Landscape Conservation Cooperatives and Climate Science Centers
Implementation Guidance

I. Purpose

The purpose of this document is to provide guidance to DOI Bureaus for implementing LCCs and CSCs as part of a coordinated Department of the Interior (DOI) response to climate change and other landscape-scale stressors. This guidance describes:

- The role of LCCs and CSCs within DOI's comprehensive climate response, including roles and responsibilities as they relate to other DOI efforts;
- The relationship between LCCs and CSCs; and
- Standards of consistency in form, function and accountability among LCCs and CSCs

Neither this guidance document, nor any LCC / CSC activity, provides authority to supersede, expand, diminish, or otherwise affect management authorities of bureaus, states and other conservation partners for their resources, property, and programs.

II. Background

A broad group of states, non-government organizations, academic institutions and federal agencies, has recognized the need to substantially enhance science and partnerships to adapt to climate change and other stresses on land, water, ocean, fish, wildlife, and cultural heritage resources. The complicated and inter-related nature of climate change, land use change, invasive species, energy development, water withdrawals, and other stresses on our natural and cultural resources increasingly demand that resource management actions should be targeted, evaluated for effectiveness, and better informed by the growing body of science on climate change and its interaction with other landscape scale stresses. Scientists and resource managers need to have new and more effective opportunities to collaborate, communicate, and develop scientific direction to inform resource management.

The Department of the Interior has recognized this challenge and its obligation to work with partners to address the impacts that climate change and other landscape scale stressors are having on America's natural and cultural resources by developing integrated adaptation and mitigation strategies. In part of its overall response, Secretary Salazar signed a Secretarial Order (No. 3289) on September 14, 2009 and amended February 22, 2010, entitled, "Addressing the Impacts of Climate Change on America's Water, Land, and Other Natural and Cultural Resources." The Order established a Department-wide approach for applying scientific tools to increase understanding of climate change and to coordinate an effective response to its impacts on tribes and on the land, water, ocean, fish and wildlife, and cultural heritage resources that the Department manages.

The Department of the Interior is not working alone. For example, the Department of Agriculture's U.S. Forest Service, has developed a comprehensive climate change plan[1] to "*ensure our national forests and private working lands are conserved, restored, and made more resilient to climate change, while enhancing our water resources.*" The Department of Commerce is building the National Oceanographic and Atmospheric Administration (NOAA) Climate Service[2] with the goal of developing and transferring climate science to other government agencies at all levels, the private sector, and individuals to assist their efforts in mitigating and adapting to climate change. Other federal agencies have also moved aggressively in this direction, and the Council on Environmental Quality initiated an Interagency Climate Change Adaptation Task Force to provide leadership and organization to this effort.

State natural resource agencies, as part of their jurisdictional responsibility and mandate to manage fish and wildlife populations and protect the integrity of natural resources within their boundaries, have also energetically responded to this challenge. Working through groups such as the Association of Fish and Wildlife Agencies, the Western Governors' Association, and the Western States Water Council, the states have provided leadership in addressing climate change and associated resource challenges.[3] Many individual states have also developed comprehensive plans for addressing the impacts of climate change on their natural resources. In addition, a broad spectrum of non-governmental organizations (NGOs) and other partners have provided science, on-the-ground responses, and public education on the effects of climate change on our natural resources.

A common theme throughout the various response strategies to climate change and other stresses is the recognition that no individual agency has the capacity to unilaterally provide the needed science and information or to stand alone in any effort to address the suite of threats to our natural resources. The conservation community must establish increasingly effective and coordinated mechanisms for science development, the sharing and transfer of science and related information, and the creation of innovative and effective science-based conservation tools, all predicated upon on collaboratively developed priorities. The community must also develop increasingly effective processes for collaborative approaches to conservation planning, prioritization, and evaluation to support effective adapted responses to a wide variety of natural resource stresses including, but not limited, to climate change. This has led to the initiation of a national network of Landscape Conservation Cooperatives (LCCs) and Climate Science Centers (CSCs).

LCCs and CSCs: Description and Relationship

[1] *National Roadmap for Responding to Climate Change*, USDA Forest Service, July 2010

[2] See http://www.noaa.gov/climate.html for more information on the NOAA Climate Service

[3] See, *Voluntary Guidance for States to Incorporate Climate Change into State Wildlife Action Plans and Other Management Plans*, Association of Fish and Wildlife Agencies, November 2009

A. What are Landscape Conservation Cooperatives and Climate Science Centers?

Given the unprecedented spatial scope of the impacts of climate change, federal, state, tribal, international, local, and private partners must work together to develop landscape-level strategies for understanding and responding to climate change impacts. As part of that effort, the Department of the Interior is working with a broad coalition of partners to develop a nationwide network of Climate Science Centers and Landscape Conservation Cooperatives. The LCC network currently includes 21 geographic units across the U.S., extending into Mexico and Canada (Figure 1). There are eight planned regional CSCs across the U.S. (Figure 2).

The eight regional CSCs will provide fundamental scientific information, tools, and techniques that land, water, wildlife, and cultural resource managers and other interested parties can apply to anticipate, monitor, and adapt to climate change impacts. Much of the information and tools provided by the CSCs, including physical and biological research, ecological forecasting, and multi-scale modeling, will be in response to the priority needs identified by the LCCs. Working closely with the LCCs, the CSCs will help develop statistically sound sampling programs and processes to monitor climate change effects and help develop adaptive management approaches. The CSCs will be partnership-based regional entities functioning with LCCs as well as the regional management community, scientific entities, and other stakeholders.

The 21 LCCs are landscape-scale applied conservation science partnerships that will support and enhance on-the-ground conservation efforts by facilitating the production and dissemination of applied science for resource management decision makers. LCCs may consist of Federal, State, Tribal, international, local, and private stakeholders. LCCs will identify and seek to coordinate among existing relevant conservation partnerships, plans, agreements, and programs with the specific goals of identifying common needs for information and sharing information and science. The science development can be accomplished through the LCCs' relationships with CSCs as well as through LCC-specific funded science and LCC-supported science developed by partners. LCCs will also actively share the results of new research and development with local partners and with the LCC network nationwide. Accordingly, LCCs will help the larger conservation community achieve better implementation of their programs by fostering improved communication and coordination among partners. Through participation in LCCs, conservation agencies and organizations can more strategically target and implement actions that satisfy their missions as well as landscape conservation priorities shared by the LCC partners.

B. Relationship between Landscape Conservation Cooperatives and Climate Science Centers

Landscape Conservation Cooperatives and Climate Science Centers are envisioned as having strong, collaborative, and complementary roles and functions. These roles and responsibilities fall along a continuum of research and science needs, which range from fundamental model and tool development by CSCs to applied science that is management specific through LCCs (see Figure 3 for a conceptual model). Interactions between LCCs and CSCs will involve:

1. **Science priority setting**: LCCs will deliberate and communicate shared priority science needs and conservation priorities to the regional CSC, which will review the input of all relevant LCCs to develop a regional science agenda.

2. **Scientific collaboration**: LCCs and CSCs have complementary science roles. Working with downscaled atmospheric climate models, CSCs will produce models, datasets, decision support tools, and research products that support applied conservation planning through LCCs. LCCs will utilize these science resources and tools to further develop and support applied scientific information tailored to specific locations and resource management priorities.

3. **Integrated Data Management**: LCCs and CSCs have a mutual goal of developing integrated data management networks to facilitate easy sharing of information; these systems will maintain consistency with DOI-wide information standards (e.g., shared data standards, databases, and GIS protocols) to enable coordination and information sharing.

III. Establishing and Implementing Landscape Conservation Cooperatives

Individual Landscape Conservation Cooperatives are independently directed and have broad latitude to function in the manner appropriate to their location and circumstances. However, all LCCs have common characteristics and core capabilities to facilitate functioning collectively as a national network. LCCs will continue to evolve as new partners and issues are identified after inception.

Each LCC will assess the need for and assemble, as appropriate, capacity in the following areas:

- Application of physical, ecological, and biological sciences;
- Conduct vulnerability assessments for species, habitats, and other resources;
- Spatial data acquisition and analysis;
- Use of climate, landscape, and population modeling;
- Statistical design and analysis;
- Development of resource inventories, monitoring strategies, and management evaluation protocols;
- Web-hosting and database design and management;
- Resource planning and conservation design, including developing decision support systems; and
- Communicating and facilitating conservation delivery among partners.

This capacity may be developed through various avenues such as collaboration with CSCs, research grants, partnerships, agency staff, and existing programs. LCC staff may include landscape and populations modelers, geographers and GIS specialists, terrestrial and aquatic

ecologists, cultural resource specialists, quantitative fish and wildlife biologists, hydrologists, data managers, outreach specialists and other technical and decision-support personnel.[4]

A. Establishing Landscape Conservation Cooperatives

1. *Staff and Resources*: Coordinating entities are responsible for staffing each LCC with a Coordinator and other staff, providing resources to support operations, establishing Steering Committees, and ultimately for ensuring that LCCs are functioning properly and achieving their goals and objectives. Initial staffing efforts will focus on the most critical core capacities to ensure performance of primary planning and science functions, with capacity added strategically over time to meet demand, as determined by the Steering Committee. Staff will likely involve a combination of hiring new positions as well as using existing structures to support LCC priorities.

2. *Steering Committees*: At a minimum, Steering Committees will be composed of representatives from resource management agencies at the Federal, State and Tribal levels. In addition, non-governmental organizations and other groups who can effectively contribute to the purpose of the LCC can be members as determined by the Steering Committee. Additionally, each LCC Steering Committee will identify points-of-contact with all relevant CSCs to ensure appropriate coordination. The makeup of the Steering Committee should include representation for the priority resources and resource impacts that are encompassed by the LCC geography. Steering Committees guide overall implementation of the LCC.

3. *Engaging with Partners*: LCCs will actively work with partners to assess their most critical needs for science, data, and tools that will enhance capacity to forecast, plan for, and mitigate or adapt to the adverse effects of climate change on the resources they manage. Partnership agreements may be developed, as appropriate.

4. *Coordination*: Each LCC will coordinate with existing conservation partnerships, plans, agreements, and programs, as appropriate. This serves to coalesce and disseminate information developed within other partnerships to support the broader community of LCC partners.

5. *Establishing Documents*: LCCs will be self-directed partnerships; each LCC will develop a governance structure which may include basic operating protocols, roles, and responsibilities, and can define relationships with existing partnerships. The Steering Committee is responsible for developing these establishing documents, collectively called the *LCC "charter"*.

[4] See *Interior's Plan for a Coordinated, Science-Based Response to Climate Change Impacts on Our Land, Water, and Wildlife Resources*, U.S. Department of the Interior, January 25, 2010.)

6. *Working Documents*: Each LCC will develop, and regularly update, an operating plan (hereinafter, "Operating Plan") and a Science Assessment. Some essential components of these documents are listed below.

7. *National LCC network*: All LCCs will be part of a national network with the intention of providing shared data, products, conservation tools to link conservation delivery and outcomes continentally.

B. Implementation – Conducting Activities and Achieving Outcomes

The Steering Committee is responsible for overall planning and implementation of the LCC's activities and products, which will be shared openly among partners and other interested parties. LCC working documents, including Operating Plans and Science Assessments as described below, will be coordinated with the relevant CSC.

1. *Operating Plans* will articulate common landscape-scale resource conservation priorities for shared resources identified by the LCC Steering Committee. Operating plans will address:
   a. Priority resources that are at the greatest risk due to climate change and other stressors;
   b. Spatially-integrated conservation strategies to reduce, if not minimize, these risks;
   c. Measurement tools needed to evaluate conservation strategies and implement adaptive management;
   d. Decision-support systems/tools needed to help participants utilize climate and other scientific data;
   e. Collaboration among existing conservation partnerships, plans and resource management activities; and
   f. Communication and dissemination of information and tools made available by the CSC and other science sources.

2. *Science Assessments* will be conducted to appraise the current spectrum of scientific knowledge surrounding shared resource priorities, and will identify and prioritize management questions and related research and technical assistance gaps and needs. They will explore potential approaches for utilizing existing information, developing scientific tools, and improving the state of knowledge. Science Assessments will identify common needs for science among the various partners and partnerships to meet their conservation priorities and goals, and will be developed in coordination with Climate Science Centers. Science Assessments will include:
   a. Inventory of existing data systems and datasets, and a list of data and other information gaps and needs;
   b. Description of the desired integrated information structure (e.g., shared data standards, databases, and GIS protocols);

c. Strategy for addressing monitoring priorities building upon foundational monitoring and assessment activities. LCCs will strive to be consistent with national monitoring strategies.
d. Description of how the Landscape Conservation Cooperative will work with the relevant Climate Science Center and other science sources to address needs, improve data, improve tools, etc.
e. Strategy for identifying, incorporating, and utilizing traditional ecological knowledge as a companion to the climate and ecosystem sciences.
f. Assessment of the science skills resident within the LCC and partner organizations and recommend strategies of utilizing and if necessary augmenting these capabilities;
g. Defining a structure and process for data management and dissemination.

3. *Applied Conservation Science*: LCCs will facilitate and coordinate with appropriate science providers to conduct the various scale-dependent elements of the needed science for the LCC partnership.

4. *Reporting*: Congressionally funded DOI participation within LCCs requires appropriate reporting to document accomplishments and fulfill obligations for performance reporting. It is understood that each LCC partner may need to report on their own involvement and that DOI requirements are the responsibility of DOI. It is expected that DOI LCC staff through each individual LCC will report the following annually or as otherwise determined:
   a. Progress towards full operational status;
   b. Progress towards meeting the objectives specified in DOI's climate change High Priority Performance Goal (HPPG), [5] including;
      i. Completing vulnerability assessments
      ii. Inventorying climate data availability and gaps
   c. Progress towards meeting the goals and objectives identified in the Science Assessments and Operating Plans;
   d. Contributions to specific climate change adaptation projects; and
   e. Budgets and expenditures.

IV. Establishing and Implementing Climate Science Centers

Climate Science Centers are intended to function both as regional providers of management-related climate science and as part of a nationally coordinated network. Their scope includes the full range of natural and cultural resources, and their focus is on information needed to manage these resources in the face of climate change, with appropriate consideration of other stresses on the resources (e.g., invasive species, changing land use). Landscape Conservation Cooperatives are the CSCs' primary clients.

[5] U.S. Department of the Interior. February 2011. *Fiscal Year 2011. The Interior Budget in Brief.* Pages DH11-DH18.

The primary scientific focal areas of the CSC staff and resources are to:

- Acquire, create, and use high resolution climate modeling information and derivative products to support adaptation planning for natural and cultural resources.
- Integrate physical climate models with models that predict impacts to or responses by resources and the ecosystems that support them.
- Forecast changes in natural and cultural resources in response to climate change.
- Assess the vulnerability and risk of natural and cultural resources to climate change.
- Develop standardized approaches to modeling and monitoring techniques to facilitate the linkage of existing monitoring efforts to climate models and ecosystem response models.

CSCs will provide LCCs with the latest climate science information and data and help LCCs develop modeling tools and conduct site-specific studies of climate impacts. LCCs will use this information provided by the CSCs to support existing or develop new landscape-scale resource management plans that will inform future activities and assist partners in focusing their management decisions. In turn, LCCs will provide CSCs information on resource responses to climate change and the effectiveness of their management actions.

A. Establishment of Regional Climate Science Centers

1. *Establishment:* DOI CSCs will be managed by the USGS National Climate Change and Wildlife Science Center (NCCWSC). Established by Congress in 2008, the NCCWSC was charged with delivering scientific and technical information to help resource managers cope with a changing climate. The independent science mission of the NCCWSC, as mandated by Congress, focuses primarily on fish, wildlife, and their habitat. The eight planned CSCs will also focus on fish and wildlife-related impacts, but given the interrelated nature of many climate change impacts, will also focus on broader water, land, and other resource impacts – as noted above, they will focus on the full range of natural and cultural resources.

2. *Staff and Resources:* CSCs are based at host institutions (such as universities or other similar non-federal establishments) with substantial climate change science expertise and partnerships. With the exception of Alaska, the location of each CSC is identified through a competitive process that includes review by a technical panel comprised of representatives from all DOI bureaus. Although USGS will provide initial federal staffing, including a director, administrative staff, and scientific positions, ultimately funds and scientific staff from multiple bureaus within DOI may be pooled to support CSCs' collaborative research, monitoring, and data-sharing across a full range of resource issues. Significant additional scientific capacity will be available through host institution agreements.

3. *Stakeholder Advisory Councils:* Each Climate Science Center will establish a Stakeholder Advisory Council (SAC), which will be chaired by a USGS Regional

Executive. All LCCs within the geographic area of the CSCs will be represented along with other management agencies, entities with scientific capabilities (e.g., NOAA-RISAs, NEON, NASA-funded science, Universities), and other regional stakeholders. The SAC will produce a regional science agenda and review the overall functioning of the CSC.

4. *Establishing Document:* The Cooperative Agreement between USGS, acting on behalf of the Department of the Interior, and the host institution for a Climate Science Center will constitute the Establishing Document. The Cooperative Agreement outlines the roles and responsibilities of the Department and the host institution and describes the funding structure.

5. *Working Documents:* Each Climate Science Center will develop, and update at least annually, a regional science agenda that identifies high priority science needs related to climate change and adaptation for natural and cultural resources. Some essential components of regional science agendas are described in B. 1 below.

6. *Funding:* The core of each Climate Science Center's funding will come from the Department through the U.S. Geological Survey. It is anticipated that Climate Science Center partners, both within the Interior Department and elsewhere will also provide funding and in-kind or other support.

B. Implementation of Regional Climate Science Centers

1. *Regional Science Agendas*: Using LCC Science Assessments as a foundation, CSCs, in cooperation the CSC Stakeholder Advisory Council, will establish regional science agendas on an annual basis, incorporating prioritized identification of key science needs for the region. During initial startup of CSCs, appropriate reviews will be undertaken on the topics below to provide a baseline for early plans:

    a. Science/research priorities: substantive issue areas and scientific questions or needs, based on conservation priorities of resource managers in the region (or in neighboring regions).
    b. Monitoring priorities building upon federal, state, and other foundational monitoring and assessment activities that ensure monitoring is consistent with national monitoring strategies.
    c. Information management, including
        i. Data systems: capabilities, existing partnerships, needs for improved access, storage, transfer, display, or other capabilities
        ii. Data resources: existing sources, identified needs and barriers to access, including priorities for access investment
        iii. Data management strategies: adherence to relevant DOI, federal, and international standards and protocols, needed interoperability investments

d. Scientific resources and skills: identification of available and needed scientific skills and assets, and an agreed-upon strategy for interactions between the CSC and LCCs in the conduct of science and conservation planning.

2. *Science Review and Quality Control:* Each CSC will have a Science Implementation Panel to oversee peer review of all proposed projects and to recommend how to utilize available scientific assets to best address regional science priorities. Science agendas will also be reviewed at the national level to identify issues benefitting from multi-region collaboration among CSCs.

3. *Reporting:* Climate Science Centers are central to DOI's High Priority Performance Goal for climate change adaptation. Climate Science Centers will measure and report on:

   a. Progress towards full operational status;
   b. Progress towards meeting the objectives identified in DOI's climate change High Priority Performance Goal;
   c. Progress towards meeting the goals and objectives identified in Regional Science Agendas;
   d. Contributions by way of models, tools, assessments, etc. to LCCs and to specific climate change adaptation activities; and
   e. Budgets and expenditures.

V. DOI Roles and Responsibilities

A. DOI's Energy and Climate Change Council:

   1. Secretarial Order 3289 created the Energy and Climate Change Council to be chaired by the Secretary and comprised of the Deputy Secretary, Counselor to the Secretary, Assistant Secretaries, and Bureau Directors.
   2. The Council provides policy oversight and direction for DOI bureaus with respect to the Department's efforts to facilitate renewable energy development and respond and adapt to climate change impacts on the resources managed by the Department;
   3. Working groups have been formed within the Department to address specific issues related to implementation of the CSC/LCC network, and these entities are charged with facilitating coordination and communication among bureaus in this effort.

B. DOI Bureau Directors (or their delegates):

   1. With respect to Landscape Conservation Cooperatives for which their respective bureaus are designated leads or co-leads:

a. Hire and support coordinators and other staff;
b. Ensure effective communication through line managers to coordinators and staff;
c. Allocate funding to staff LCCs and support projects and general operations;
d. Ensure proper reporting on activities and accomplishments; and
e. Support Steering Committee efforts in coordination, data sharing and data integration across bureaus and LCCs.

2. With respect to Landscape Conservation Cooperatives for which their bureaus are not designated leads or co-leads:

   a. Designate staff to participate on Steering Committees, to serve as LCC core staff, and to support LCCs, as appropriate;
   b. Identify projects the bureau will participate in and fund;
   c. Ensure that appropriate staff are engaged;
   d. Dedicate resources to support other LCC activities, as appropriate; and
   e. Support Steering Committee efforts in coordination, data sharing and data integration across bureaus and LCCs.

3. With respect to Climate Science Centers, the USGS Director (or delegate) will

   a. Secure and maintain contractual or cooperative arrangements with host institutions to provide the space, facilities, and access to scientific expertise for each CSC;
   b. Provide core CSC staff, such as a CSC Director, coordinator for regional partnerships and agenda setting, and administrative staff; and
   c. Ensure that CSCs function as an integrated national network.

4. With respect to Climate Science Centers, any and all Bureau Directors (includes USGS) may locate scientific staff at CSCs to address issues identified as priorities by the CSC Stakeholder Advisory Council/regional science agenda.

C. Coordinators for Individual Landscape Conservation Cooperatives:

1. Support and assist the LCC Steering Committee;
2. Work with the LCC Steering Committee to provide leadership for the LCC;
3. Develop and sustain partners;
4. Manage and maintain establishing documents, operating plans, science assessments, and other administrative documents;
5. Manage and track the LCC budget;
6. Track and report activities and outcomes, including at least an annual report of activities, accomplishments and plans for upcoming year; and
7. Ensure coordination with adjacent LCCs and with the relevant CSCs.

8. Actively participate as a member of the LCC national network of LCC coordinators and staff and support or participate as appropriate in the National LCC Assembly as described in item F, below.

D. Climate Science Center Directors:

1. Provide leadership for the CSC;
2. Support the establishment and annual convening of the Stakeholder Advisory Council;
3. Establish and chair the Science Implementation Panel;
4. Ensure all CSC scientific products are appropriately peer reviewed;
5. Manage CSC funds, including all necessary tracking and reporting;
6. Establish and maintain strong, active relationships with regional LCC Coordinators;
7. Establish and maintain effective working relationships with neighboring CSCs; and
8. Facilitate the co-location of scientific staff of other bureaus/agencies.

E. USGS Regional Executives:

1. Chair the Stakeholder Advisory Council for the CSC in their geographic area of responsibility, or as designated.

F. LCC National Council:
(*note that this section may be revised based upon workgroup recommendations*)

A national LCC Council will be comprised of representatives from LCCs; federal, state, and tribal governments; and key partners and will act to ensure an appropriate level of consistency, communication, and collaboration among the LCCs. This body may establish sub-committees or other structures to address specific LCC issues that require national coordination. The LCC Council will convene, at least annually, a national workshop of the LCCs and partners. Objectives of the LCC National Council include:

1. Identifying opportunities for regional and national collaboration on natural resources science and conservation actions and prevent duplication and overlap of priorities and conservation efforts.
2. Working with other conservation partnerships to support, collaborate, or leverage programs to the greatest degree possible.
3. Support and facilitate the application of all resources in the most efficient and effective way across efforts to address the impacts of climate change and facilitate adaptive response of natural systems.

The six major tasks of the LCC National Council will include:

1. Prioritization and allocation of national LCC and related resources.
2. Deployment of resources (human, fiscal, technical) through programmatic alignment, co-share, etc.
3. Facilitating and coordinating with non-federal partners to achieve maximum efficiencies, respecting the demands on all partners.
4. Identifying cross-cutting performance measures.
5. Resolution on issues which are key or emerging.
6. Standardization of emerging, and harmonization of existing, methodology, practice, and communication.

It is expected that the National Council will use this language as an initial charge, but will review and revise it, as appropriate, to ensure that the Council reflects the needs of the LCC network and partners in accomplishing conservation goals.

VI. Revisions and expansions of this document

This Implementation Guidance will be reviewed annually by DOI's Energy and Climate Change Council to ensure that it reflects the current intent of the Department in management of its roles and responsibilities with regard to LCCs and CSCs. The National LCC Council, which reflects the entire partnership of the LCCs, will also annually review this document and may develop other guidance or policy documents as needed. Such guidance cannot contravene the DOI guidance with respect to DOI staff, resources, and policy but can build upon and expand this guidance to enable and support the LCC effort in attaining its collective vision, goals and objectives.

Figure 1. Map of the Landscape Conservation Cooperatives

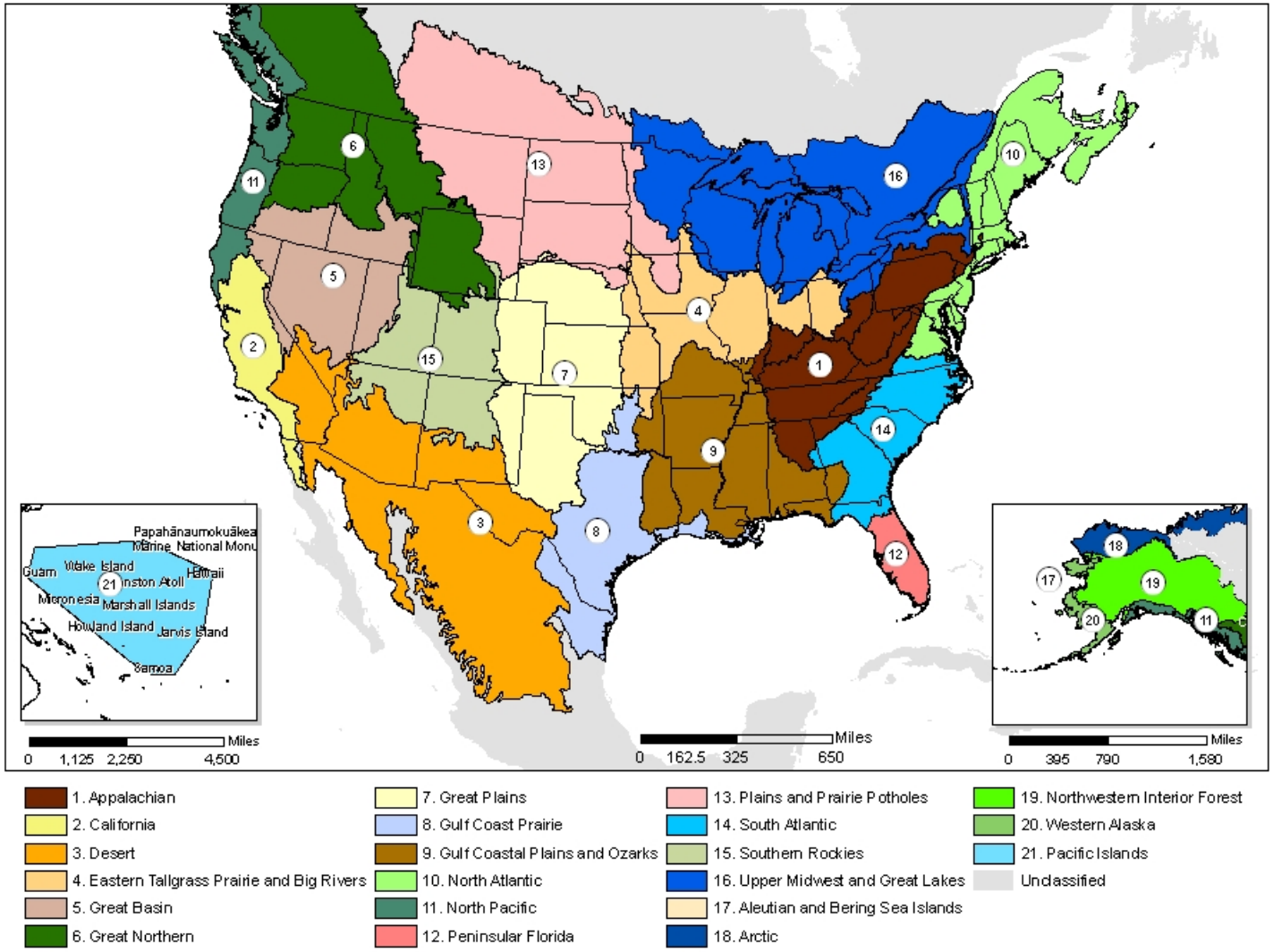

Figure 2. Map of the Climate Science Centers

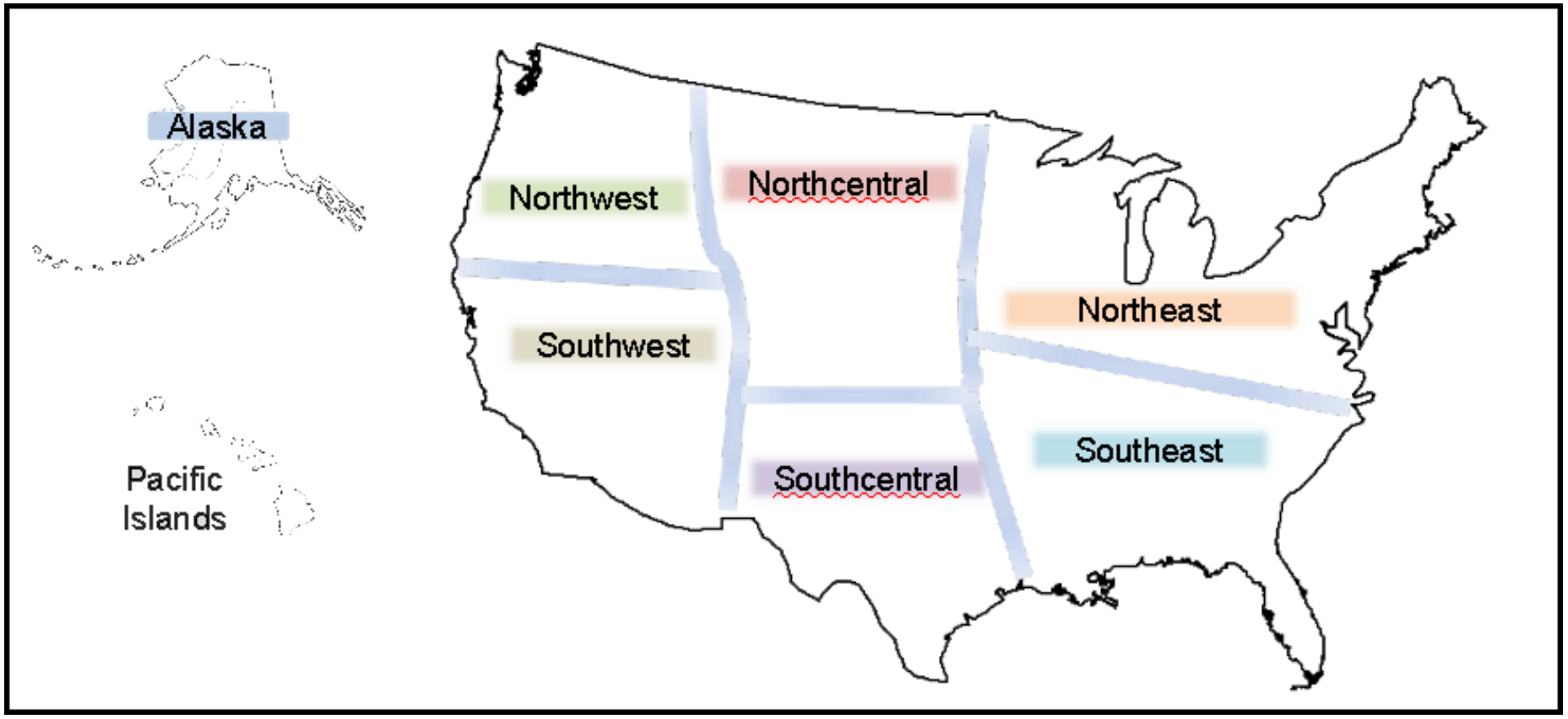

Figure 3. Conceptual relationship of science and management among LCC and CSC partnerships. This model should not be interpreted as a constraint upon any entity from working throughout the spectrum of activities. This simply illustrates a simplified model of primary areas of emphasis by the various components of the partnership.