



THE WILDERNESS SOCIETY

Assumptions and Constraints

When completing a complex analysis such as such as an oil and gas build-out projection for 2.4 million acres of federal mineral estate, it is imperative that the methodology, assumptions, and constraints used to carry out the analysis are outlined in detail. Below is listing of the assumptions and constraints used to model the Reasonable Foreseeable Development (RFD) as well as a description of the software used for placing wells, the technique used for determining the most likely location of new roads, and a description of the methodology used for measuring habitat fragmentation. If you have further questions about the oil and gas build-out projection, please contact Dawn Hartley at dawn_hartley@twc.org or 206-624-6430 x230.

Assumptions

- Modeled RFD as closely as possible given available spatial data
 - 3,031 well pads to be placed (one well per pad)
 - § 2,108 pads in or near known fields (Table 8 of RFD)
 - § 923 wells in clusters (12 to 15 wells each) near existing wells but outside of defined fields (per Fred Conrath of the BLM)
 - 20% (606) of wells will be dry – distributed proportionately to producing wells
 - Wells pads = rectangular, 4 acres in size
 - Road right-of-way = 50 feet
- Did not model central facilities (e.g., pumping stations)

Constraints – Development Areas

- Two types of development areas
 - Large areas defined by Table 8 of the RFD (pg 57)
 - § one boundary per formation/formation group listed in table (e.g., “Powder Wash”, “East of Godiva Rim – Fox Hills/Lance”)
 - derived from public land survey data
 - based on township, range and # of sections identified in Table 8 of RFD
 - after the appropriate township and range were isolated, the USGS oil & gas assessment unit boundaries (where available) were used along with the appropriate # of sections to define area within the township and range
 - Small clusters = 4 to 6 sections in size
 - § manually selected to near areas with existing wells (per conversation with Fred Conrath of the BLM)

Constraints – Well Placement

- All wells placed in “high” and “medium” oil and gas potential zones as defined by BLM
- Well pads placed outside of the road right-of-way
 - placed 234’ buffer on road center line
 - § ½ of road right-of-way plus ½ width of a 4 acre pad
- Wells placed outside of slopes > 35%

Constraints – Alternative C

- Also took into account constraints based on Alternative C of the Little Snake RMP Working Document
 - No wells placed in:
 - § identified wilderness study areas
 - § designated Areas of Environmental Concern (ACECs)
 - § select previously considered ACECs
 - § select areas of wilderness character
 - § special recreation management areas
 - § Potential Wild and Scenic River segments

Constraints - Well Count and Spacing

- Each development boundary was populated with wells according to:
 - Well count
 - based on “# of Wells” column in Table 8 of RFD
 - Well Spacing
 - wells were placed at a minimum separation distance of 1,000 feet (or between 400 and 600 ft between pads, depending on orientation)*
 - number of wells took precedence over well spacing identified in Table 8 of RFD

* in 2 of the Sandwash/Vermillion areas the 1,000 ft separation could not be maintained and still populate with the correct number of wells. This constraint was removed for these two areas.

Software Used

- CommunityViz extension to ArcGIS was used to populate the landscape with well points
- All of the constraints just outlined were input as parameters to CommunityViz model
- Output from model was well point data, randomly generated within constraints identified
- ArcGIS script converted well points to well pads 4 acres in size

Adding in the Roads

- Roads were manually digitized to connect new wells to existing route network
- A digital elevation model was displayed behind the data to aid in route placement
- The shortest route was digitized unless topography suggested otherwise

Habitat Fragmentation Analysis

- Using the well pads modeled in CommunityViz and the connecting routes, a habitat fragmentation analysis has been started
- Two main fragmentation metrics
 - Distance to route
 - Route density
- Metrics calculated for the resource area as a whole and are now beginning to look at sub-areas (individual development areas, sagebrush patches, Vermillion Basin, etc.)