2012\_ScienceNeedsPortfolio\_(3)\_Cave-Karst-Minelands\_Restructured.docx

**Thematic Area: Cave/Karst and Mine lands**

**MISSION:** ~~Develop and implement comprehensive regional strategies to~~ Conserve and manage cave/karst and restored mine land (CKM) communities across jurisdictions.

*[science objective]* Inventory significant regional subterranean/cave/karst systems and communities, evaluate the condition and importance of those communities, and identify regional threats impacting these (in order)

*[management objective]* to develop and implement cohesive regional strategies to protect and manage those resources across jurisdictions.

A. Heading: Regional Level

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

**PROGRAM DESCRIPTION:** Develop and compile data regarding the status and distribution of subterranean resources, threats impacting associated species, and work with partners to develop management strategies needed to address habitat threats and assist in the recovery of threatened and endangered species. [*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*

* **Project Description:** Develop a classification system for karst systems in the Appalachian region (to help prioritize conservation strategies).
	+ **(related) Project Description:** Map of springs throughout karst region—characterization and identification
	+ **(related) Project Description:** Compilation and integration of cave data, some of which is sensitive or ‘not owned’ by LCC partners.
	+ **(related) Project Description: [S]** Compile species information from each state into a centralized database across the region.

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

* **Project Description:** Abiotic effects of Climate Change [on cave/karst habitats.]

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

(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*

(Grouping) – *Cumulative Impacts*

* **Project Description: [N]** Effects of stressors (human use, urbanization, energy development) on stability and functionality of CKM systems and associated species.
* **Project Description: [S]** Develop predictive models for cave/karst high-biodiversity systems. [*COP needs to elaborate and provide specific details.*]

B. Heading: Human Dimensions

**2. PROGRAM: Social Component**

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

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

[No specific Projects articulated.]

C. Heading: System Level

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

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

(Grouping) – *Dams/Instream Barriers*

(Grouping) – *Mitigating Ag and Forestry Impacts*

(Grouping) – *Protection & Restoration Approaches*

* **Project Description: [N]** Inventory and geo-referencing of restorable caves post-WNS.
* **Project Description:** Develop BMPs for cave/karst landscape, based on existing science.

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

**PROGRAM DESCRIPTION:** Establishes how these systems are supposed to work, understanding the systems and their interrelatedness/interdependency.

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

(Grouping) – *Effects of Fire on Ecosystems*

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

* **Project Description: [N]**Understanding of hydrology, recharge, and quality of ground water as it relates to cave/karst/mine systems.
* **Project Description:** Understanding of nutrient dynamics (in disturbed systems).

(Grouping) – *Ecosystem Integrity / Resiliency*

* **Project Description: [N]** Linkages of above ground processes and management regimes to cave/karst/mine systems.

D. Heading: Community Level

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

(Grouping) – *Basic Ecology/Ecological Relationships*

* **Project Description:** Determine species and community distributions, their habitat relationships, and linkages across systems.
* **Project Description: [S]** Biological inventory of animal communities.

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)*

* **Project Description: [S]** Identify/understand of disease threats and their impacts on species of greatest conservation need.
	+ **(related) Project Description: [N]** Etiology, response, and management of WNS.
	+ **(related) Project Description:** Inventory/monitoring and geo-referencing of caves with highest potential of supporting bat populations post-WNS.
	+ **(related) Project Description: [N]** Assesses the efficacy of utilizing electronic monitoring systems as a potential WNS “early warning” indicator.
* **Project Description: [S]** Develop process to prioritize taxonomic descriptions of described species (to understand their conservation status, population level).
* **Project Description: [S]** [Develop] predictive models for cave species to assist with targeted monitoring efforts.

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

* Need cave/karst training workshops for resource managers (e.g., provided by Karst Waters Institute).
* Need BMPs that include a monitoring/evaluation component for cave/karst landscape based on existing science.

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