

INITIAL LANDSCAPE CHANGES ASSOCIATED WITH MARCELLUS SHALE DEVELOPMENT—IMPLICATIONS FOR FORESTS AND WILDLIFE

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Marcellus shale development is occurring rapidly across Pennsylvania. We conducted a geographic information system (GIS) analysis using available Pennsylvania Department of Environmental Protection permit data, before and after photos, ground-truthing, and field measurements to describe landscape change within the first 3 years of active Marcellus exploration and development. The number of permits and wells drilled increased exponentially. More than 85 percent of drilling pads and wells are going into private land. Between 45 and 62 percent of the wells are going into farmland with the highest numbers in the northeast and southwest parts of the state. Between 30 and 54 percent of the wells are in forest lands. Of those, 23 percent are being placed in core forest (forest > 100 m from a pre-existing road or edge). These pads are a particular concern because of their potential to fragment forests as roads, pipelines, and other infrastructure are built. Mean drilling pad size is 1 ha with a range from 0.1 to 20 ha, and pads are typically covered with a stone surface. Sixteen percent of pads have undergone some type of reclamation that reduced pad size and local disturbance by over half. However, most reclamation is to grassy cover and not back to forest habitat. There is a trend toward more wells being built per pad, but currently more than 75 percent of pads have only one or two wells. Whether companies return to these pads in future years to add wells or build more pads in other locations will influence further landscape change. If rates and patterns of development continue in a similar manner, core forest habitat is at risk particularly on private land. As a consequence, public land will become increasingly important for large blocks of undeveloped habitat and the area-sensitive forest species they support and the ecosystem services provided.

The content of this paper reflects the views of the authors(s), who are responsible for the facts and accuracy of the information presented herein.

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