

Haynesville Play Development: Sustainability Analysis of Local Fresh Groundwater Resources in Northwest Louisiana

Van Biersel, Thomas P.¹; Carlson, Douglas A.¹; Milner, L. Riley¹ (1) Louisiana Geological Survey, Louisiana State University, Baton Rouge, LA.

The rapid development of Haynesville Shale, an unconventional gas play, and its reliance on local groundwater resources, has resulted in friction between public and industry interests. The play is located in a fast-growing area of northwest Louisiana, where no pre-existing water resource management plans exist, and limited potable water resources are available. The proposed approach for the Haynesville Shale play of northwestern Louisiana is to drill the production well, and subsequently open the formation to enhance natural gas flow, using hydraulic fracture stimulation. It has been estimated that the fracture stimulation process for each well drilled in the Haynesville play will require several million gallons of water per well, and may require this process several times. Regionally, fresh water is available from several reservoirs and the Red River. However, with the exception of shallow groundwater resources, there are no readily-available ample sources of water in a large portion of the area.

There are two heavily-used aquifers in the subject area identified for early development: the Carrizo-Wilcox and Red River Alluvial aquifers. Based upon a review of existing data, and a capture zone analysis, the Carrizo-Wilcox Aquifer has a large regional storage, but locally poor productivity as an aquifer. It is also subject to locally elevated drawdown values and the creation of large capture zones. In comparison, the Red River Alluvial Aquifer is a much more prolific aquifer, although at times it appears to be used at a level above its sustainable yield. A more thorough analysis and model of these water resources is needed to better estimate and manage the aquifers, and provide for domestic, public and industry needs.