

APPALACHIAN LANDSCAPE CONSERVATION COOPERATIVE GRANT 2013 PROGRESS REPORT

Quarter: (circle one)

2013 1st

2013 2nd

2013 3rd

2013 4th

Grant Number and Title: 2012-02; Assessing Future Impacts of Energy Extraction in the Appalachian LCC

Grant Receipt/Organization: The Nature Conservancy

Grant Project Leader: Joseph Kiesecker/Jeff Evans/Judy K. Dunscomb

Were planned goals/objectives achieved last quarter? YES

ALCC Need Addressed: Forest Resource Extraction

Progress Achieved: (For each Goal/Objective, list Planned and Actual Accomplishments)

Shale gas model:

We have completed 2 Shale-gas models: A high resolution detailed model at only a subset of the Appalachian LLC (= Marcellus Shale Play, see previous progress reports) and a lower resolution model across the entirety of the Appalachian LLC (see figure below). For details on the model and scenarios see previous progress reports. We do feel that in the region where we do have adequate training data the model estimates represent an underlying probability of potential deep shale gas resources. But as previously stated we feel that the uncertainty associated with the spatial prediction in the southern portion of the LCC study area is too high to support any scenario development.

Wind development model:

We have completed 2 wind models: A high resolution model at only a subset of the Appalachian LLC (= Marcellus Shale Play, see previous progress reports) and high resolution model across the entirety of the Appalachian LLC (see figures below). To examine areas where development risk will likely be high for both wind and shale gas we selected a threshold (= .90) for both predictive models. We then intersected these areas with forest cover to identify forested areas at risk of development (see figures below).

Modeling & Data:

Models and data are available for download thru the following links (metadata is in progress):

Files available at the Appalachian LCC boundary

File: GasWellPointLocations.zip (shapefile)

Description: DOE-NREL deep gas well locations

<https://s3.amazonaws.com/LCCAPP/GasWellPointLocations.zip>

File: LCC-GasDevProbs1KM.zip (imagine raster)

Description: Gas development probability 1km

<https://s3.amazonaws.com/LCCAPP/LCC-GasDevProbs1KM.zip>

File: LCC-WindDevProbs1KM.zip (imagine raster)

Description: Wind development probability 1km

<https://s3.amazonaws.com/LCCAPP/LCC-WindDevProbs1KM.zip>

File: NLCD2006-FOREST.zip (imagine raster)

Description: Forest (1)/nonforest(0) 30m imagine raster from 2006 NLCD

<https://s3.amazonaws.com/LCCAPP/NLCD2006-FOREST.zip>

File: WindTurbinePointLocations.zip (shapefile)

Description: Wind turbine locations form FAA obstruction database

<https://s3.amazonaws.com/LCCAPP/WindTurbinePointLocations.zip>

Files available at Marcellus boundary

File: BASINS.zip (shapefile)

Description: 6th-level HUC (basin) watersheds shapefile

<https://s3.amazonaws.com/CentralApps/BASINS.zip>

File: CWPImpairmentAnimagion.gif (giff)

Description: GIFF animation of CWP impacts

<https://s3.amazonaws.com/CentralApps/CWPImpairmentAnimation.gif>

File: F2F_input.zip (dbf)

Description: F2F dbf file - for relate to subwatersheds shapefile

https://s3.amazonaws.com/CentralApps/F2F_input.zip

File: MarcellusGasWellProbs1km.zip (imagine raster)

Description: Marcellus gas well development probabilities

<https://s3.amazonaws.com/CentralApps/MarcellusGasWellProbs1km.zip>

File: NLCD2006-FOREST.zip (imagine raster)

Description: Forest (1)/nonforest(0) 30m imagine raster from 2006 NLCD

<https://s3.amazonaws.com/CentralApps/NLCD2006-FOREST.zip>

File: NLCD2006-IMPERVIOUS.zip (imagine raster)

Description: Impervious (1)/nonimpervious(0) 30m imagine raster from 2006 NLCD

<https://s3.amazonaws.com/CentralApps/NLCD2006-IMPERVIOUS.zip>

File: SCENARIO_POINTS.zip (shapefile)

Description: Point shapefile of development scenarios

https://s3.amazonaws.com/CentralApps/SCENARIO_POINTS.zip

File: SUBWATERSHEDS.shp (shapefile)

Description: 12th-level HUC (subwatersheds) with current and scenario(s) for impervious surface and forest impacts

<https://s3.amazonaws.com/CentralApps/SUBWATERSHEDS.zip>

File: WindProbs30m.zip (imagine raster)

Description: Wind development probabilities

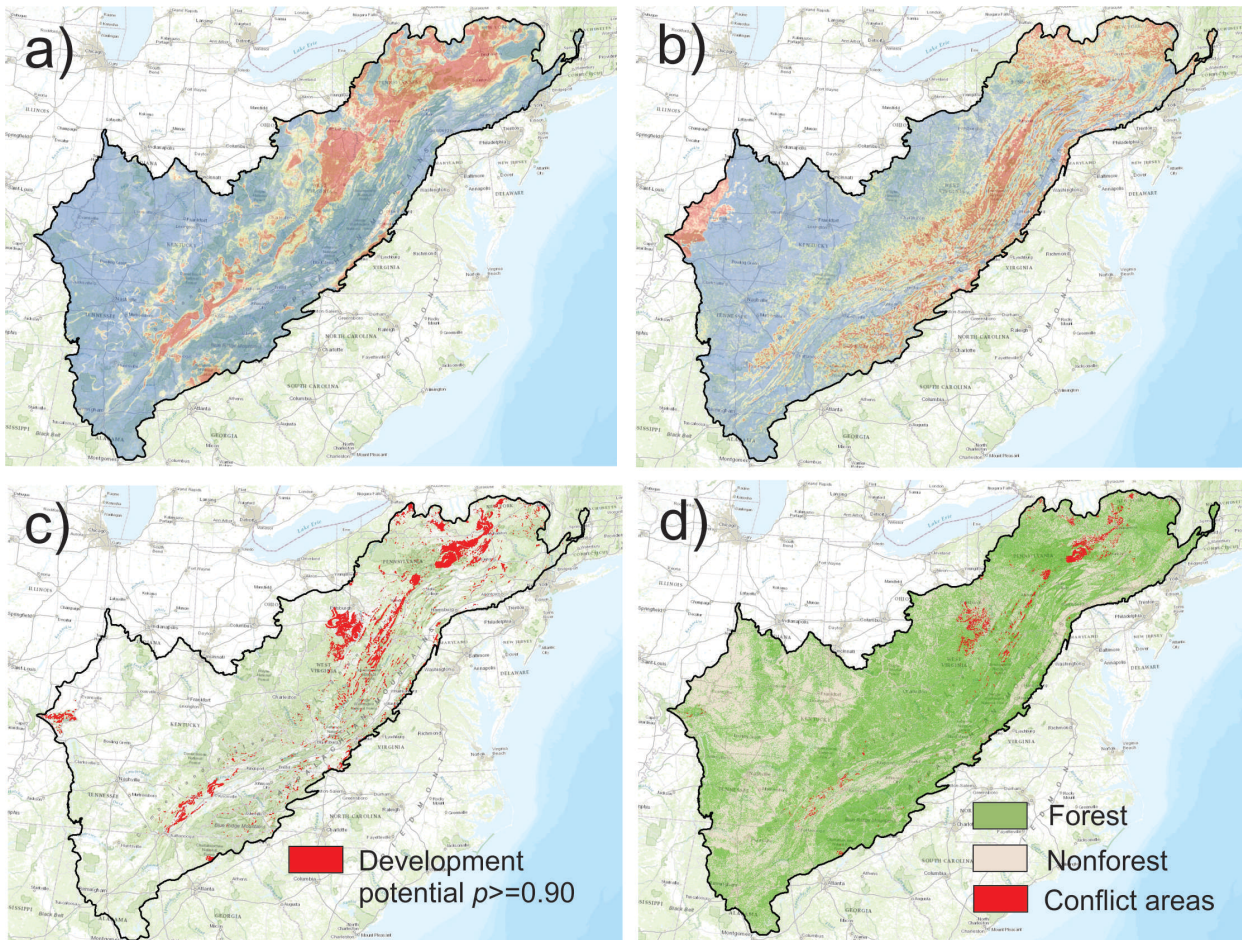
<https://s3.amazonaws.com/CentralApps/WindProbs30m.zip>

Coal Model: Through a subcontract with TNC, West Virginia University researchers have completed a draft predictive model of surface coal mining development for the Appalachian LCC. WVU researchers have completed and submitted (to TNC) a draft report summarizing data inputs, methodology, and draft results. The draft report is included as an attachment to this document. On July 18th, the WVU presented their draft model and findings to a peer review group which included Appalachian LCC leadership and other energy experts. The model generated substantial conversation among reviewers and there were a number of suggestions for how to improve WVU's approach. A second peer review

session has been scheduled for early September, and between now and then WVU will work to incorporate suggestions and update their model.

Web Map Server: A template web map server has been prepared and will be previewed at the upcoming meeting with LCC advisory team in September.

Figure 1 a) probability of gas development color ramped where blue is low and red is high probability; b) probability of wind development color ramped where blue is low and red is high probability; c) Areas with gas and wind development potential $p \geq 0.90$; d) 2006 USGS-NLCD Forest and nonforest cover with identified conflict areas where forest and highest development potential ($p \geq 0.90$) intersect.



Summary of Progress: (Provide a paragraph describing progress, work to come, and timelines)

Models that depicts the probability of shale gas and wind energy development across the Appalachian Landscape Conservation Cooperative are completed; Shale Gas and Wind development scenarios have also been completed across the subset of the LCC study area (= Marcellus Shale). We have also completed a development scenario for wind across the entirety of the Appalachian Landscape Conservation Cooperative. We think it will be unlikely to develop scenarios for shale gas for the entire LCC since development beyond the Marcellus Shale has been limited.

Difficulties Encountered: We have been unable to acquire detailed data for a shale gas model across entire study area. Information that can be used to generate shale gas development scenarios is currently only available for

the Marcellus Formation. Estimates as to the extent of shale gas development in formations outside the Marcellus (i.e. the Utica formation) are limited. To date we have been able to locate only ~300 shale gas well locations from the Utica Shale play. We have also gather information that to date ~40 wells have been drilled in the Chattooga, New Albany, Conasaugo, Floyd & Neal plays (potential shale plays found in the LCC study area) but have be unable to acquire specific locations for these wells. We doubt that incorporating this well data would result in appreciable improvement of the model.

Activities Anticipated Next Quarter: Conduct review with external advisory group; Complete metadata associated with GIS datasets; Populate and get feedback on web map server.

Expected End Date: December 31st 2013

Costs:

Funds Expended to Previous to this Report:

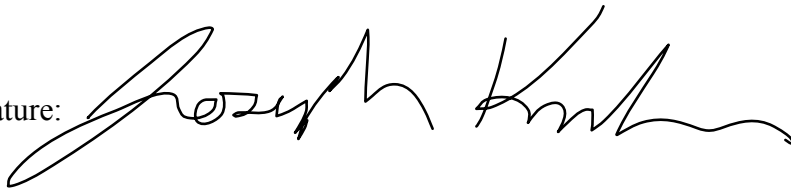
Amount of ALCC Funds Requested within this Report: NA

Total Approved Budgeted ALCC Funds: NA

Are you within the approved budget plan? YES

Are you within approved budget categories? YES

Signature:



Date: 7/30/2013