2012\_ScienceNeedsPortfolio\_(5)\_Forest\_Restructured.docx

**Thematic Area: Forests**

**[MISSION:** Identify and prioritize regional forest habitats and natural communities to foster resiliency in the face of current and future threats while supporting a larger multi-jurisdictional framework for planning and management.]

*[science objective]* Inventory significant regional forest habitats [while evaluating] present and future conditions (including threats), importance, and connectivity of these habitats (in order)

*[management objective]* to [carry-out conservation planning, based on landscape-scale scientific assessments,] so that LCC partners and stakeholders can develop and implement cohesive regional management strategies to protect and manage forest resources across jurisdictions.

A. Heading: Regional Level

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

[**PROGRAM DESCRIPTION: Describes how forested systems respond to large-scale transformation of biotic and/or abiotic conditions]** [*Examines major disturbances* (*includes climate change) as well as the impacts associated with these, regardless of ecological organization (e.g., community, species, population)*] **[PROGRAM DESCRIPTION:** Describes the major system stressors and response to those stressors. Work with partners and stakeholders to develop and compile information about how stressors individually and cumulatively impact forest sustainability and rare and unique species and communities**]**

(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*

* **Project Description:** [Describe how] forest biochemical cycles are altered due to changing climate and if those changes affect ecosystem services.
* **Project Description:** Assessing Priority Amphibian & Reptile Conservation Areas (PARCAs) and vulnerability to climate change in the Appalachians.
* **Project Description:** [Are] Deer overbrowsing impacts exacerbated by climate change?

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

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

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

(Grouping) – *Effects of Air Pollution*

* **Project Description:** Determine air quality impacts due to acid deposition, mercury, sulfur, and ozone [depletion].

(Grouping) – *Cumulative Impacts*

* **Project Description:** [Determine] effects of stressors (e.g. urbanization, energy development, etc.) on forest integrity/functionality and endemic species.
* **Project Description:** Describe the interaction among identified threats (e.g., fragmentation and invasive species/disease introduction, spread, etc.) on communities and species.

B. Heading: Human Dimensions

**2. PROGRAM: Social Component**

[**PROGRAM DESCRIPTION: This program outlines the social values of ecosystem services]**

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

* **Project Description:** Conduct water value case study to show the ecological, economic, and human health importance of water coming from the high elevations of Central Appalachian forests to large [human] population centers on the East Coast.

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

C. Heading: System Level

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

[PROGRAM DESCRIPTION: Describes community level population responses to non-natural disturbance.] PROGRAM DESCRIPTION: Describes how systems are affected by human alteration/influence

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

* **Project Description:** Compile data resources that exist in various forms, and provide it in a usable/accessible format for LCC partners (e.g., comprehensive minelands layer, Regional Conservation Database of protected/easement lands, invasive species maps).

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

(Grouping) – *Mitigating Ag and Forestry Impacts*

* + **Project Description:** Complete and compare forest block modeling/prioritization (Note: TNC connectivity/flow models, Atlantic Flyway Initiative with Audubon and Joint Ventures). Identify minimum area requirements.
  + **Project Description:** Complete ECAP for entire region—what is the natural range of variability in forested systems, and where are we now in relation to reference [conditions]?
  + **Project Description:** Crosswalk ELUs to other initiatives (e.g., LandFire, Ecological Zone Modeling).
  + **Project Description:** [Describe] carbon sequestration dynamics and potential for [use of this mitigation approach for Appalachian] forest systems.

(Grouping) – *Protection & Restoration Approaches*

* **Project Description:** Develop and compile data regarding the utility of silvicultural tools, invasive species management [approaches], and especially prescribed burning as restoration and management tools for a full complement of forest communities.
* **(related) Project Description:** Research how these practices [(above)] might facilitate habitat conservation and coordination of forest conservation actions across regional boundaries under changing conditions.
* **Project Description:**  Identify spruce forest reference conditions ~~for~~ [to support] restoration [design and planning] purposes.

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

**[PROGRAM DESCRIPTION:** Understanding the system relatedness and dependency]

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

* **Project Description: [**Complete] Ecological Land Units (ELUs) [mapping] for entire Appalachian region.
* **Project Description:** Develop finer-scale conservation objectives that are based on existing regional data/layers.
* **Project Description:** Identify availability/scale/format/source of existing resources, provide access to those resources, and identify gaps for addressing existing science needs.
* **Project Description: [**Collate existing] LiDAR [efforts and curate data to identify and prioritize new data capture.]

(Grouping) – *Effects of Fire on Ecosystems*

* **Project Description:** [Develop]BMPs [(best management practices)] or use of prescribed fire for forest restoration.
* **Project Description:** Detail use [and efficacy] of prescribed fire in the presence of and control of invasive fauna, flora, and pathogens.

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

* **Project Description:** Determine disturbance impacts on nutrient cycling (e.g., fire, pests, erosion).
* **Project Description:** Set canopy targets for the region’s forest to reduce storm water flows.

(Grouping) – *Ecosystem Integrity / Resiliency*

* **Project Description:** Utilize existing intact ecosystems/communities to identify important functional, structural, compositional (species composition), and distributional ties/relationships with other ecosystems/communities necessary for the sustained health of one or both of those systems.

D. Heading: Community Level

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

**PROGRAM DESCRIPTION:** Describes community level population responses to disturbance] **PROGRAM DESCRIPTION:** Develop and compile information about the distribution and status of existing high priority forest communities and work with partners to develop management strategies that will either conserve existing forest types under changing climatic conditions or will facilitate successional transition to other forest types, if appropriate to public and management needs.

(Grouping) – *Basic Ecology/Ecological Relationships*

* **Project Description:** Need for up-to-date landcover data and refined modeling techniques for determining the appropriate amount of each seral stage within each community type; must be able to down-scale to local area to incorporate species-specific needs/data.

E. Heading: Species/Population Level

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

**[PROGRAM DESCRIPTION:** Work with partners and stakeholders to develop and compile information about priority species and priority conservation areas within the LCC, their habitat requirements, and changes in the distribution of those species and habitats to facilitate the regional management of those resources.] [**PROGRAM DESCRIPTION:** Develop and compile information about the LCC's terrestrial endemic species, work with partners to better estimate their current degree of imperilment, and coordinate the development of regional management strategies that will help conserve these species in the face of changing land-use and climatic conditions.] [**PROGRAM DESCRIPTION:** Describes needs for additional study to support sustainable populations and outlines emerging threats]

(Grouping) *– Basic Biological Information*

* + **Project Description:** Need to develop statistically sound inference methods to be able to develop models based on existing data sources (e .g., methods that would allow us to relate detection probability to a process [of establishing scientifically valid population trend analyses.] [*COP needs to verify scope and intent of this science need*.]

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

* **Project Description:** Develop and overlay taxa-specific priority areas (e.g., terrestrial salamanders, priority birds, etc.). [*COP should discuss a process and intended uses for this information.]*
* **Project Description:** Adapt standardized approach for developing at risk wildlife and plant species/community list.
* **Project Description:** [Document the] incidence/cumulative impacts of forest pests/pathogens/invasives on forest/wildlife species.
* **Project Description:** ~~Determine linkages between species of greatest conservation need and natural communities.~~ [Editor: *COP needs to review this statement and determine what was intended as a potential Project*.]
* **Project Description:** Transitioning from nest-box surveys to acoustical surveys for the endangered Carolina and Virginia northern flying squirrel. [Editor: *COP needs to explain what specific Project need is related to this topic?*]
* **(related) Project Description:** Determine linkages between northern flying squirrel habitat preferences for conifer-dominated, i.e., red spruce systems. [*COP needs to describe specific Project need.]*

(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)*

* **Project Description:** [Describe] Chytrid fungus: incidence and impact on Appalachian amphibians.

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

* Coordinate management plans/treatments across jurisdictional and ownership boundaries to achieve broader conservation gals (e.g., regional connectivity).

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