

Wyoming Power GIS Project

Brief

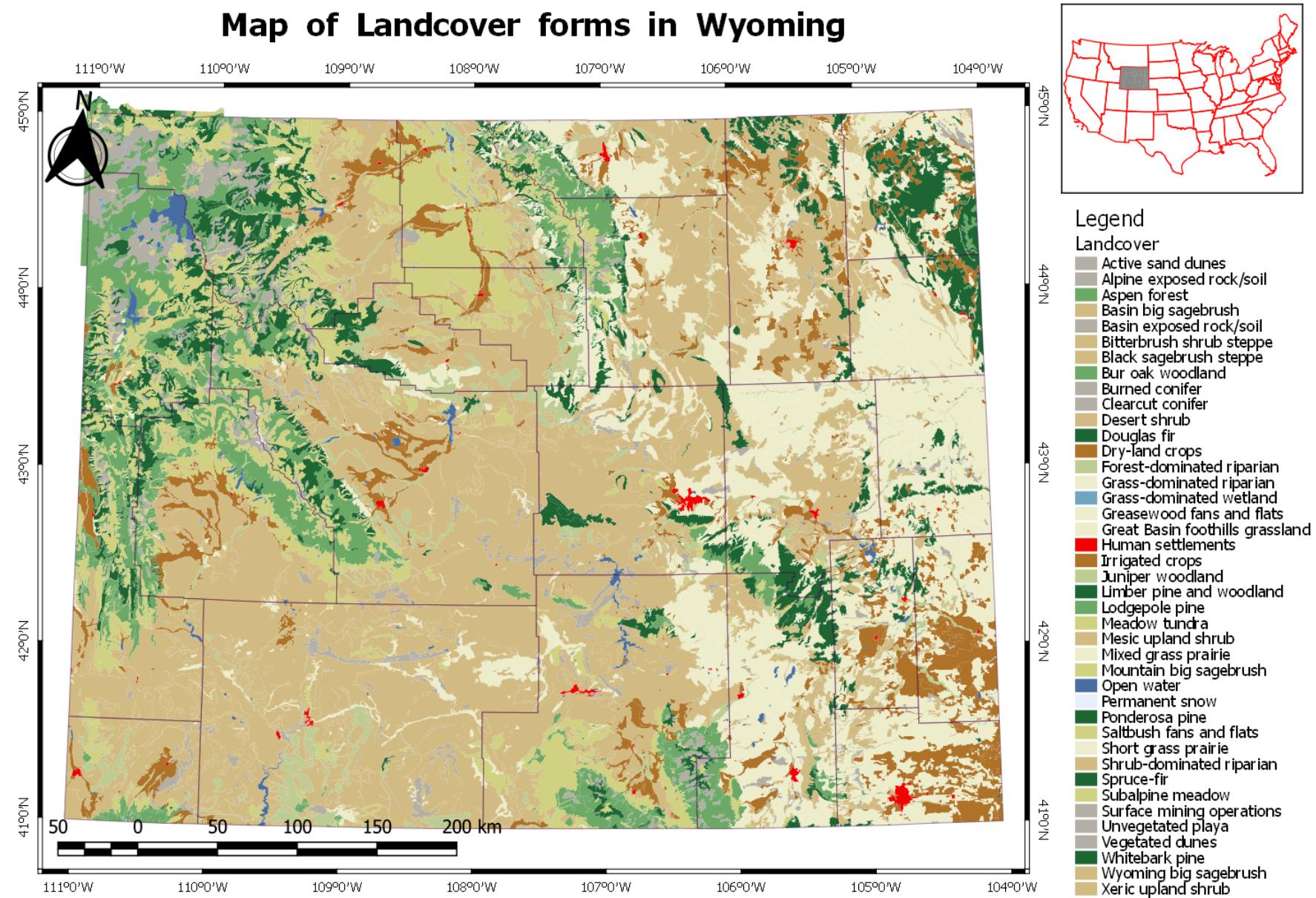
Due to increasing customer demand the Wyoming Power Corporation has announced an interest in expanding its power generation production within Wyoming state. It wishes to explore both potential wind power locations and remaining oil deposits and requires a selection of maps to be produced.

Tasks

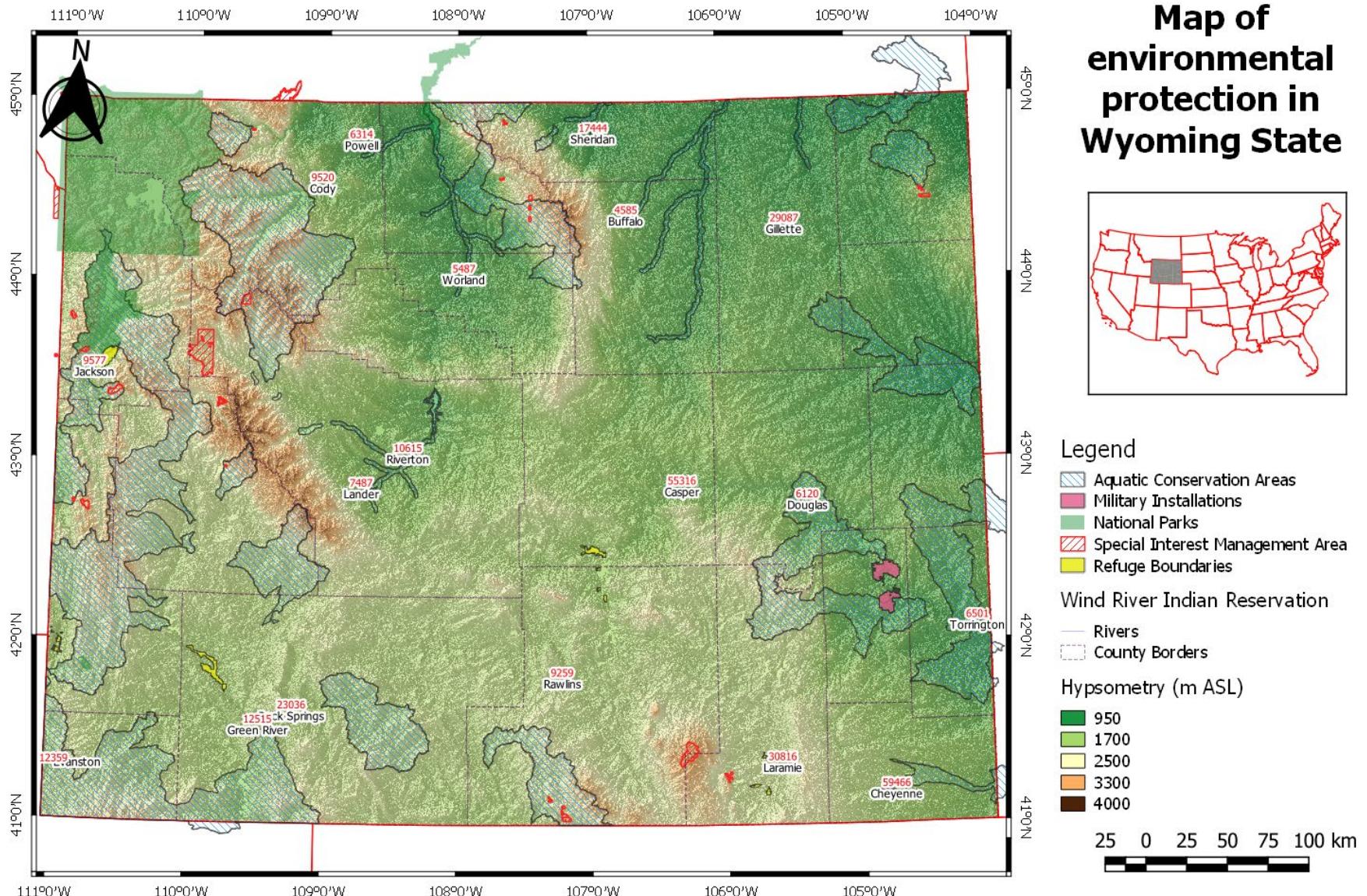
Produce the following maps:

1. A general landcover, including county borders and major towns over 4000 inhabitants.
2. Protected areas (including indigenous reservations, national parks, National Forestry Service refuge areas, military installations, aquatic conservation areas).
3. Oil deposits that are not in protected areas and within 50Km of a main road.
4. Spatial distribution of mean annual precipitation.
5. Existing green energy generation.
6. Projected wind speeds across Wyoming State at a height of 80m.
7. Proposed locations for 3 different wind farms of at least 50 turbines (spaced 2300m apart) which are within 50Km of any existing power network.
8. Basic 3D models of general area and each of the 3 proposed wind farms.

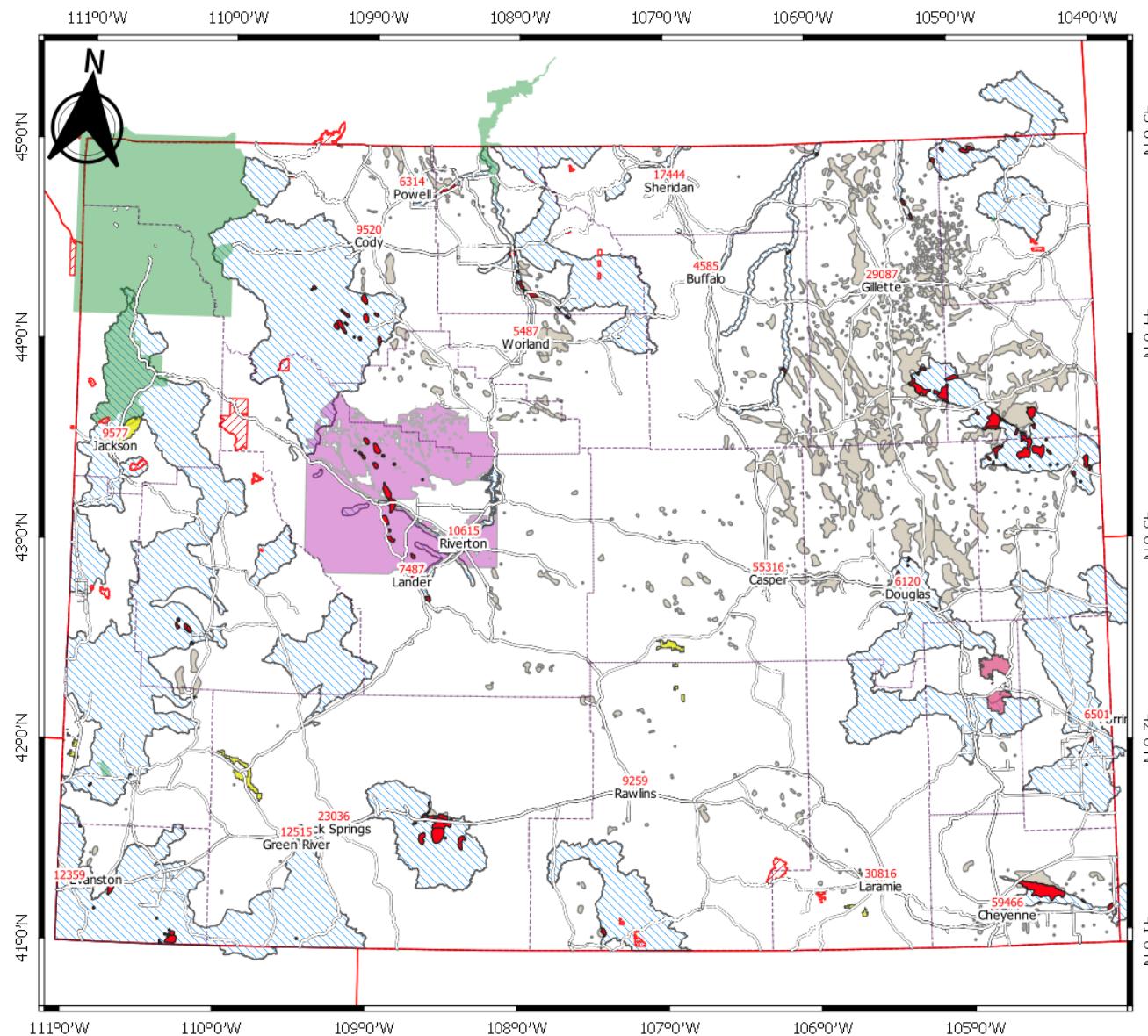
1) A general landcover, including county borders and major towns over 4000 inhabitants.



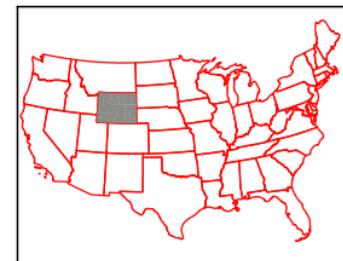
2) Protected areas (including indigenous reservations, national parks, National Forestry Service refuge areas, military installations, aquatic conservation areas).



3) Oil deposits that are not in protected areas and within 50Km of a main road.



**Map of oil deposits
in Wyoming State**



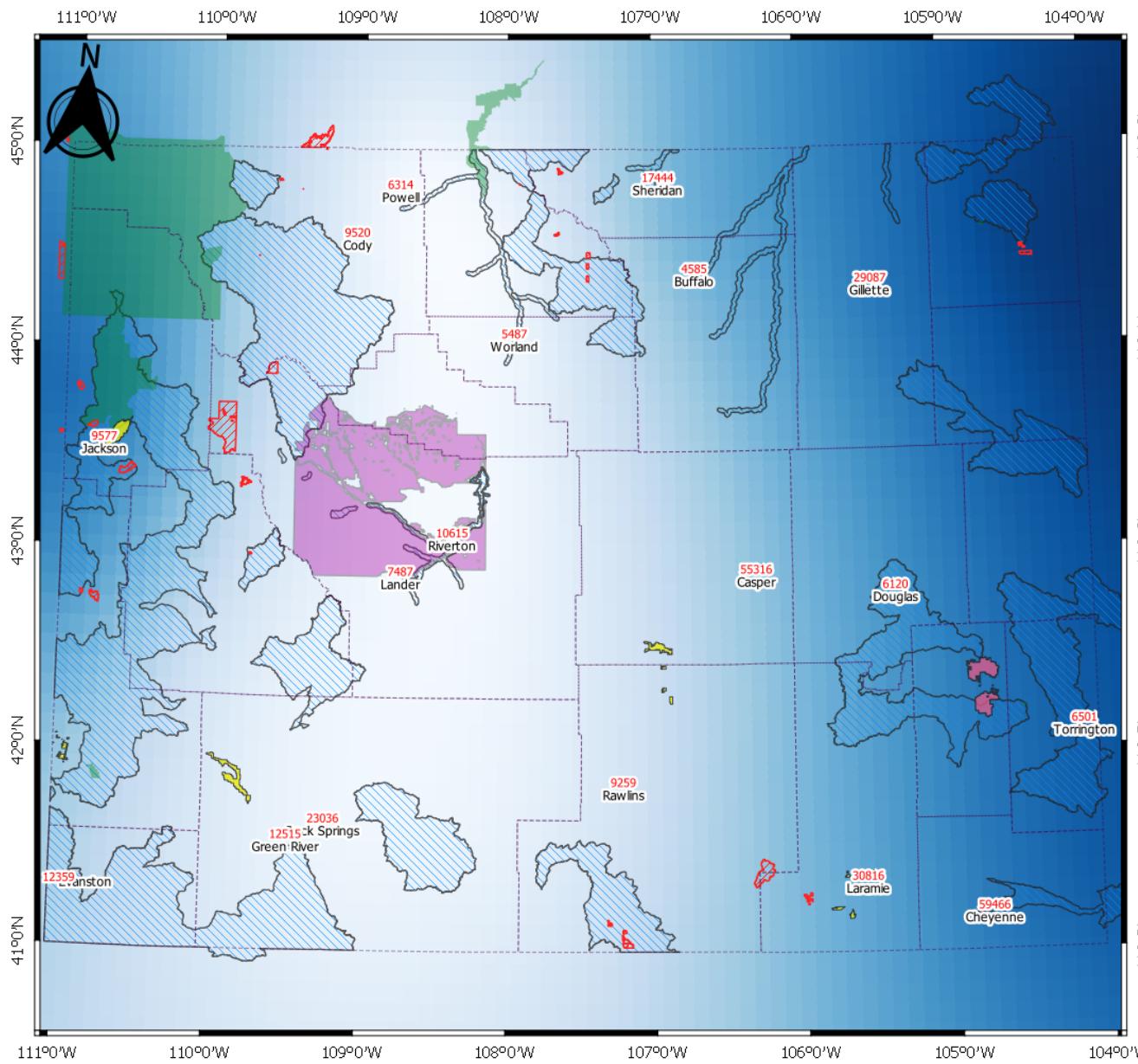
Legend

- County Borders
- National Parks
- Special Interest Management Areas
- Refuge Boundaries
- Aquatic Conservation Areas
- Wind River Indian Reservation

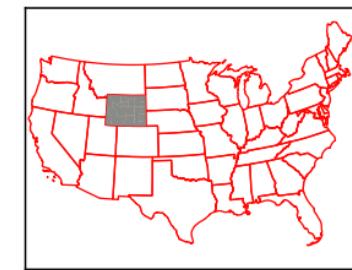
Oil Deposits

- Deposits within 50km of main roads
- Deposits in protected areas

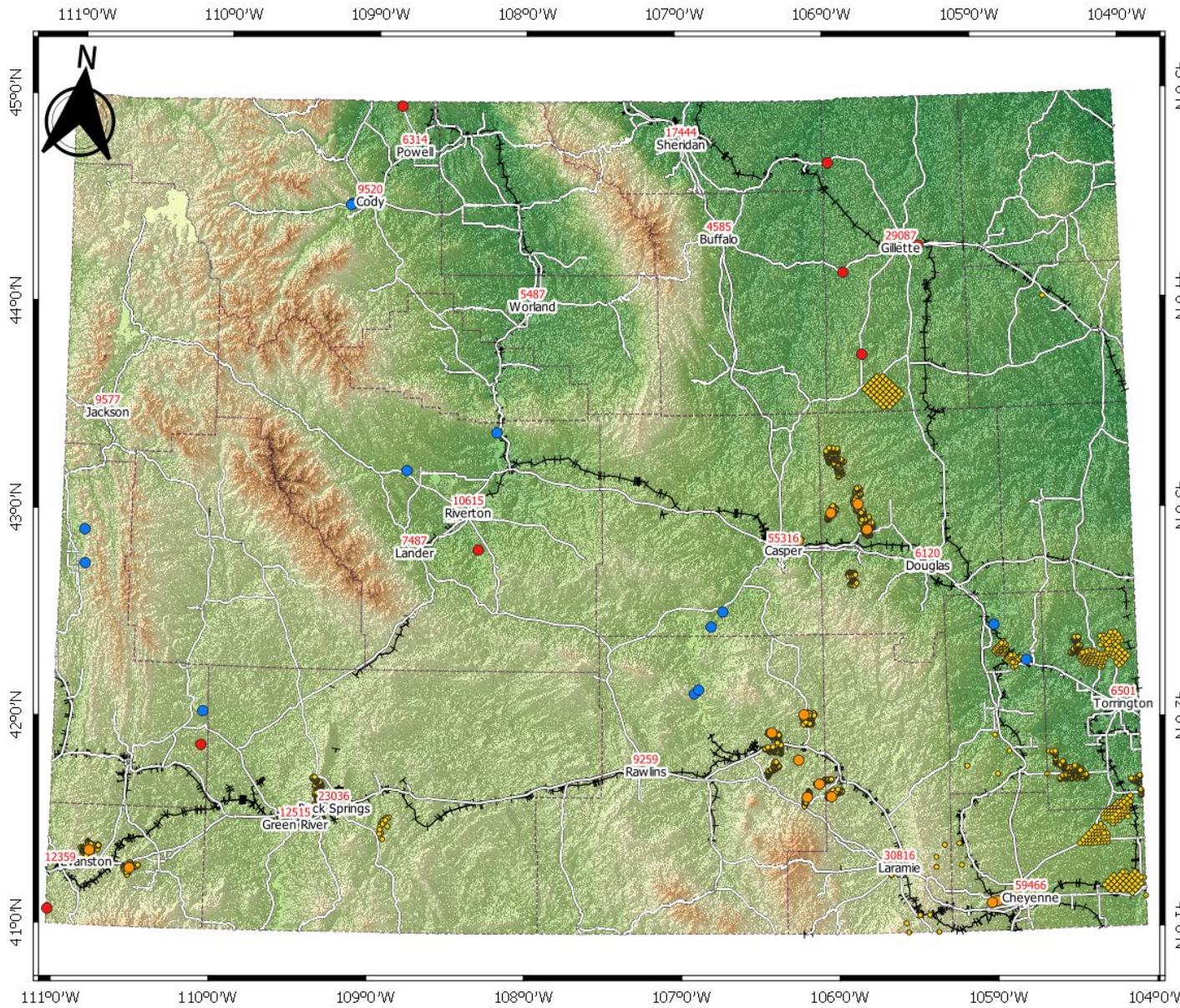
4) Spatial distribution of mean annual precipitation



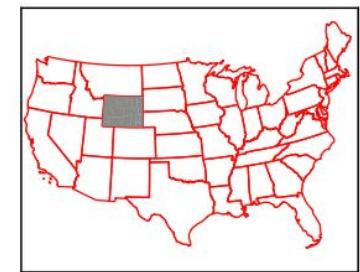
Map of mean annual precipitation distribution in Wyoming State



5) Existing green energy generation



Map of green power generation in Wyoming State



Legend

- ↔ Railroads
- Main Roads
- ◻ County Borders

Power Generation

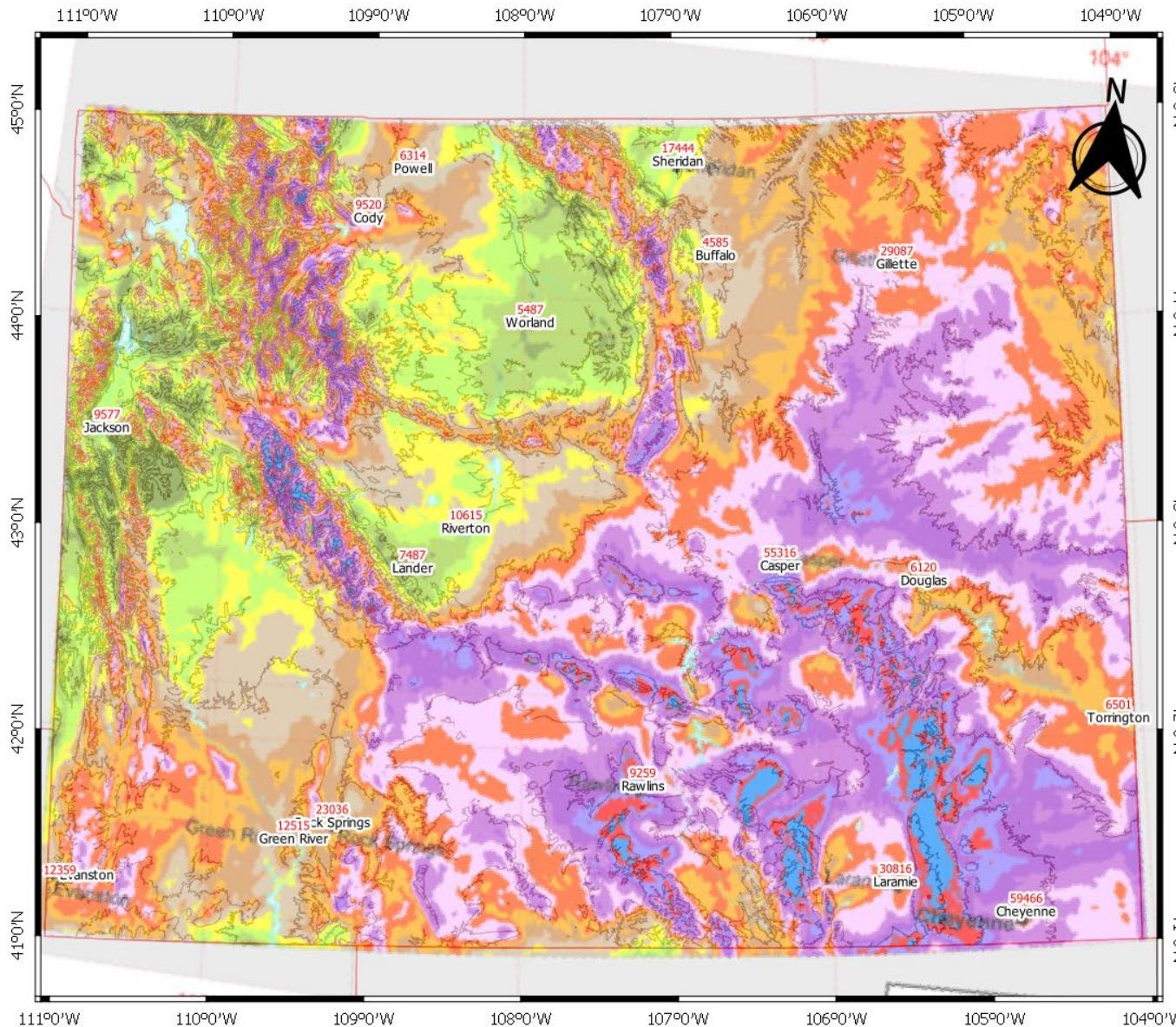
- Hydro Power
- Natural Gas
- Wind Power
- Wind Turbines

Hypsometry (m ASL)

950 m
1700 m
2500 m
3300 m
4000 m

25 0 25 50 75 100 km

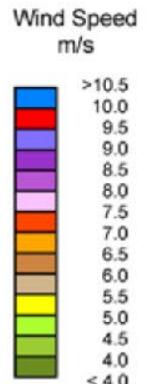
6) Projected wind speeds across Wyoming State at a height of 80m.



Map of estimated wind speed at 80m for Wyoming State



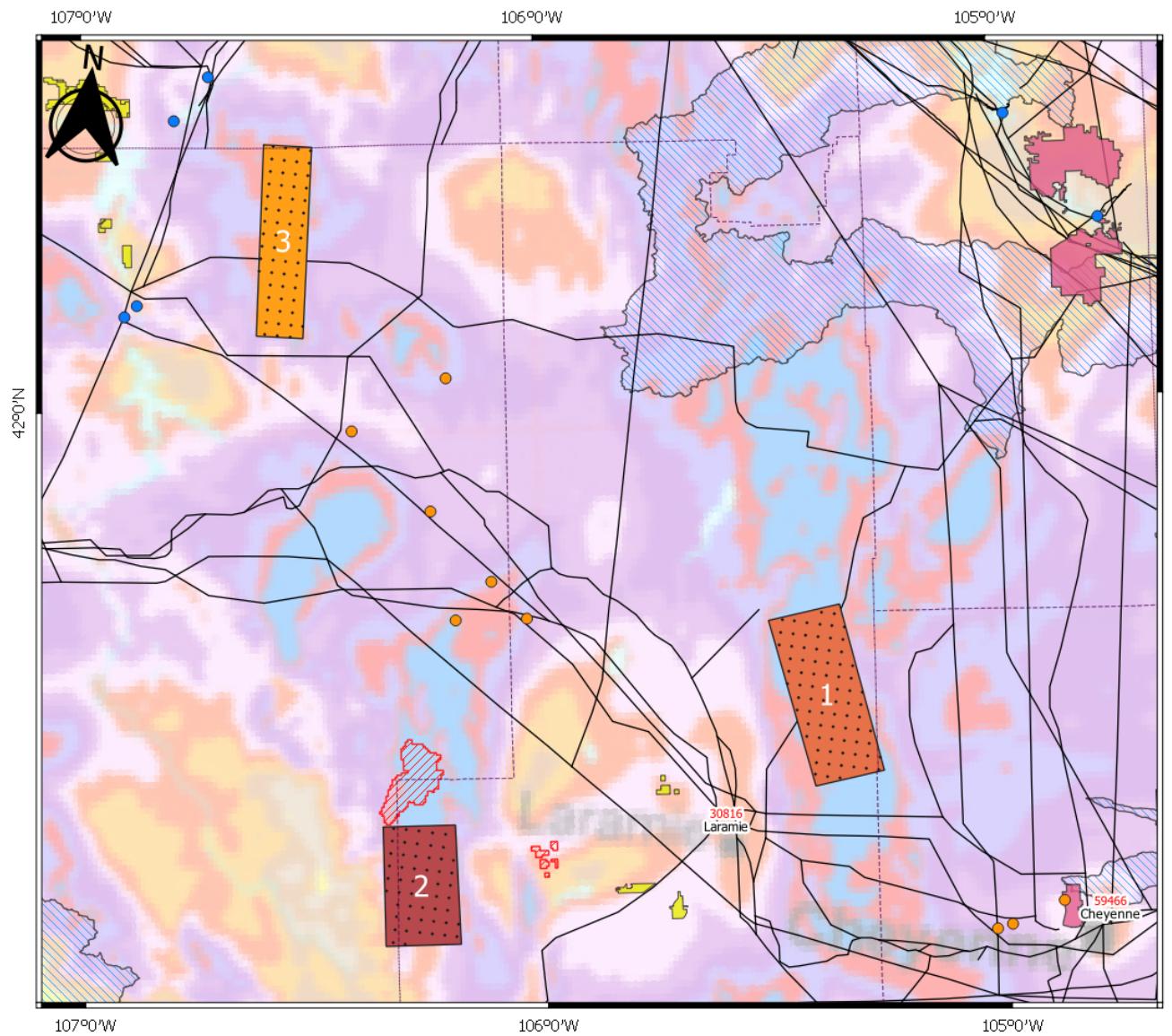
Legend



Wind speed estimates courtesy of
www.windnavigator.com and AWS Truepower LLC.

25 0 25 50 75 100 km

7) Proposed locations for 3 different wind farms of at least 50 turbines (spaced 2300m apart) which are within 50km of any existing power network.



Map of wind farm locations in Wyoming State



Legend

- Aquatic Conservation Areas
 - Military Installations
 - National Parks
 - Special Interest Management Area
 - Refuge Boundaries
 - County Borders
 - Wind River Indian Reservation
 - Green energy locations
- Wind Speed m/s
- | |
|-------|
| >10.5 |
| 10.0 |
| 9.5 |
| 9.0 |
| 8.5 |
| 8.0 |
| 7.5 |
| 7.0 |
| 6.5 |
| 6.0 |
| 5.5 |
| 5.0 |
| 4.5 |
| 4.0 |
| <4.0 |
- Wind Speed m/s
- Hydro
 - Natural Gas
 - Wind
 - Proposed location 1
 - Proposed location 2
 - Proposed location 3

Wind speed estimates courtesy of
www.windnavigator.com and AWS
Truepower LLC.

0 10 20 30 40 50 km

8) Basic 3D models of the general Wyoming area and location of each of the 3 proposed wind farms.

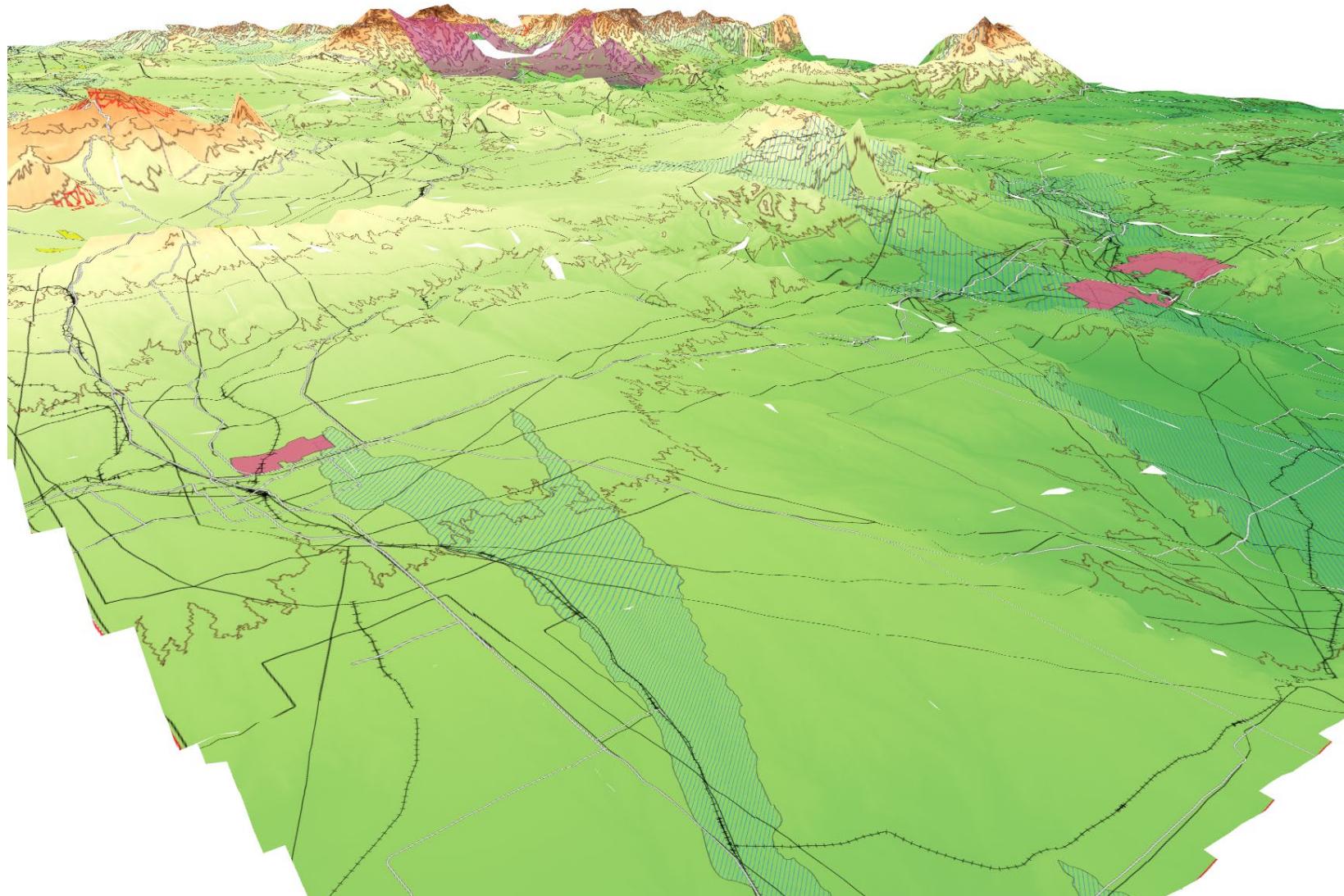


Fig 1 - General area 3D model of Wyoming topography.

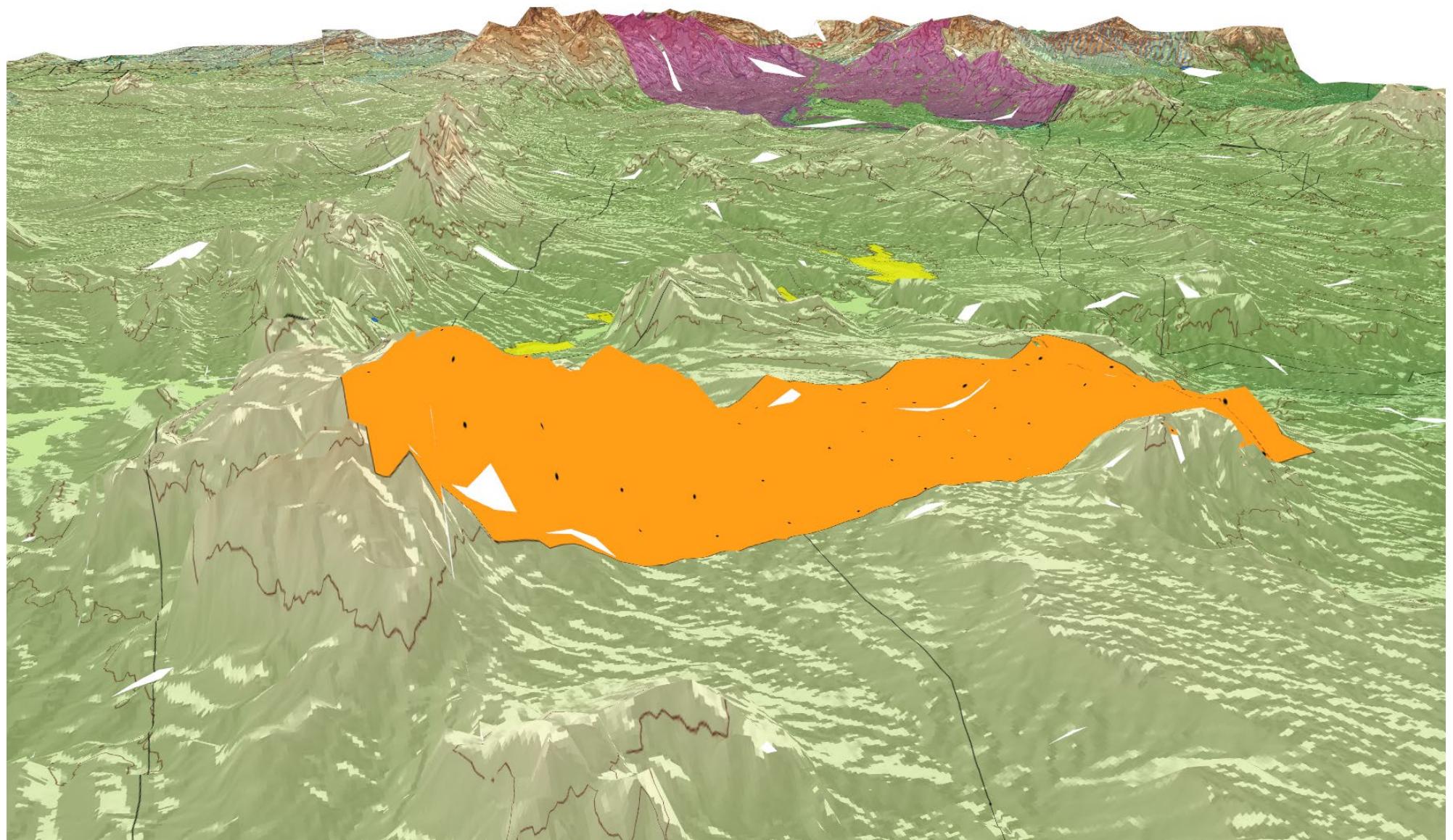


Fig 2 - 3D model of proposed windfarm Location 1.

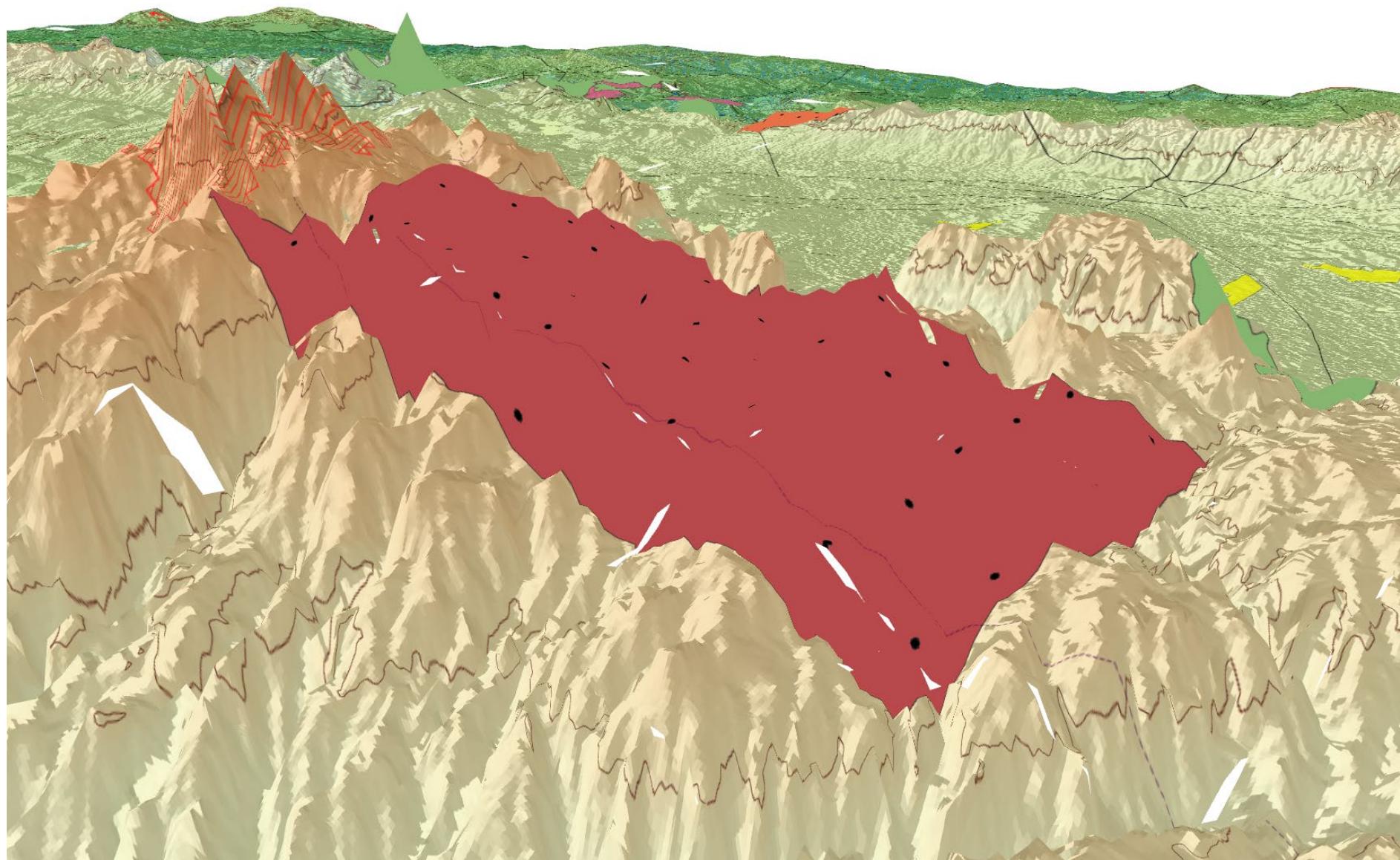


Fig 3 - 3D model of proposed windfarm Location 2.

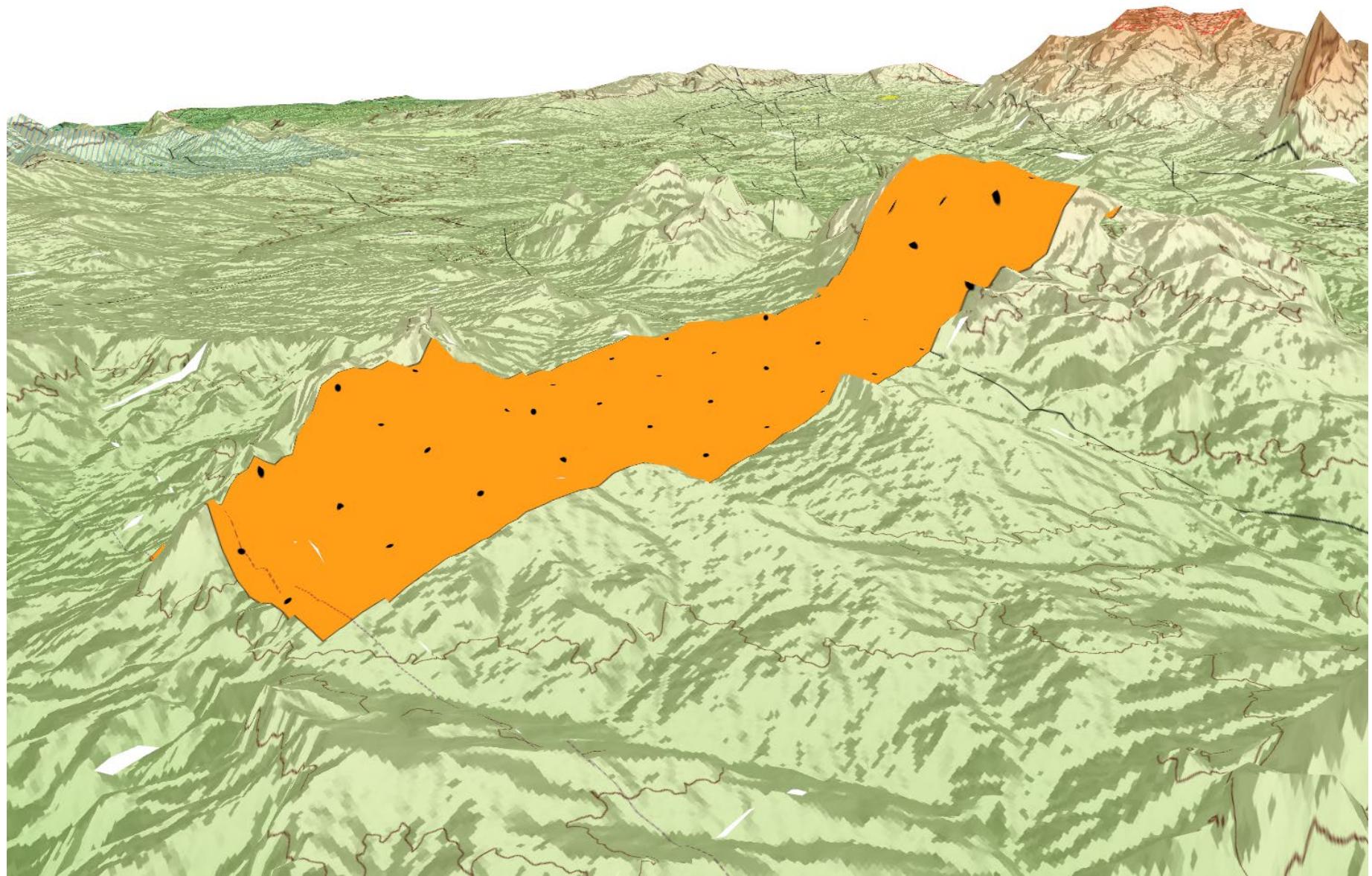


Fig 4 - 3D model of proposed windfarm Location 3.

References:

SRTM data from Consortium for Spatial Information <http://srtm.csi.cgiar.org/srtmdata/>

Transportation networks, utilities, facilities and structures, demographic, climate, boundaries, environmental and conservation data from Wyoming Geospatial Hub
<https://data.geospatialhub.org/>

80m windspeed charts from AWS Truepower and the National Renewable Energy Laboratory <https://dashboards.awstruepower.com/>

All charts produced in QGIS 3.14 in WGS84 UTM 11 format.

(Higher resolution images are available as separate PDFs in the images folder.)