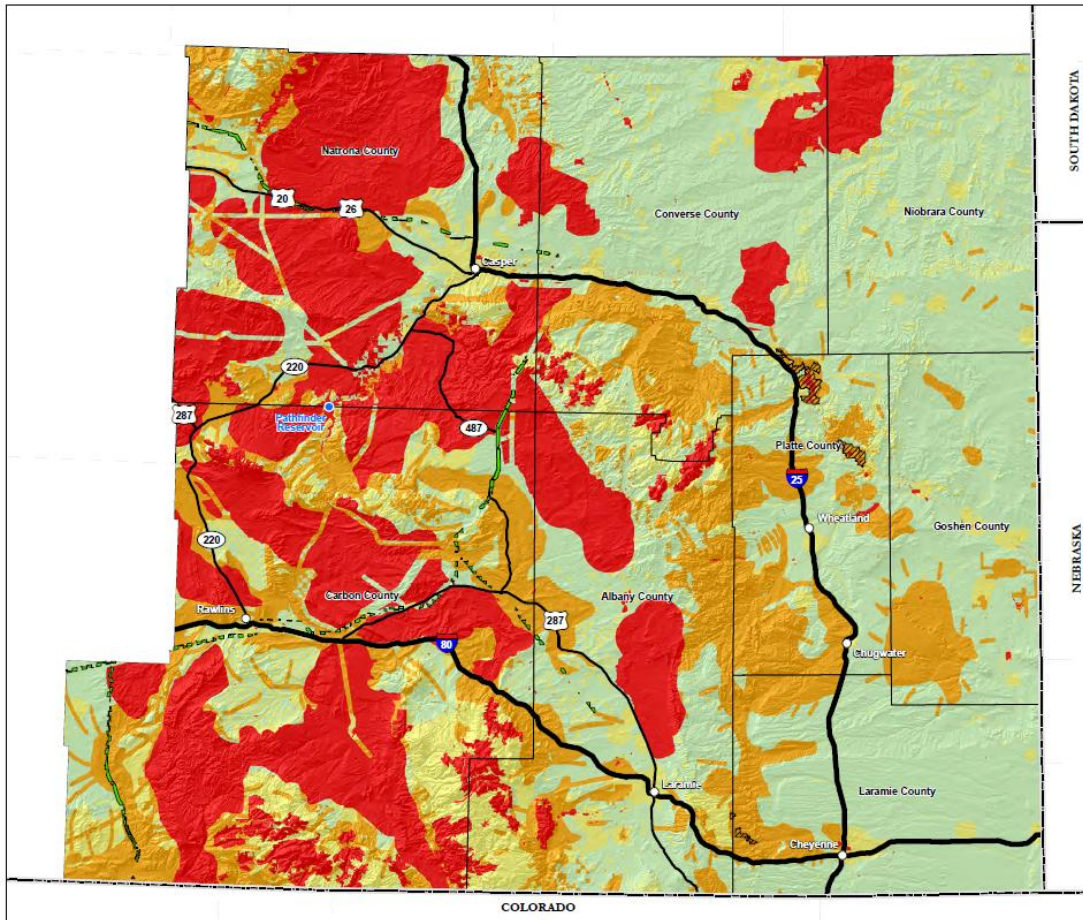
A copy of the Phase 2 report can be downloaded at: <http://wyia.org/news/wyoming-releases-study-of-a-collector-system-and-integration-of-wind-and-natural-gas-phase-2-study/>

Data Sources:

| | |
|--|---|
| Bureau of Land Management, 2010 | West-wide Energy Corridor Programmatic EIS, 2008 |
| Environmental Systems Research Institute, 2010 | Wyoming Game and Fish Department, 2010 |
| National Park Service, 2010 | Wyoming Geographic Information Science Center, 2010 |
| The Nature Conservancy, 2010 | Wyoming Natural Diversity Database, 2010 |
| United States Fish and Wildlife Service, 2010 | Wyoming State Parks, 2010 |
| United States Forest Service, 2010 | Wyoming State Parks, 2010 |
| United States Geologic Survey, 2010 | |

Scale: 0 to 40 Kilometers / 0 to 40 Miles

Project Area: A locator map of Wyoming showing the project area in the southeast corner, bordered by Montana, Idaho, Utah, Colorado, and Nebraska.



Constraints on Future Infrastructure Development in Southeast Wyoming

Legend:

- State Park
- West-wide Energy Corridor

Constraints:

- Area of very high constraint:** Area of potential resource or land use conflict is unsuitable for energy corridor due to unique, high-value, complex, or legally protected resources.
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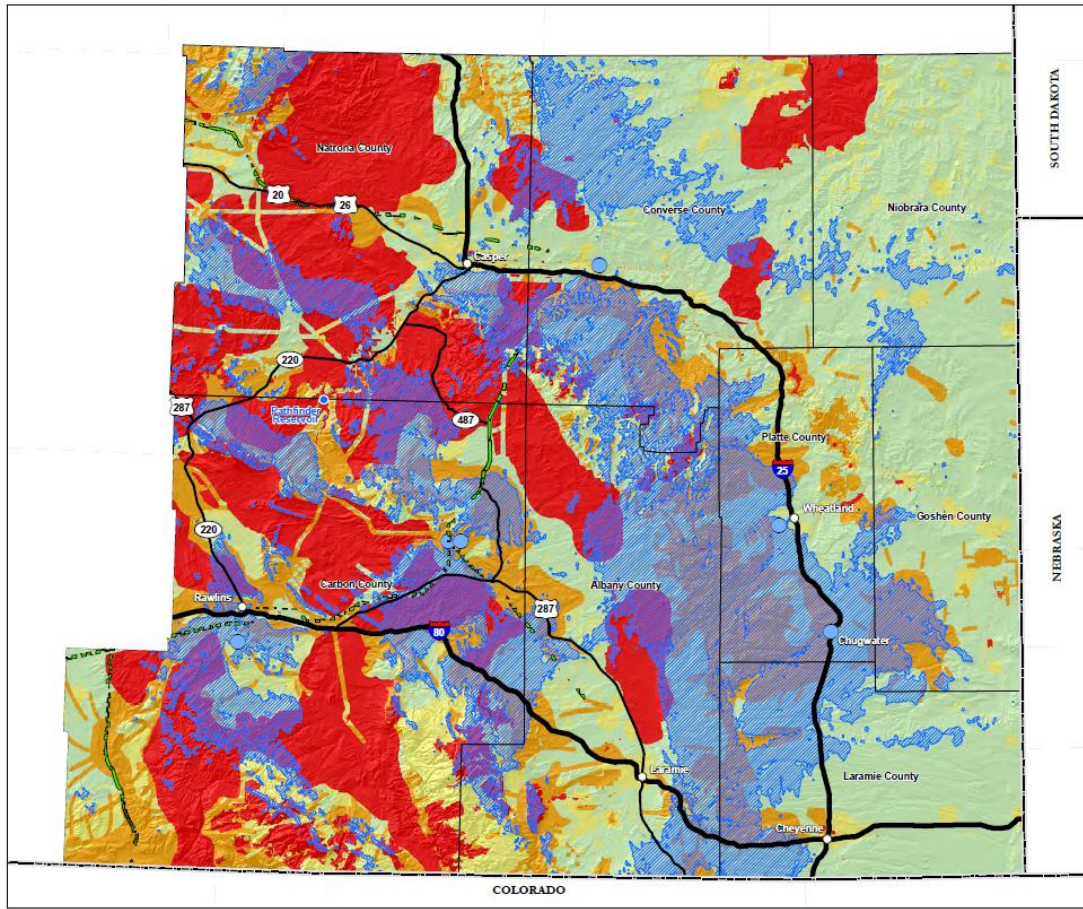
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| The Nature Conservancy, 2010 | Wyoming Natural Diversity Database, 2010 |
| United States Fish and Wildlife Service, 2010 | Wyoming State Parks, 2010 |
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Scale: 0 to 40 Kilometers / 0 to 40 Miles

Project Area: A locator map of Wyoming showing the project area in the southeast corner, bordered by Montana, Idaho, Utah, Colorado, and Nebraska.



Constraints on Future Infrastructure Development in Southeast Wyoming with Wind Resource Potential

- State Park
- West-wide Energy Corridor
- Transmission Export Hub
- Wind Potential Class 5, 6 and 7 - 50 Meter Hub Height

Constraints:

- Area of very high constraint: Area of potential resource or land use conflict is unsuitable for energy corridor due to unique, high-value, complex, or legally protected resources.
- Area of high constraint: Area of potential resource or land use conflict is less suitable due to unique, high-value, complex, or legally protected resources.
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NOTE: Resource data and constraint category levels are based on the Wyoming Wind Collector System and Integration Study, Phase 2 report. The constraint categories used in that report and shown on this map are not absolute, and substantial variability may be experienced at the local level and during the siting process.

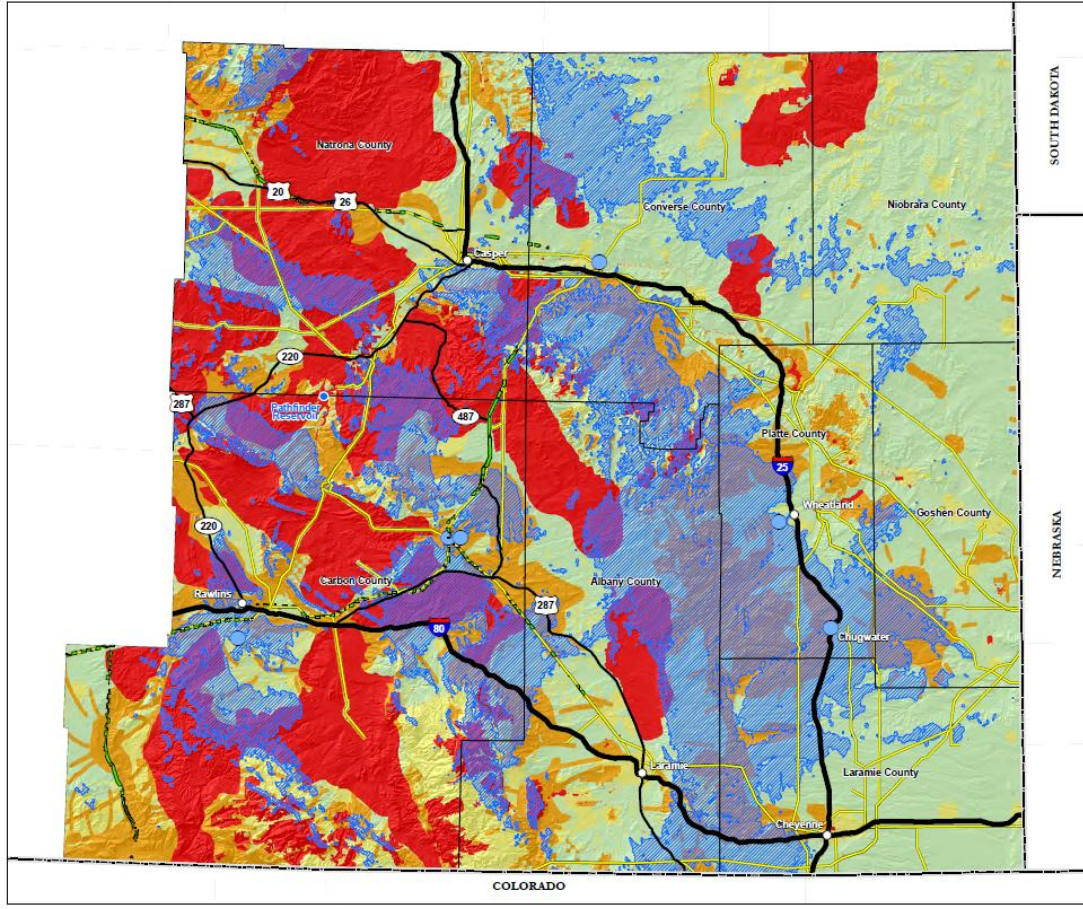
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Data Sources:

| | |
|--|---|
| Bureau of Land Management, 2010 | United States Geological Survey, 2010 |
| Environmental Systems Research Institute, 2010 | West-wide Energy Corridor Program, 2010 |
| National Park Service, 2010 | Wyoming Game and Fish Department, 2010 |
| National Renewable Energy Laboratory, 2010 | Wyoming Geographic Information Science Center, 2010 |
| The Nature Conservancy, 2010 | Wyoming Natural Change Database, 2010 |
| United States Fish and Wildlife Service, 2010 | Wyoming State Parks, 2010 |
| United States Forest Service, 2010 | WyoNet, 2010 |

Scale: 0 to 40 Kilometers / 0 to 40 Miles

Project Area (Map of Wyoming showing project location)



Constraints on Future Infrastructure Development in Southeast Wyoming with Transmission Lines

- State Park
- West-wide Energy Corridor
- Transmission Export Hub
- Wind Potential Class 5, 6 and 7 - 50 Meter Hub Height
- 115 Kilovolt or Greater Transmission Line

Constraints:

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- Area of high constraint: Area of potential resource or land use conflict is less suitable due to unique, high-value, complex, or legally protected resources.
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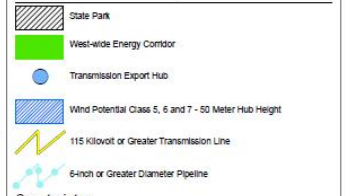
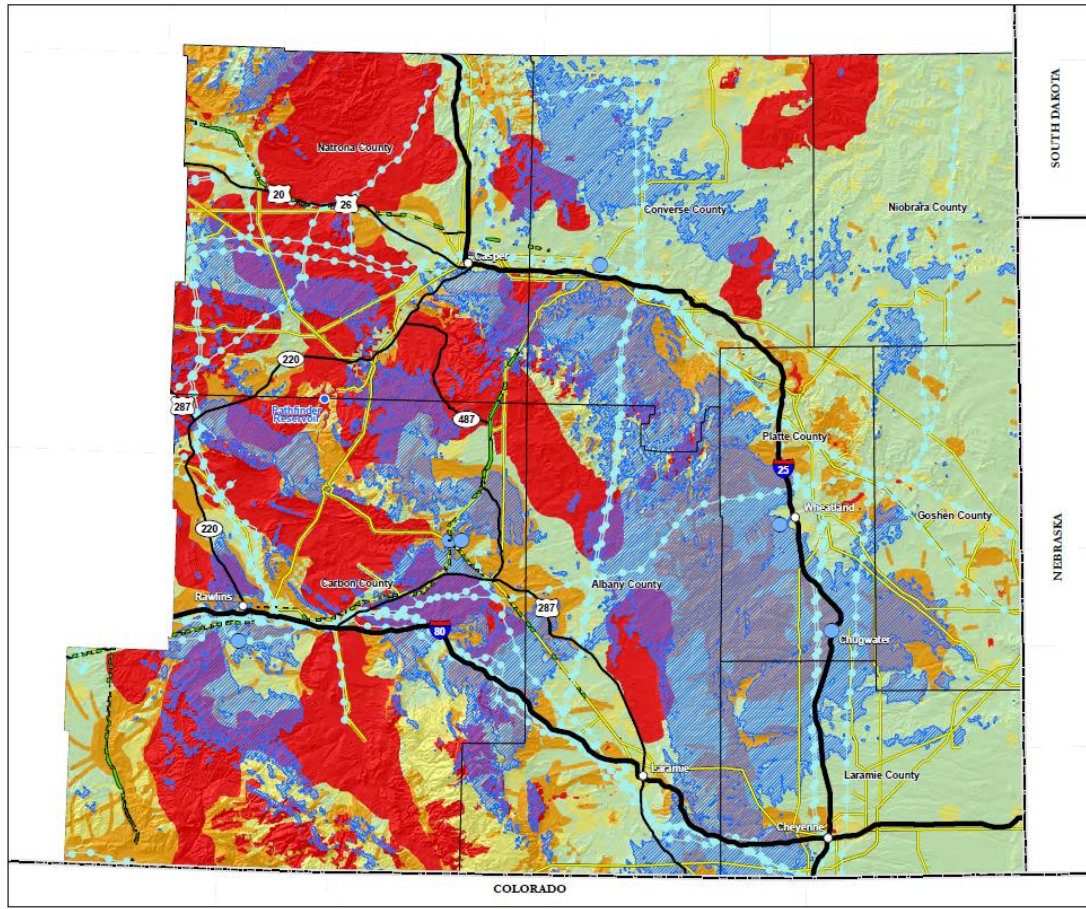
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| The Nature Conservancy, 2010 | Wyoming Natural Change Database, 2010 |
| United States Fish and Wildlife Service, 2010 | Wyoming State Parks, 2010 |
| United States Forest Service, 2010 | WyoNet, 2010 |

Scale: 0 to 40 Kilometers / 0 to 40 Miles

Project Area (Map of Wyoming showing project location)

Constraints on Future Infrastructure Development in Southeast Wyoming with Pipelines

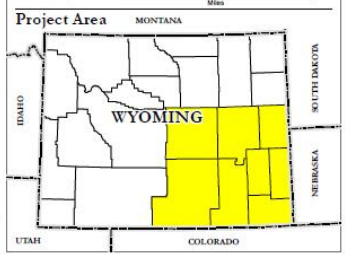
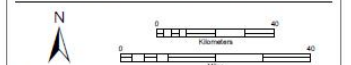


- Constraints:**
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 Environmental Systems Research Institute, 2010
 National Park Service, 2010
 National Renewable Energy Laboratory, 2002
 The Nature Conservancy, 2010
 United States Fish and Wildlife Service, 2010
 United States Forest Service, 2010
 United States Geological Survey, 2010
 Wyoming Game and Fish Department, 2010
 Wyoming Geographic Information Science Center, 2010
 Wyoming Natural Diversity Database, 2010
 Wyoming State Parks, 2010
 Wetly, Velocity Suite



SOUTH DAKOTA

NEBRASKA

COLORADO

UTAH

COLORADO