High soil bacterial diversity prior to Marcellus shale drilling

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The environmental effects of the current expansion of gas drilling in the Marcellus shale region of Pennsylvania are poorly understood. Studying the diversity of soil bacteria, which have the capability to respond quickly to environmental changes, will allow us to thoroughly understand the environmental effects of drilling. To this end, soil bacteria were cultured and analyzed from the 57-acre Abernathy Field Station, a mixed temperate forest in Southwestern Pennsylvania using their signature 16S rDNA sequences. Over 200 bacteria including 70 unique species were isolated spanning across 30 taxonomic families. Relatively high numbers of β-Proteobacteria and Bacteriodetes were recovered suggesting that the soil is nutrient rich. High bacterial diversity was seen among the samples as determined by the ecological diversity indices such as the Shannon-Weaver and Chao1 indices. Moreover, rarefaction analysis indicated that sampling saturation was not reached and more culturable species could be recovered. This study was thus successful in establishing a baseline of soil bacterial diversity in this region. It now will be possible to monitor short and long term effects of Marcellus shale drilling on soil bacterial diversity and overall ecosystem health.