



Appalachian LLC Sponsored Projects for FY 2011/12

1. Development of a hydrologic foundation and flow-ecology relationships for monitoring riverine resources in the Marcellus Shale region

Description - The emergence of hydraulic fracturing has led to the rapid expansion of natural gas drilling in the Marcellus Shale deposit in portions of Pennsylvania and West Virginia. Millions of gallons of water are needed per fracturing event and will likely put a substantial strain on regional surface and ground water supplies, as well as lead to changes in stream flow that may alter available habitat for freshwater biodiversity and other ecological processes in adjacent freshwater ecosystems. There is a great need for the development of region-wide flow policies to protect stream ecosystems and enhance long-term management of aquatic resources. To that end, this project will develop model(s) that predict ecological responses to flow alteration within the Marcellus Shale region of the Appalachian Landscape Conservation Cooperative (LCC).

Deliverables/Timetable - The study will provide a report assessing availability of hydrologic and ecological flow model(s) suitable for the region, a georeference assessment of available ecological data to inform the ecological flow model(s), the application of the model(s) to anticipate how altered flow regimes will affect critical conditions, and a report that forecasts changes in hydrology and associated predicted biological responses in relation to different water resource development scenarios for critical watersheds. The estimated timetable is from May 2012 to the end of April 2014.

2. A Stream Classification System for the Appalachian Landscape Conservation Cooperative

Description - River classification information is needed to develop and implement instream flow standards and management recommendations so that environmental flows can become integral to all water management decisions from the onset. This project will develop a hierarchical classification for stream and river systems and a GIS map for aquatic ecosystems within the Appalachian LCC. The classification will identify and consistently map ecologically similar types of rivers and streams using a hierarchical set of geomorphic and hydrologic variables deemed appropriate by independent peer reviews and relevant to the spatial scale of management.

Deliverables/Timetable - The study will include a report describing the methods used to evaluate and develop the classification system, a literature review of existing stream classifications, and a GIS stream data set. The estimated timetable is from January 2013 to October 2014.

3. Assessing Future Impacts of Energy Extraction in the Appalachian Mountains

Description - The rapid pace of new energy development coupled with more aggressive methods for extracting traditional fuels pose substantial risks to some of the Appalachians most cherished lands, waterways, and wildlife. Currently, little effort has been paid to the effect of energy development on the swaths of relatively intact, recovering forest habitat that define the Central Appalachian Region. This project employs land use change build-out scenarios from future energy development demand to quantify future impacts on forest habitats across the Appalachian LCC.

Deliverables/Timetable - Maps of wind, oil and gas, and coal development potential for the entire study area will be created. These maps and published projections from federal and state land management agencies will be used to model future build-out scenarios. Impacts of the build-out scenarios will be measured regarding habitat fragmentation of forest resources with a focus on the effects to biodiversity and water production for human populations. The study will also create a probability surface for land disturbance associated with large area surface coal mining and create a public web-based map server. The estimated timetable is from May 2012 to June 2013.

4. Support for Understanding Land Use and Climate Change in the Appalachian Landscape

Description - Future climate change adaptation and mitigation strategies will be dependent on the best available projections of how the regional climate will change and on estimates of the impacts those changes will have on the region's natural and cultural resources. Thus understanding the vulnerability of various species and habitats within the Appalachian LCC to climate change is of critical importance. This project will compile climate change vulnerability assessments and other relevant information on vulnerable species and habitats, discern the various methodologies and criteria used in these assessments, and use a team of expert peer reviewers to recommend the most efficient, effective, and appropriate methods for adoption by the Appalachian LCC for conservation and adaptation planning. The recommended method will then be deployed, resulting in vulnerability assessments for a suite of key species/habitats selected in consultation with partners of the Appalachian LCC.

Deliverables/Timetable - Along with a narrative synthesis report containing the review of existing vulnerability assessments with a comparison of methodologies used and a recommendation for the most appropriate vulnerability assessment method, a database will be created of the vulnerability assessments of selected species and habitat. The database will be easily accessible on the web. This project's estimated timetable is from May 2012 to end of April 2014.

