

THEMATIC AREA:

HUMAN DIMENSIONS

(Environmental Benefits, Ecosystem Services, Social Expectations)

MISSION: *Incorporate ecosystem services values into natural resource decision-making.*

[Science objective] Conduct research necessary to sustain, enhance, and restore ecosystem services provided by natural ecosystems.

[Management objective] Develop and implement an ecosystem services framework to inform management actions and decisions in the Appalachian LCC region.

A. HEADING: REGIONAL LEVEL

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

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*

- **Project Description:** Continually measure and assess how climate change is impacting both biotic and abiotic resources of the Appalachians, and ecological functions.
- **Project Description:** Examine how predator's sustainability/population status will be impacted by climate change and potential for human-wildlife conflict/interactions increase.

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

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

- **Project Description:** Model land use practices to identify vulnerable ecosystem services, with focus on water quantity/quality but including all priority resources as determined by conservation and other stakeholder groups.
- **Project Description:** Describe water quality and supply for the LCC's freshwater resources, the human uses of those resources, and current or future conflicts between human and fish and wildlife needs for water. Model use and inter-dependency of water supply, and limiting factors contributing to potential future shortages to meet human and ecological needs.

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

(Grouping) – *Effects of Air Pollution*

- **Project Description:** Establish long-term monitoring of air quality parameters across Appalachian LCC due to acid deposition, mercury, sulfur, and ozone.

(Grouping) – *Cumulative Impacts*

- **Project Description:** Model cumulative impacts of lost ecosystem services.

B. HEADING: HUMAN DIMENSIONS

2. PROGRAM: Social Component

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

- **Project Description:** Determine regional public attitudes, values, and opinions related to wildlife and natural resource conservation across the Appalachian LCC.
- **Project Description:** Determine methods to communicate complex technical issues to multiple stakeholders including decision-makers, especially information about ecosystem services.
- **Project Description:** Conduct opinion surveys to determine the public's preferences and priorities in regards to management of natural resources and ecosystem services.
- **Project Description:** Economic analyses to demonstrate the opportunity cost of losing our natural resources and ecosystem services.
- **Project Description:** Conduct an economic analysis to examine land use stressors *[and the community]* benefits of stream and wetlands restoration.
- **Project Description:** Economic valuation of goods and services provided by native bivalves.

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

- **Project Description:** Evaluate the inter-relatedness of other ecosystem services and recreation: Focus on brook trout and freshwater mussels.
 - o **(related) Project Description:** Evaluate [the implications of] resource management decisions/policies on socioeconomic values: especially the relationship between brook trout and socioeconomic benefits.

- **Project Description:** Conduct opinion survey to better understand the cultural and overall social value of outdoor recreational activities in the Appalachian Mountains.

[LCC Staff/COP Comment: One Portfolio Reviewer offered the following project sequencing for consideration, noting that some services may already be known and could move to valuation and decision-making projects now:

1. *Identify the “most important” ecosystem services in the Appalachian region. Since the concept is connected to human well-being, this list will likely vary with location. Since we probably know or can easily develop this list for state and federal agencies, need to focus on public and stakeholders. What do they think is important? Includes mapping where these services exist on the landscape;*
2. *Identify drivers/stressors/threats to these services including linkages between structure and function (production functions), scaling issues, and appropriate metrics for quantifying, monitoring, and reporting changes. This includes work on bridging terminology gaps among disciplines and with public;*
3. *Conduct economic valuation of both market and non-market goods and services;*
4. *Develop an ecosystem services framework that includes scenario modeling, uncertainty analysis, and economic valuation to evaluate tradeoffs under different scenarios;*
5. *Identify and overcome barriers inhibiting agencies/organizations/general public from using ecosystem services science in decision-making.]*

C. HEADING: SYSTEM LEVEL

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

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

- **Project Description:** Measure and track degradation of Soundscapes.
- **Project Description:** Measure and track degradation of Viewsheds.

(Grouping) – Barriers (flows and species movement)

(Grouping) – Mitigating Ag and Forestry Impacts

(Grouping) – Protection & Restoration Approaches

4. PROGRAM: Ecological Functions of Natural/Intact Systems

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

- o **Project Description:** Model individual ecosystem services at landscape scales and their cumulative benefits; map major ecosystem services provided in the Appalachians.
- o **(related) Project Description:** Map the significant beneficiaries of ecosystem services.
- o **(related) Project Description:** Establish metrics for measuring, reporting and verifying environmental performance of ecosystem services.

(Grouping) – Effects of Fire on Ecosystems

(Grouping) – Relationship/Ecological Flows and Nutrient Dynamics

- **Project Description:** Model nutrient dynamics as land use alters systems.

(Grouping) – Ecosystem Integrity/Resiliency

D. HEADING: COMMUNITY LEVEL

5. PROGRAM: Community Level (Description and Function or Basic Community Ecology)

(Grouping) – Basic Ecology/Ecological Relationships

E. HEADING: SPECIES/POPULATION LEVEL

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

(Grouping) – Basic Biological Information

- **Project Description:** Conduct studies that lead to broadening our understanding of the biology of organisms.

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

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

(Grouping) – Invasive Organisms Effect on Species and Populations

- **Project Description:** Establish better tracking and coordination on the progression of invasive species into Appalachia (e.g. coordination through Aquatic Nuisance Panels).

(Grouping) – Effects of Disease (on a Species or Taxonomic Group)

F. HEADING: "HOW (THE LCC) SHOULD DO BUSINESS"

- Identify collaborative management opportunities by working with partners and stakeholders to identify existing foundational resources that describe the quality and supply of the LCC's freshwater resources, the human uses of those resources, and current or future conflicts between human and fish and wildlife needs for water.