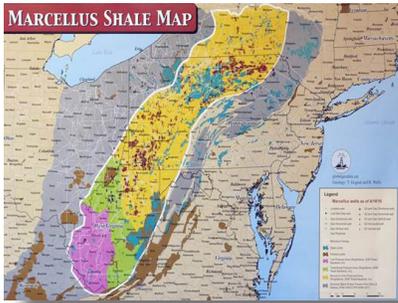


Patuxent Wildlife Research Center

Energy Extraction in the Marcellus Shale and Environmental Quality



The Challenge: Water resource quality is a primary concern relative to natural gas extraction from the Marcellus Shale. Establishing baseline conditions of aquatic ecosystems in advance of emerging threats is a critical first step to insuring environmental quality. Declines in species richness or abundance of wildlife often precede visible environmental degradation.

The Science: At the pinnacle of the aquatic food chain, river otters (*Lontra canadensis*) for example, may serve as bellwethers of ecosystem change. We are exploring non-invasive methods for monitoring abundance and habitat use of wetland mammals over large geographic areas. Research-grade, digital trail cameras allow us to remotely and discreetly “capture” activity patterns and relative abundance. In addition, we are experimenting with different protocols for extracting DNA from scat and other biological secretions to allow for individual identification.

The Future: Non-invasive methods for monitoring wildlife are unique in terms of the prodigious amounts and kinds of data typically collected. For example, we have accumulated nearly 250,000 digital images and hundreds of biological samples from the Finger Lakes Region of New York in a short 2.5 year period. Developing proper meta-data standards, data storage and retrieval procedures, and state-of-the-art analysis capabilities are critical for wide adoption and application of these techniques.

Our goal is to develop a comprehensive monitoring program for wetland mammals that can be deployed over multiple years and large spatial extents. Micro-satellite DNA markers, combined with Spatially-Explicit Capture-Recapture statistical survey designs, will permit the estimation of key population parameters for a suite of wetland mammals.

