

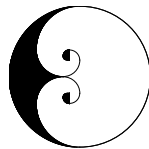
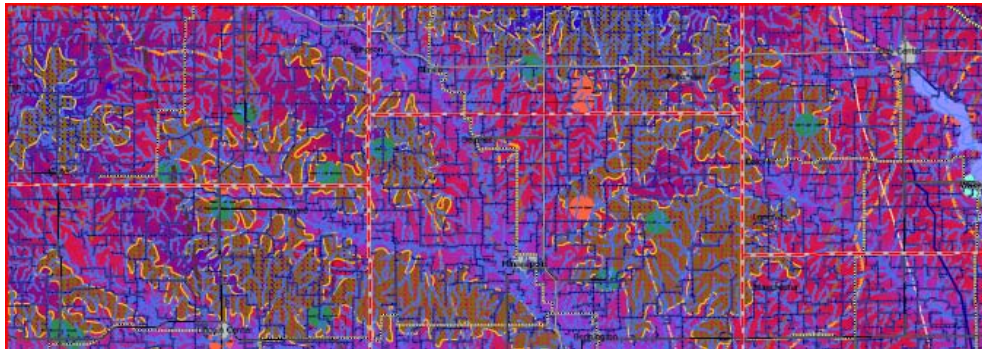
North Central Kansas Renewable Energy Maps

North Central Regional Planning Commission
Beloit, Kansas

Chase, Clay, Cloud, Dickinson, Ellsworth, Geary,
Jewell, Lincoln, Lyon, Marshall, Mitchell,
Morris, Ottawa, Pottawatomie, Republic,
Riley, Saline, Wabaunsee, Washington

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A Guide for Map Use



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Created by funding from the Rural Business Development Tax Credit program administered by the Kansas Department of Commerce and as invested by North Central Kansas Community Network, Inc. The Solar Map and 50 M Kansas Wind Resource Map layers were prepared by Coriolis and the 50, 70, and 100 M Wind Speed and Wind Power Map layers were prepared by AWS Truewind, LLC for the Kansas Corporation Commission. See original maps and associated reports for details. This material was prepared with the support of the U.S. Department of Energy (DOE) Grants No. DE-FG26-07NT43197 & DE-FG36-0747006. Whooping crane flyway data was acquired from the U.S. Fish and Wildlife Service. Untilled Land data was acquired from The Nature Conservancy. Prairie Chicken habitat data, flora and fauna data on threatened and endangered species, and species in need of conservation sitings, as well as protected areas, are from the Kansas Department of Wildlife and Parks. Data on archeological sites are from the Kansas State Historical Society. The latter two were accessed through The Kansas Geospatial Community Commons (KGCC). This multilayer pdf map is intended to facilitate the siting and development of renewable energy projects, particularly in early phases. All energy development projects should confirm resources with direct measurement in accordance with industry standards and development criteria with state and local officials. Neither the authors of this map or any data source used herein or any sponsoring agency assumes any responsibility for the completeness or accuracy of the information presented

Background

These maps were prepared to assist a wide audience seeking to evaluate renewable energy development project potential in the North Central Kansas region. Local and state government officials, land owners, renewable energy project developers large and small, and environmental advocates will all hopefully find them useful.

The maps consist of many layers of information acquired from diverse sources gathered together in a geographic information system (GIS) database and exported for viewing in Adobe Acrobat, available for free on the web. Although the files are large, particularly the regional map which is distributed in compressed (zipped) format, they should be easily accessible and transportable.

Map Structure

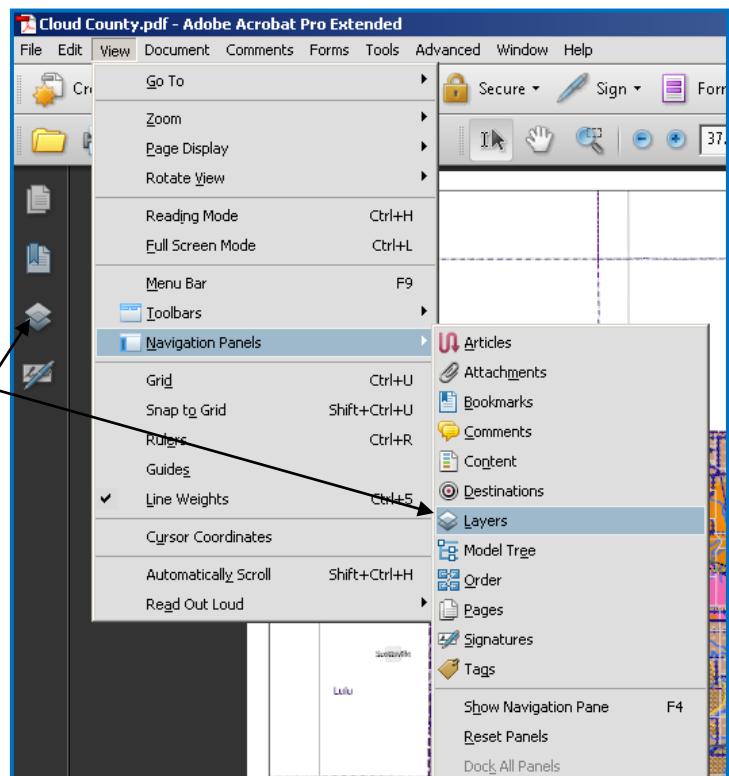
When first opened in Acrobat all of the very large number of layers will be viewable one on top of the other. This makes interpreting the information difficult if not impossible. The layer set is intended to be used with only a limited number of layers turned on and visible to evaluate a particular topic.

Map Use

Follow the instructions below to begin looking at the particular combination of layers that can provide information and insight into a particular issue you are interested in.

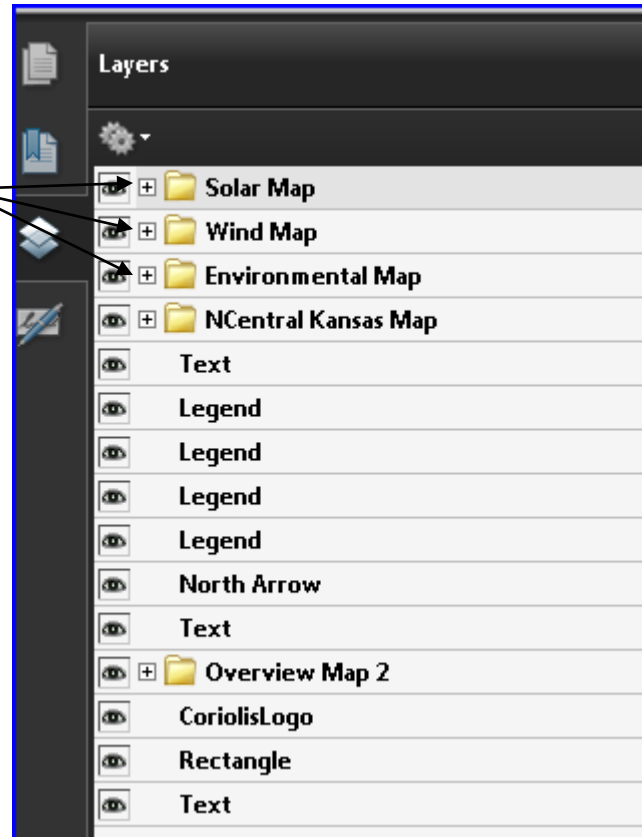
After the file has opened in Acrobat activate the layers tab.

Click on the layer icon at the left margin
or in the View-Navigator Panels
pull-down menu in Acrobat



The layers tree will appear. Expand the Solar Map, Wind Map, Environmental Map Folders by clicking on the + tabs.

On the Regional Map titled North Central Kansas Renewable Resource Analysis there is a folder title Environmental Concern Map. If you are viewing that map click on it as well.



Turn all of the layers in each of these folders off by clicking on the eye icon. One has been left on for illustration.

You are now ready to use the map. Turn back on the combination of layers that you want to evaluate by clicking in the empty eye icon box. Experiment. Looking at combinations of different layers of information can often lead to useful insights.

The screenshot shows a 'Layers' panel with the following structure:

- Solar Map** (Folder)
 - Solar Radiation
 - Solar:1-January Avg
 - Solar:2-February Avg
 - Solar:3-March Avg
 - Solar:4-April Avg
 - Solar:5-May Avg
 - Solar:6-June Avg
 - Solar:7-July Avg
 - Solar:8-August Avg
 - Solar:9-September Avg
 - Solar:10-October Avg
 - Solar:11-November Avg
 - Solar:12-December Avg** (Active)
 - State Mask
- Wind Map** (Folder)
 - Truwind Power Density, 100m
 - Truwind Power Density, 70m
 - Truwind Power Density, 50m
 - Truwind Wind Speed, 100m
 - Truwind Wind Speed, 70m
 - Truwind Wind Speed, 50m
 - Coriolis Wind Speed Raster, 50m
 - KS Counties - Boundary
 - N Central KS Counties.v1
- Environmental Map** (Folder)
 - TNC: Lesser Prairie Chicken Range Drawing
 - TNC: Greater Prairie Chicken Range Drawing
 - State: Natural Communities by Section Drawing 2
 - State: Protected Areas Drawing
 - State: Archaeological Sites by Section
 - TNC: Untilled Land
 - TNC: Untilled Land 3mile Buffer
 - TNC: Untilled Land 5mile Buffer
 - State: Rare Plants and Animals 1mi buffer Drawing
 - Rare species Label
 - State: Heart of the Flint Hills Area

North Central Kansas Renewable Energy Resource Map(s)

Sources of Data for Key Individual Layers

Solar Map

Solar Radiation

Annual Solar Insolation (energy), Watt-hour/M²

Taken from the Kansas Solar Resource Map prepared for the Kansas Corporation Commission by Coriolis in 2008. Based on 15 years (1991-2005) of hourly solar insolation contained in the National Solar Radiation Data Base (NSRB) acquired from the National Renewable Energy Laboratory. A copy of the Kansas Solar Resource Map and associated information can be downloaded from <http://www.kcc.state.ks.us/energy/solar.htm> .

Solar: 1 January Avg thru Solar: 12 December Avg show month specific values taken from the data described above.

Wind Map

Truewind Power Density, 100 m

Taken AWS Truewind, LLC prepared a series of wind speed and power maps for the Kansas Corporation Commission in 2008 using their MesoMap method. Copies of the Wind Resource Map of Kansas are available at <http://www.kcc.state.ks.us/energy/wind.htm> .

Truewind Power Density, 70 m, Truewind Power Density, 50 m, Truewind Wind Speed, 100 m, Truewind Wind Speed, 70 m, Truewind WindSpeed, 50 m, are all part of the map set described above.

Coriolis Wind Speed Raster, 50 m

Taken from the Kansas Wind Resource Map prepared for the Kansas Corporation Commission by Coriolis in 2003 using the WindMap software. Copies of the individual county maps are available at http://www.kcc.state.ks.us/energy/comm_wind/cw_toolkit.htm .

Environmental Map

Lesser Prairie Chicken Range Drawing

Provided by Brian Obermeyer <bobermeyer@TNC.ORG> of The Nature Conservancy from Kansas Wildlife and Parks information.

Greater Prairie Chicken Range Drawing

Provided by Brian Obermeyer < bobermeyer@TNC.ORG > of The Nature Conservancy Kansas Wildlife and Parks information.

State: Natural Communities by Section Drawing 2

Originator: Kansas Natural Heritage Inventory

Publication_Date: 20080718

Title: natural_communities

State: Protected Areas Drawing

Originator: Kansas Natural Heritage Inventory

Publication_Date: 20080718

Title: protected_areas

State: Archaeological Sites by Section

Wind and Prairie Task Force

TNC: Untilled Lands

Provided by Brian Obermeyer < bobermeyer@TNC.ORG > of The Nature Conservancy.

State: Rare Plants and Animals 1 mi buffer Drawing

Originator: Kansas Natural Heritage Inventory

Publication_Date: 20080718

Title: rare_species

TNC: Whooping Cranes Migration 90avg_buffers_75-95 Drawing

The Whooping Crane Migration data was provide by Brian Obermeyer <bobermeyer@TNC.ORG> and Chris Hise cmhise@TNC.ORG . The principal source is Martha Tacha of the U.S. Fish and Wildlife Service, Grand Island, NE.