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## **USGS adds environmental impacts to its energy resource evaluations**

The US Geological Survey has assessed domestic energy resources for more than 125 years. While its evaluations also cover coal, oil shale, and uranium, its major activity remains oil and gas, where it forecasts and prioritizes volumes of undiscovered, technically recoverable resources.

Now, a fact sheet posted at its website on July 23 describes how the US Department of the Interior agency has also begun to assess and monitor environmental impacts associated with energy development.

"Using its integrated-multidisciplinary expertise in geology, biology, hydrology, and geography, USGS created the Ecological Assessment and Monitoring process to evaluate the consequences of resource extraction, production, distribution, and use on ecosystems," it says.

Environmental assessments depend first on the energy resources being considered; then on landscapes, habitats, and biota at risk; and finally the objectives of the agency charged to manage the resources, according to the fact sheet, "Ecological Assessment and Monitoring for Energy Resource Development".

### **'Adaptive management'**

"Technical findings provide managers needed information and contribute to an adaptive management process intended to establish monitoring and surveillance strategies, evaluate the effectiveness of mitigation measures, and inform restoration decisions linked to energy resource use," it notes.

The report by Tom Owens, of USGS's Center for Biological Informatics in Denver, on the environmental assessment and monitoring (EAM) process begins with strategic planning. Once a petroleum province is identified, stakeholders begin to identify factors, called "stressors", which can influence the ecosystem and shape resource management decisions.

"Most stressors are sociopolitical or economic in nature and may be affected by expanding economies and populations, commercial and industrial development, and increased standards of living. When examined cumulatively, the oil and gas wells, infrastructure, and human activities that directly affect the landscape may be substantial" in energy resource areas, it observes.

A conceptual model is developed next to link drivers, stressors, effects, and end points for planning purposes. It can indicate how stressors may produce cumulative effects, such as when suppressants used to control road construction dust can potentially damage plant communities, the report says.

### **What it provides**

Complementing the US Environmental Protection Agency's existing processes, a USGS EAM can initially characterize the at-risk landscape by conducting a baseline biological resources inventory, the fact sheet continues. It also can screen implemented screening efforts, or comprehensive efforts resulting from previously completed evaluations.

Mitigation effectiveness; restoration, monitoring, and surveillance strategies are three critical information areas than the EAM process can address, according to the report.

"Depending on the resource management questions and technical issues linked to the assessment and monitoring needs of [DOI's] resource-management bureaus, existing data and information may be analyzed and evaluated within the context of uncertainty sufficient for resource management needs," it says.

In the face of climate change and other shifting baselines, these resource management bureaus and their USGS partners may develop assessment, monitoring, and surveillance programs critical to the long-term sustainability of ecosystems and their resources, the report says.

Contact Nick Snow at [nicks@pennwell.com](mailto:nicks@pennwell.com)

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