2012\_ScienceNeedsPortfolio\_(7)\_Working-Lands\_Restructured.docx

**Thematic Area: (7) Working Lands [Human Dominated/Economic Lands (e.g., Urban, Ag, Energy etc.)]**

**MISSION:** [To improve planning and integration of “working lands” (which include urbanized, agricultural, forestry, industrial, and energy development) and conservation interests.]

*[science objective]*through [better] understanding [of how potential] land use changes [will affect conservation goals and how these affects can be avoided or mitigated], reduce economic impacts and pressures on the [natural] resources of the Appalachian region (in order)

*[management objective]*to collaboratively meet economic development and conservation management goals [through improved] decision-making and [resource] management.

A. Heading: Regional Level

**1. PROGRAM: Landscape-level Disturbances & System-level Response**

**PROGRAM DESCRIPTION*:*** *Develop/compile information about new or expanding [land] development (e.g. urbanization, energy) within the LCC and the opportunities and cumulative impacts these have on fish and wildlife.* [*Examines major disturbances* (*includes climate change) as well as the impacts associated with these, regardless of ecological organization (e.g., community, species, population).*]

(Grouping) – *Foundational/Stock-taking Assessment/Classification System*

(Grouping) *– Climate Change Science and abiotic or mechanical aspects*

(Grouping) *– Climate Change impacts on Ecological Function and Response to Changes*

(Grouping) *– Energy and Related Infrastructure and Roads*

* **Project Description:** Abandoned **Mine Land** assessments (AML). {*It was noted that there are some existing materials to build off*.} [Editor: Vague, *COP needs to elaborate/explain]*
* **Project Description:** Forecast Energy Development in new or expanding markets (shale, wind, biomass).

**[AppLCC FY11/12 Funded Project:** (Kiesecker, The Nature Conservancy) “Forecast Resource Extraction” -- to forecast energy development for shale, wind, and coal for 20-year timeframe and produce geospatial displays.]

* **Project Description:** Regarding Energy Development; investigation into **conservation value of lands** (mitigation banking, carbon sequestration, monetizing ecosystem services.) [Editor: COP needs to elaborate/explain]
* **Project Description:** Estimate **demand for energy** use with increased temperatures [resulting from predicted climate change]: [assess] increases in electricity use and [as it relates to] heat island effect.
* **Project Description:** Develop guidance for **water withdrawals** for natural gas, abandoned mine lands (AML) and other energy uses.

**[AppLCC** **FY11/12 Funded Project:** (Fisher/Cornell University) “Development of a hydrologic foundation and flow-ecology relationships for monitoring riverine resources in the Marcellus Shale region”]

* **(related) Project Description:** Research question: What’s going to happen with land ownership (in light of gas production)? Ownership is key. Concern that lands will revert to local governments.
* **Project Description:** **Determine the effects** of land use alterations in the energy industry on species, populations, and natural communities.
	+ **(related) Project Description:** Effects of shale [gas development] on aquatic communities, and thresholds of ecological impacts as it relates to this energy sector activity.
	+ **(related) Project Description:** Effects of shale [gas development] on avian communities, and thresholds of ecological impacts as it relates to this energy sector activity.

(Grouping) – *Urbanization, Population Growth and (Domestic or Industrial) Water Demands*

* **Project *Description:*** *Develop/compile information about the ongoing/future* ***conversion of agricultural land to urban and suburban uses*** *within the LCC and the impacts these changes are having on the character and distribution of human communities and fish and wildlife habitats {so that partner agencies may be better able to understand system dynamics and recommend alternatives to minimize future land-use conflicts involving human communities, wildlife, and ecosystem service functions*.}
	+ **(related) Project Description:** Create urbanization models playing out different scenarios – future projections – for this type of development. {*Details: Forecasting future spatial footprint of development in 20 years in light of changes to demand, technology and regulation – an appeal for an econometric model. Need social science research into policy option and natural resource impacts given a particular policy direction. There are good models to help with our understanding.}*
	+ **(related) Project Description:** Model land use change resulting from urban growth.
	+ **(related/component):** Develop decision-support tools for growth assessments/projections; run scenarios at a landscape level.
	+ **(related/component):** [Develop planning decision support tools to assist state and local governments and]] other agencies with jurisdictional decision-making power [[to make informed land use change decisions].
* **Project Description:** **Human population shifts** – need to understand [complexities of] population growth/urbanization [patterns].
	+ **(related) Project Description:** Update the 1996 (SAMAB) Southern Appalachian Man and the Biosphere report (Chapter 3 – Changing Demographics and Economic Conditions in Southern. Appalachia.
	+ **Project Description:** [Other] effects [of land use change] on human populations. [Editor: COP needs to elaborate/explain.]

(Grouping) – *Agricultural Expansion and (Ag-related) Water Demands*

(Grouping) – *Effects of Air Pollution*

* **Project Description:** [Evaluate] what’s happening to terrestrial and aquatic [habitats as a result of] atmospheric impacts (from climate change, carbon emissions and/or other air quality parameters).

(Grouping) – *Cumulative Impact*

* **Project Description:** [Develop a] landscape-scale approach for evaluating cumulative impacts [of land use change] using satellite imagery, aerial photography, and geographic information systems.
	+ **(related) Project Description:** [Develop a shared database, system or method for] tracking land use conversions over time.
	+ **(related) Project Description:** Forecast land-cover changes. {*Note: Include climate change models, but incorporates other LULC changes (urbanization, etc.*).}
* **Project Description:** Identify indicator species (also known as representative or surrogate species), as a means of tracking [effects of land use change] (development impacts, edge effects, etc.) [on habitats and species assemblages.]

B. Heading: Human Dimensions

**2. PROGRAM: Social Component**

(Grouping) – *Value/Ecosystem Services and Conflict*

* **Project Description:** [Conduct opinion survey to] understand people/group motivations [as they relate to making decisions that involve trade-offs between environmental sustainability and human needs or desires]. Purpose: Support ability to craft communication products that are sensitive to public motivations but are also effective conservation tools].????
* **Project Description:** [Conduct research into] economics of small landowner forestry practices (example of oak forests). {*Question: Can we find triggers or tipping points that enable small landowners to more sustainably manage forested lands?}*
* **Project Description:** Need to identify the drivers of [environmental] change. Need to define this around multiple sectors (forest products, [energy] industry, urbanization, etc.). [Editor: Vague, *COP needs to elaborate/explain]*

(Grouping) – *Recreational, Commercial, Subsistence Use*

* **Project Description:** Impacts of land use alterations on [availability and types of outdoor] recreation.

C. Heading: System Level

**3. PROGRAM: Ecological Functions of Managed/Human-Altered Systems**

(Grouping) – *Foundational/Stock-taking Assessment/Classification System*

(Grouping) – *Barriers (flows and species movement)*

(Grouping) – *Mitigating Ag and Forestry Impacts*

* **Project Description:** [Develop new/enhanced] sustainable Ag and Forest land management [practices].

(Grouping) – *Protection & Restoration Approaches*

* **Project Description:** [Explore how species and habitat] restoration [can mitigate] land use stressors.

**4. PROGRAM: Ecological Functions of Natural/Intact Systems**

(Grouping) – *Foundational/Stock-taking Assessment/Classification System*

(Grouping) – *Effects of Fire on Ecosystems*

(Grouping) – *Relationship/ Ecological flows and Nutrient dynamics*

* **Project Description:** Evaluate [ecological flow demands to] meet future [aquatic resources] needs.

(Grouping) – *Ecosystem Integrity / Resiliency*

D. Heading: Community Level

**5. PROGRAM: Community level (description and function or basic community ecology)**

E. Heading: Species/Population Level

**6. PROGRAM: Basic Biological Understanding (Species-level)**

(Grouping) *– Basic Biological Information*

(Grouping) – At-Risk Species/Populations & Endemics

(Grouping) – *Contaminants/Pollutants Effects on Species/Populations*

(Grouping) – *Invasive organisms effect on species and populations*

(Grouping) – *Effects of Disease (on a species or taxonomic group)*

F. Heading: “How (the LCC) Should Do Business”

* Make conflict resolution and consensus-[building training more widely available in the conservation community; consider hosting joint sessions with industry or other public interests].

**Notes:** version posted: 2012-12-18