LANDSCAPE CONSERVATION COOPERATIVES

2012 NATIONAL WORKSHOP

"Defining Conservation for the 21st Century"

The 2012 National LCC Workshop was held at the Sheraton Hotel in downtown Denver, Colorado on March 27-28, 2012. With over 375 attendees and interest from hundreds more, the Workshop was a huge success in terms of advancing the evolution of the LCC Network and providing a forum for the LCCs and partners to share information.

The 2012 National LCC Workshop was the first of its kind, pulling together the 22 LCCs and partners from across the nation (and beyond) to discuss landscape conservation tools, approaches, challenges and successes. Eight plenary speakers and dozens of concurrent session speakers participated in the workshop, with numerous ancillary activities held in conjunction with the workshop. Discussions linked science, theory, practice, and policy through deliberate dialogue and professional exchange and participants were deeply engaged in the most up to date information on landscape scale conservation.

The following workshop proceedings capture the main perspectives and outcomes of the National LCC Workshop. The full list of downloadable presentations is available on the website, along with video recordings of the entire workshop: http://nationallcc2012.com/documents/. The proceedings are organized into five primary themes in order to meaningfully synthesize and understand the discussions that took place.

Paradigm Shift

Landscape scale conservation as a "paradigm shift" was a central theme of the workshop. Landscape scale conservation has become a central concept of many natural resource initiatives and LCCs exemplify the opportunities that arise when science and management can be linked at a large landscape scale. Below is a synopsis of key points about landscape scale conservation as a "paradigm shift" that emerged from the workshop:

Working across traditional data and communication boundaries
Workshop discussions revealed the need to work across traditional boundaries, including the need to partner, communicate, and conduct science in new ways.

- The conservation community is and needs to be a part of the great information technology changes of our time and leverage these technologies to work together and across traditional boundaries at a landscape scale.
- Building partnerships is key to accomplishing conservation challenges. To effectively partner, LCCs must:
    - Continue to integrate with other initiatives.
    - Operate as a network. For example, four LCCs are collaborating to tackle sage-grouse issues.
- To be relevant, LCCs must develop landscape-scale science and information needs that will inform conservation delivery.
- We need to broaden our perspective both temporally and spatially. Scale matters and we need to think about problems at a variety of levels.

- US Fish and Wildlife Service (USFWS) workload on renewable energy has increased substantially, and with it comes the need for greater data integration.
- Traditional inventory and monitoring efforts have occurred separately. For instance, national forest inventory, soils inventory, and wetland inventory are completely separate efforts. As a conservation community, we need to move to monitoring landscapes that are dynamic and constantly changing.
- We need to have a means to communicate data/information through open source venues.

Leveraging resources
The potential for LCCs to leverage resources was articulated as a significant opportunity that should not be missed.

- We need to leverage resources and agency efforts. No one agency or organization can do all this work – we need to leverage each other's effort. According to one participant, "If you amass resources, great things can be done on a landscape."
- For 100 years, conservation has been about identifying important places and protecting those places. As landscapes shift in the face of climate change, that paradigm is no longer effective, so we need to adopt a forward-looking perspective for our conservation goals.
    - As one speaker noted, "Stationarity is dead." In other words, the historical range of variability concept no longer applies.
    - A "new normal" will continue to evolve as natural systems respond to climate change; consequently our reliance on static protected areas will no longer be sufficient.
- LCCs have the flexibility to see problems and risks at various scales and address them at the most appropriate, effective level.
- LCCs provide communication and resource leveraging mechanisms for landscape scale efforts.
- Landscape scale conservation is challenging, especially when several agencies are involved, but it can no longer be done in silos.

Adapting to a different conservation future
Speakers outlined the importance of rethinking conservation goals based on new ecological realities, focusing on approaches that are adaptive and resilient.

- We need to incorporate adaptation planning and implementation into conservation work, and promote innovation in adaptation strategies.
    "I skate to where the puck is going to be, not where it has been." Wayne Gretzky
- The secret sauce for successful adaptation is intentionality. In the face of climate change, doing good conservation is not good enough. Be adaptation-intentional instead of adaptation-consistent.
- The conservation community must shift from a focus on status quo (resistance approaches) to resilience approaches. Resilience approaches are not about creating healthier systems that can bounce back from disturbance but about maintaining ecological functionality as things change, not in opposition to change. We need to reassess and revise conservation goals and targets based on climate change effects and vulnerability assessments.

Linking Natural and Cultural Resources with Human Dimensions
The value of integrating cultural resources with landscape conservation efforts, and the importance of connecting science to the public were key themes.

- Cultural resources are a critical part of the discussion, and there is often little distinction between natural and cultural resources for traditional communities.
- Focusing attention on cultural resources opens the door for social information when it comes to climate change adaptation.
- Engage Tribes, First Nations and Indigenous people early and often, with an aim of condensing outreach to avoid "consultation fatigue." Significant traditional knowledge exists that is as valuable as the best available science.
- A central tenet in this new paradigm is to recognize that landscapes have a deep human history.
- To be successful and relevant in today's world, LCCs must focus on human dimensions, or how to connect science to the public.

Adding Value (Successes and Accomplishments)

Discussions during the workshop focused on areas where LCCs are adding value to landscape scale conservation, where opportunities lie for further collaboration, and how LCCs are uniquely positioned to be a clearinghouse for data and the best available science. Conservation leaders from across the nation engaged in presentations and dialogue focused on the impact LCCs can have on regional landscape conservation issues by encouraging partnerships, cross-pollinating approaches, and providing a nexus to link science and management. Of the successes and accomplishments discussed over the course of the Workshop, below is a sample of what was heard:

How LCCs add value
LCCs bring together a multitude of vested stakeholders, each with different data and resource capacities and needs. Many discussions focused on the value LCCs add to conservation efforts by addressing landscapes cross-jurisdictionally and encouraging integration of resources.

- LCCs have the opportunity to create a common and coherent scientific database for their respective regions, and also to provide interpretation of the data for partner organizations. For example, a Landscape-scale Energy Action Plan (LEAP) may identify data and monitoring needs that could be addressed by the LCCs. LCCs can play a role in developing basic data sets for the gaps identified.
- Additionally, LCCs add value by:
    - Addressing conservation at broader spatial and temporal scales, and working collaboratively across jurisdictional and geographical boundaries (i.e., looking at landscapes in a new way instead of in a typical "silo" approach)
    - Streamlining identification of science priorities
    - Integrating aquatic and terrestrial resource information
    - Developing explicit linkages across existing conservation partnerships that span multiple taxa
    - Looking beyond science and into the human dimensions of the landscape
    - Providing an opportunity to invest in foundational data sets so progress can be made toward creating interpretable data layers
    - Supporting investment in foundational data and working with partners to maintain similar data approaches and standards
    - Providing the best available science to partners
    - Helping partners to understand and incorporate future landscape change (e.g., sea-level rise, urbanization, climate, etc.) into conservation planning
    - Creating national commitment to do conservation in a collaborative way
    - Providing a ready-made mechanism for getting the message out about decision support tools
    - Encouraging an overall shift to a landscape level conservation approach
    - Providing a forum to share best practices and advertise successes.
    - Provide a forum for coordinated decision-making and actions across the landscape

Initiatives underway
The Workshop provided the opportunity for LCCs and their partners to highlight current efforts to further landscape-scale conservation, including:

- Crown of the Continent Collaborative Forest Land Restoration Planning (CFLRP) collaborated with the Great Northern LCC to use the Landscape Conservation Management and Analysis Portal (LCMap) to help share and store data. The LCMap now provides virtual collaboration in data discovery, management and analysis, and keeps track of who submits what. It is available on the Great Northern LCC website: http://greatnorthernlcc.org/lcmap
- The Designing Sustainable Landscapes Project is underway within the North Atlantic LCC, focusing on the conservation of landscapes that sustain cultural and natural resources by providing a modeling framework to guide conservation decisions in the LCC.
- North Pacific LCC has been asked by partners to focus on data management and is working closely with the Northwest CSC to integrate science plans and priorities, hold joint workshops and presentation, and conduct stakeholder priority work in time to drive the Northwest CSC science plan and RFPs.
- The Southeast Conservation Adaptation Strategy links six LCCs to move from a stovepipe model to a collaborative form of conservation. In the Southeastern Conservation Adaptation Strategy, LCCs are involved with engaging the conservation and science communities, as well as the public.
- Public engagement is important – listening to people matters and the future conservation state will depend on what people want. A key role of public engagement must include making science and conservation relevant and helping members of the public understand the value and benefits of functional landscapes in order to drive support of landscape-scale conservation.
- The Coastal Storms Pilot Program for Western Alaska LCC connects physical science with biological science to understand impacts to natural resources, land, community, and emergency managers.
- The National Oceanic and Atmospheric Administration (NOAA) Gulf Coast Landscape Conservation Liaison will help advance the shared goals for coastal conservation, management and adaptation and will co- develop cross-LCC products.
- LCCs can help connect the watershed within the National Marine Fisheries Service Living Marine Resources project.

Unique opportunities

As LCCs continue to address landscape-scale conservation needs and nurture partnerships, unique opportunities including the following are likely to emerge:

- State and federal agencies have mixed priorities, providing a unique opportunity for LCCs to work among states and federal permitting agencies to help define what science is lacking and to help think about addressing resource extraction and management issues.
- NOAA Sentinel Site Cooperatives: Five locations that will be looking at delivering useful info on the rate and impact of sea level rise on coastal areas. These five sites would be good places for LCCs to engage in the seascape.
- LCCs can help with databases so there are places to put survey results.
- LCCs can provide mitigation tools so partners can identify where mitigation is needed. Partners are eager to be part of a larger system that is aware of landscape level impacts.

Coordination and Collaboration

As cooperatives, themes of collaboration were entwined throughout each session of the workshop. Gathering and sharing information, building capacity, amassing resources, and nurturing partnerships while drawing on existing efforts were central tenets heard. The sub-themes below identify the main opportunities for collaboration, including: linkage of science and management, integration of natural and cultural resources, and the critical need for collaboration between agencies and other partners.

Linking Science and Management
CSC and LCC partnerships

- LCC definition of science needs is critical for US Geological Survey Climate Science Centers (CSC) to implement and deliver on these needs.
- CSCs can be used as levers to promote broader agency integration.
- Science development and application can be harmonized through coordination of priorities, joint actions, bringing processes together and sharing leads to avoid duplication.
- Major opportunities exist for coordination due to CSC-LCC cross-pollination, including: anticipating data management platforms, leveraging funding for regional science priorities, and issuing joint requests for proposals (RFP).
- Synchronizing science strategies and annual plans will establish LCC-CSC partnerships; hosting joint workshops to facilitate science coordination will advance collaboration.
- CSCs can bring university research capacity to LCCs, while LCCs can provide linkages to multi-national partners and climate centers.

National Bird Joint Ventures & the National Fish Habitat Action Plan
The need to determine how LCCs can channel science capacity to interact effectively with fish habitat partnerships was raised during several sessions. Below is a sample of what was heard:

- Integration with fish partnerships is important, including attending meetings and having an LCC liaison with fish partnerships.
- Capacity exists for science at CSCs but LCCs and fish partnerships need to channel that capacity.
- LCCs could help identify the state of aquatic riparian systems in the West, particularly those that may have been erroneously listed as healthy due to a lack of clear data.
- By using science and decision support tools to identify where to best conserve habitat, LCCs can help target conservation easement funding to the best places.
- LCC funding seems to be going to universities, but there needs to be more communication with NGOs.
- LCCs should communicate with fish habitat partnerships because a lot of opportunity exists to share information.
- Data should not be duplicated, and LCCs can build a tool that allows fish partnerships to query data.
- The North Pacific LCC serves a broad constituent of partners and is interviewing decision makers to identify resource science needs. All LCCs should be a place for partners to voice science needs so LCCs can prioritize these needs.
- LCCs can be a forum to share best practices and advertise successes.
- In the South Atlantic, the South Atlantic Regional Partnership is translating South Atlantic-funded science into conservation and habitat restoration on the ground. LCCs in this region will have a unique opportunity to look at a broader vision, engage other partners, and enhance regional tools.

- LCCs are in the business of setting conservation targets. Joint Ventures and Fish Habitat Partnerships need to adopt that role for their respective taxonomic groups to help LCCs integrate and translate them into landscape-level conservation targets.
- In data-sparse environments, LCCs can bring disciplines together to work across departments and share costs across organizations. Even with limited data, LCCs can begin to guide resource managers in decision-making while communicating the ubiquitous uncertainties.
- LCCs can move the needle by identifying collective conservation issues and opportunities in order to act as a true network

USDA Forest Service and LCC integration

LCCs are in a good position to develop a mechanism to organize information across the landscape and make it accessible for people who want to use that information. During the workshop, and particularly in the Nurturing Partnerships Concurrent Session, participants noted that the US Department of Agriculture Forest Service (USFS) is a key partner of the LCCs and existing USFS initiatives can be integrated with the LCCs in a meaningful way, including:

- The Department of the Interior (DOI) and the USFS both embrace a landscape-scale approach to conservation, and philosophically, both organizations need to consider all lands and multiple users, uses, management objectives and partners.
- Landscape-scale conservation integrates existing stove-piped strategies into a single, overarching framework. LCCs provide:
    - Communication and resource leveraging mechanisms
    - Opportunity for land management and science agencies to share resources
    - Development of valuable information and tools
    - Reduced duplication and improved consistency
    - Easier access to a rapidly changing science base
- USFS employees bring scientific expertise, and inclusion of this expertise benefits large-scale ecosystem management by:
    - Monitoring forest ecosystem structure and services
    - Contributing USDA's focus on working lands
    - Integrating research into land management
- The Caribbean LCC, initiated in 2011, involves major land management stakeholders in Puerto Rico and the Virgin Islands.
- Science-management partnerships are at the core of research and development support for land managers and are handled in a variety of ways across the country.
- One example of management/science integration is the Climate Change Response Framework (www.climateframework.org), which focuses on climate change adaptation.
- Significant opportunities exist to coordinate the USFS Collaborative Forest Land Restoration Planning (CLFRP) program and LCCs.
    - Such collaboration must identify shared goals, leverage monitoring resources, and share data storage and search methods.
    - An example of an existing collaboration includes the Colorado Front Range CFLRP proposal for the Southern Rockies LCC based on monitoring and desired future needs.

Bureau of Land Management (BLM) Landscape Approach and LCCs

The BLM REAs are ecosystem-based models for collaboration and build upon the BLM's landscape scale approach. Additionally, the BLM Assessment, Inventory and Monitoring Strategy (AIM) presents a

framework for collecting consistent monitoring data across the landscape. LCCs and REAs overlap geographically, and during the workshop, attendees heard about opportunities for LCC and REA collaboration, described below:

- REAs and AIM can be sources of multi-scale, seamless, cross-program data and products that are directly applicable to landscape scale management and the LCCs.
- LCCs can serve as facilitators of several items important to public land management.
- REAs are working to address regional challenges and need collaboration between states, partners, and stakeholders. The collaborative step-down approach provides for partner and stakeholder involvement and can be applied in multi-state situations.
- The BLM Solar Programmatic Environmental Impact Statement will evaluate utility-scale solar energy development and amend relevant BLM land use plans to potentially establish a new BLM Solar Energy Program. The program has 17 zones and the opportunity to come up with mitigation plans across the landscape. BLM can build the framework, but LCCs could contribute data and become more involved.

Engaging Tribes, First Nations, Indigenous Peoples

Incorporating traditional knowledge into science is necessary to further integrate the tools and approaches of LCCs and their partners. Many opportunities exist for further integration and engagement, and the engagement could be conducted through a partnership to avoid engagement duplication and consultation fatigue.

Examples of cooperation

- The Upper Midwest Great Lakes LCC funded the Manajawin Project to identify how to reach out successfully to tribes.
- Several LCCs have tribal representation on their Steering Committees.
- Papahanaumokuakea: This Marine National Monument is the first mixed natural and cultural UNESCO World Heritage site in the U.S. and represents cross jurisdictional collaboration (NOAA, USFWS, and the state of Hawaii).
- The National Park Service and the University of Hawaii, partners in the Pacific Islands Climate Change Cooperative (PICCC), are collaboratively pursuing a framework to address climate change impacts on cultural resources.
- Within PICCC, a core assumption states that successful conservation requires meaningful participation of Pacific Island communities. From this, other LCCs can understand that restoration of native ecosystems can enhance and draw upon cultural identity, knowledge, and practice in equal measure. PICCC: http://piccc.net/
- The PICCC Culture and Communities Work Group defines cultural resources and works to integrate natural and cultural resources, understanding that early and meaningful engagement is key, ““Each ecosystem is unique, as is its corresponding indigenous community.”

Why is Tribal cooperation important?

- Tribes need to be informed about landscape-scale conservation issues and developments within LCCs, and LCCs can make an effort to find creative ways of reaching out to Tribes. The idea of adapting to climate change is not new to Tribes and LCCs should not deprive themselves of

knowledge of the generations past, but take advantage of the intergenerational equity, social cohesion and security, and knowledge and expertise of Tribes and Indigenous peoples.

- Tribally significant lands extend off reservation, tribal lands are near public lands, and tribal members have compatible aspirations about landscape scale conservation. Tribes often have a unique culture and history with the land where cultural and biological diversity are located side by side.
- The Manajawin Project, in cooperation with the Upper Midwest Great Lakes LCC, is examining cooperation exclusively initiated by tribes, tribal NGOs, or tribal activists. There are 50 examples within the Great Lakes region and the project aims to tell a different story of what Tribes have initiated. The project also aims to extract lessons learned from this approach as a different form of tribal engagement than typical government-to-government consultation.

Potential and Critical Need for Collaboration

The need for collaboration and coordination across agencies and organization was clear during the Workshop. The critical needs stretch from further data sharing capabilities to working together to demonstrate success and tell the LCC story loud and clear. Data sharing was articulated as a particular need, with most participants acknowledging the need to leverage existing data to inform science priorities and decision making within LCCs. Additional comments on potential and critical needs for collaboration included:

- In some areas, LCCs have not been embraced by key leaders in a region, including state wildlife agencies, tribal nations, and other key stakeholders. The key is "getting everyone around the table to get skin in the game."
- LCCs have two chief things to accomplish:
    1. Agree on basic principles for the LCC system as a whole
    2. Relentlessly work together to apply principles, demonstrate success, and get high-level participation and buy-in.
- LCCs should look for creative ways to staff efforts, engage diverse organization and look to build capacity within the cooperatives.
- Overall, LCCs are a tangible way to produce relevant partnerships in a short amount of time. In the end, the LCC enterprise is about making better places to live.
- LCCs foster liaisons between existing efforts, such as the relationship between the National Wildlife Refuge Systems Inventory & Monitoring Network and LCC Steering Committees.
- Coordination and collaboration can be achieved by focusing on sharing science. The LCC concept provides a place where resource managers can see the big picture and use science to make decisions.
- LCCs have the opportunity to be data system clearinghouses to inform regional scientific needs, in collaboration with the CSCs.
- In the "ScienceBase as a Critical Hub for Data Management, Documentation, and Delivery" session, data management was described as not needing to have to have your data in one place, but to have standards and make it available transparently.
- Nonprofits can bring philanthropy to the table for LCCs. For example, The Trust for Public Land used LCC science for resiliency planning in the New England states.
- It is important to work together as a community to look at cumulative effects of projects across sectors, such as the cumulative impacts of renewable energy projects, where issues of siting, transmission, landscape impacts, and ecosystem stressors are at play.

- In data-sparse environments, such as the tundra and tropics, LCCs are at the beginning of a long effort to identify tools needed in the future. With the LCCs, there is the ability to increase capacity and link efforts to develop needed ecological models. The scale of this problem has brought partners together at a level not previously seen.

Tools and Approaches

A large part of the Workshop focused on tools and approaches being implemented within the LCC Network, including those that have been particularly effective in helping LCCs achieve their goals and other tools being used at the landscape scale level that LCCs could adopt. What follows are examples of the conservation tools and approaches featured during the Workshop.

Yale Science Panel framework

- The goal of this framework is to provide guidance and clarity to practitioners and to enhance coordination and communication among organizations. The Framework provides a menu of options with relevant adaptation strategies, models, and datasets through synthesis of existing literature and is being tested and refined through pilot projects.
- Key adaptation strategies in the framework include protection of current and future patterns of biodiversity as well as maintenance of ecological process and connectivity.
- The Western Governors' Wildlife Council's landscape Integrity and Connectivity workgroup is comparing landscape integrity datasets and validating models through expert surveys.

USGS Land-Cover Trends and Land Change Science

- These tools systematically analyze change across multiple scales and focus on the dynamics of land change alongside weather and climate interactions.
- Assessments recently completed for LCCs showed much variability in data, including regional differences in land cover change
- LCCs can be a framework for assessing overall spatial change. An emerging direction is to look at the consequences of land use change through regional consequences assessments that examine land use effects on earth systems and processes. For example, these assessments can evaluate land use impacts on hydrology and climate.
- The USGS Land Cover Science approach is beneficial as it provides information to help understand human-environmental interactions across the nation, including rates and types of land conversion, driving forces of conversion, and consequences of land use change.
- A summary of land use change in LCC regions is under development and will be available in late 2012. Some LCCs are working to predict future land cover and the potential exists for further collaboration with the USGS Land Change Science approach.

The Trust for Public Lands (TPL) tools and databases

The Trust for Public Land gave an overview of the following tools and approaches that can benefit LCC conservation planning and analysis.

- LandVote is an online database and mapping site of over 2,000 ballot measures to help the public get information about local level ballot measures and successful/unsuccessful conservation funding initiatives.
- The Conservation Almanac is a database that identifies where conservation money is being generated and spent on the ground.
- The National Conservation Easement Database, the first of its kind, documents all conservation easements in America, and reminds planners of the importance of including conservation easements in planning.

- The “4P” Landscape Conservation Model approach consists of engaging stakeholders and partners, modeling high priority areas, examining conservation finance options to fund implementation, and protecting and restoring priority lands.
- In New England, TPL is using LCC science for resiliency planning to identify conservation priorities for Eastern Brook Trout.

Western Governors’ Association (WGA) Crucial Habitat Assessment Tools (CHAT)
WGA CHATs are examples of easily accessible online map systems that display crucial wildlife habitat and corridors across the West. Once complete in 2013, the system will provide information throughout the West, but will also consist of more specific CHATs, such as the Lesser-Prairie Chicken Tool, as described below. Further details of CHATs are listed below:

- CHATS are aimed at scalable benefits, including the state-wide and trans-boundary level and include the following development steps:
    - Data development
    - Prioritization of crucial habitats
    - Application development
- WGA is focused on developing partnerships to provide support and collaboration for tool development and to guide implementation, including:
    - Collaboration with land managers and federal wildlife managers
    - Initiating cooperation with Federal Highway Administration (FHWA)
    - Collaborating with NatureServe and state Heritage programs to examine existing relationships, funding, data access, roles/responsibilities, data security, and organizational structure.
- LCCs can use CHATs to:
    - Facilitate trans-boundary state Wildlife Action Plan activities
    - Develop regional mapping infrastructure
- Lesser-Prairie Chicken Tool: Southern Great Plains CHAT
    - This tool was developed by five state wildlife agencies to help wind energy developers identify crucial habitat.
    - The tool defines habitat in four categories: irreplaceable; limiting; significant; significance unknown.
    - This tool built on existing tools including the Playa Lakes Joint Venture corridor analysis.

LCC science planning approaches
The Appalachia, Western Alaska and Plains and Prairie Potholes LCCs described the different ways that LCCs identify science needs, address immediate needs, and decide on future actions. Taking landscape and natural resources differences into consideration, the LCCs each developed their own approach to science planning and action, including:

- Utilizing input from individuals with research and science backgrounds, with varying level of inclusion (Appalachia LCC).
- Organizing workshops to identify science needs, participants were categorized into areas of expertise (For example, aquatic, terrestrial, human dimensions). During these workshops, a science portfolio was developed and top-ranked science needs were identified and analyzed in a workshop report (Appalachia LCC).

- Identifying immediate science needs by bringing together all funded projects to identify connections and discover overlaps (Plains and Prairie Potholes LCC).
- Focusing on the human dimensions within LCCs and the importance of connecting with the public and addressing human challenges (Plains and Prairie Potholes LCC).
- Identifying future actions by defining a vision for the future, developing a science plan, translating needs into activities, and developing a decision making process for performance evaluation (Western Alaska LCC).

Northeast Conservation Framework and LCCs

- The Northeast Conservation Framework is organizing separate agencies collectively to achieve desired conservation outcomes. The framework organizes and prioritizes the work that best contributes to desired outcomes, and includes science translation, conservation adoption, and conservation delivery tools.
    - The Framework approach is the foundation for the North Atlantic LCC strategic plan.
    - LCCs facilitate planning at landscape scale by leveraging funding, staff and resources, providing a forum for exchange, and developing tools. LCCs also need the tools to engage in implementation and empower communities to implement at the local level.
    - The framework also acts as a communication tool, and helps to organize individual capacities, responsibilities, and expertise to determine where each partner organization can contribute.

National Wildlife Habitat System Approach

- The Wildlife Habitat Policy Research Program is organized to improve information and tools to accelerate wildlife habitat conservation, by:
    - Developing a vision for wildlife habitat system for the nation.
    - Creating an integrated and effective approach to protecting and managing wildlife habitats.
    - Exercising strategic thinking by looking forward.
- The program asked and funded key research questions, with key themes emerging:
    - The first generation of State Wildlife Action Plans (SWAP) has become an important step in conserving fish and wildlife in a changing world.
    - Lessons learned from SWAP experience:
        - Habitat conservation must occur at the landscape scale.
        - Landscape scale conservation requires sophisticated analysis of where we need to conserve land and new management strategies for adapting to new issues such as land conversion and climate change.
- An example of a habitat approach is the Mississippi River Valley Alluvial Basin, which used the Partners in Flight North American Landbird Conservation Plan as a tool to develop guidance on priority breeding bird conservation.

National Fish, Wildlife, Habitat and Plants Climate Adaptation Strategy: Implications for LCCs

- The Strategy is a framework for common action on climate change with goals of conserving and connecting habitat, managing species and habitat, enhancing management capacity, supporting adaptive management, increasing knowledge, awareness and information, and reducing non-climate stressors.

- LCCs have an opportunity for collaboration by helping to redefine conservation in a period of climate change, showing the public what conservation success could look like, and being creative and cohesive in conservation approaches.

Cultural resources and adaptation approaches

- Management actions related to cultural resources should be coordinated at a regional scale, which gives the opportunities for LCCs to inform actions. There is a need to start defining non-negotiable priorities for cultural resources, and LCCs can contribute to this decision making process. The following adaptation approaches exist for vulnerable, threatened or endangered cultural resources:
    - Do nothing and assess the need for monitoring.
    - Remove or deflect stressors.
    - Modify the resource itself to better withstand stressors.
    - Move the resource– relocate or allow movement to happen.
    - Conduct data recovery and intensive reporting and then let the location go.
    - Record that the resource existed and then let the location go.
    - Interpret the change (climate change is heritage of the future).

USDA Forest Service Approaches – Science for Landscape-scale Conservation

The USDA Forest Service is employing an adaptive management approach at the following levels:

- USFS is establishing a new Forest Planning Rule at the national level for iterative planning processes for each Land Management Plan, which guide resource management and allow National Forest System lands to adapt to changing conditions, including climate change.
- The Inventory, Monitoring and Assessment Strategy supports adaptive management by improving delivery of priority information to decision makers.
- USFS is employing a decision framework of: Problem Structuring, Problem Analysis, Decision Point, Implementation and Monitoring, and Adaptation.
- USFS is thinking in a "Risk Management" framework by considering values at risk, relative vulnerabilities, and balancing risk reduction across multiple risks and costs.
- USFS has adopted a Climate Change Adaptation Guidebook, which calls for taking the following steps:
    - Review – become aware of basic climate change science and integrate that understanding with knowledge of local resource conditions and issues
    - Rank – evaluate sensitivity of specific natural resources to climate change
    - Resolve – develop and implement strategic and tactical options for adapting resources to climate change
    - Observe – monitor the effectiveness of adaptation options, learn and adjust management as needed.

Landscape-scale Energy Action Plan: An Online Decision Support Tool for Energy Developers and Conservation Managers

- As oil and gas wells increase in number, and energy demand continues to increase over time, tools are needed to help biologists, and developers deal with the impacts of energy developments. Goals of the LEAP decision support tool are to provide applicants with information early in the planning process to proactively guide project siting, and provide tools and data that enable field staff to consistently and strategically assess vulnerability of resources to development across the landscape.

- LEAP is a set of web based tools, data and analyses being developed for Region 6 for proactive, landscape scale conservation planning. The tool is being piloted in Wyoming in 2012, with a target release date for the end of 2012.
- LEAP is accessible from the ECOS-IPaC Initial Project Scoping Tool (site specific information) and USGS ScienceBase.
- LEAP could help developers recognize regulatory burdens, identify which conservation elements are likely to be affected, and understand how to avoid or mitigate those impacts. Additionally, LEAP could provide a pathway to other tools that other organizations are developing or have been developed (LCCs, JVs, etc).
- Landscape Scale Vulnerability Assessment (LVA) is a spatially-explicit analysis that ranks the landscape based on relative vulnerability. Intended to guide site selection away from sensitive or high value areas, it alerts developers to areas of high conflict, provides a field officer with a landscape level view, and is intended for use in preliminary site selection.

Scenario planning as a tool for climate change adaptation planning

- Scenario planning is a good tool for addressing uncertainty in climate change. Existing efforts include:
    - ALARM: Assessing Large-scale Environmental Risks for Biodiversity with tested methods.
    - Addressing the Challenges of Climate Change in the Greater Everglades Landscape
    - City of Tucson Water Plan 2000-2050 looked at human behavior and how to best use the available renewable water supplies

Best practices approach to data management

As heard during the Workshop, paying attention to best practices is important because the LCCs have regional autonomy and there are not federal mandates about what LCCs are supposed to do. The goal is to take an approach on the best way to handle cross cutting issues, then inform LCCs so they can make the best decisions. The following was heard during the sessions on a best practices approach to data management:

- The LCC Network, in part through working groups, provides guidance on desired cross-LCC standards or best practices.
- The trick is to ensure the guidance is compelling to Steering Committees and linked with a broad range of existing partner practices.
- Data management investment is important because it encourages data sharing, enables data aggregation, saves time, simplifies research and protects against data loss.
- CSCs founded a group to develop common practices and policies that will be required in proposals beginning in 2012. CSCs will be asked to leverage existing tools rather than develop new ones. Data managers will be placed at each CSC, and this effort will be managed by the National Climate Change and Wildlife Science Center.
- NatureServe's approach to coordinated data management and delivery includes 82 programs in 14 countries with a mission of providing a scientific basis for effective conservation. The following lessons learned were shared:
    - Inter-operability and co-evolution is essential.
    - Programs participate in standards and systems development.
    - Focus on a standard core set of data to work towards.
    - Provide the ability to add custom tables and spatial data to meet local needs.

- NatureServe's 'Biotics 5' is moving to the Cloud. There will be separate databases for each program with the ability to share data and tweet in real time. Hosting the web application will eliminate program costs and enhance delivery.
- Data Basin tries to translate information for people who are not GIS coordinators and best practices include interacting with a variety of people where access is key. Data Basin encourages transparency, as often time the biggest problems are political and social. Details of Data Basin include:
    - Free to use
    - Users control level of access to content
    - Branding permitted throughout the system
    - Users publish their own work to contribute
    - 3,700 registered users
    - Can make public or private working groups, over 200 groups currently exist.
    - There are 8500 data sets
    - Yale Framework has own gateway at databasin.org/yale, because branding is important
- Data management at California Department of Fish and Game is managed by the Bio-Geographic Data branch, which serves as clearinghouse for data in the department and the state.
- Biogeographic Information and Observation Systems (BIOS) is a system for archiving, viewing, and facilitating sharing of biogeographic information.
    - It houses a diversity database that comes from multiple sources.
    - There are nearly 700 different data sets, most of which are publicly accessible.
    - LCCs are encouraged to use the database as a resource, and to mimic the transparency exemplified by this database.
    - Potential roles of LCCs include supporting the generation of interpretive data layers and tools, supporting investment in foundation data, and working with states and partner agencies to maintain similar data standards and practices.
- LCMap is a tool that allows LCC partners from multiple organizations to collaboratively access and analyze common data in near-real time, significantly speeding the transfer of scientific knowledge to management actions.
- LCMap lets GIS analysts access geospatial datasets through ArcGIS desktops and community members can develop derivative datasets from uploaded themes.
    - For example, the Great Northern LCC can load a national phenology, and ArcGIS toolkit with embedded R model. Modelers from all LCCs can connect from their desktop systems, access components, run models, and upload outputs.

Looking forward

Expanding conservation approaches to the landscape scale requires close coordination and collaboration, as well as an understanding of this new paradigm. As repeated throughout the Workshop, LCCs have the unique opportunity to work at this scale and take recommendations from a wide variety of partners to support actions on the ground. Below is a summary of suggested next steps, lessons learned, and future opportunities for LCCs as heard during the Workshop. A summary of Deputy Secretary Hayes' Plenary Session outlining five important steps for the LCC is outlined as it was referenced frequently and neatly captured the main topics heard during the workshop.

- Continue focusing on the human dimensions aspect and make science relevant to the public in order to make headway in the conservation battle.
    - For example, a large part of the landscape is under private ownership in the Eastern states. LCCs need to involve the public and look at this part of the picture. Until the public is thoroughly involved, additional funding will be hard to generate. Making landscape scale conservation relevant to the public is crucial.
    - Outreach and communication is essential to "skate where the puck is going to be."
    - Involving the Tribal and Indigenous community is crucial to establishing partnerships and informing best available science.
- LCCs have been tasked with collecting, sharing, and distributing information, but it is also crucial for LCCs to align regional partnerships to drive toward the same conservation goals.
    - LCCs need examples of how their data is used, and need to be able to share stories of how the data is making on-the-ground impacts.
- Working with the planning community will be integral to monitoring landscape level impacts and achieving on–the-ground conservation outcomes at the landscape level.
- Data coordination is a top priority for LCCs, but LCCs also need to be able to interpret science and inform decisions and policies to be effective cooperatives. Translation of data will lead to conservation delivery, implementation, and informed decision-making.
    - Conservation partners have said that if the information is not translated at a useful scale, and if the partners do not know how to use the data, then it is useless. The data must be interpreted and relevant.
    - Understanding changes across landscapes and mapping across boundaries can be improved by coordinating data.
- LCCs need to empower communities and partners to implement conservation science at a local level.
- Time spent developing relationships cannot be underestimated. Partnerships need care, nurturing, trust, and cultivation.
- LCCs have the opportunity to:
    - Help redefine conservation in a period of climate change
    - Show communities what conservation success could look like
    - Be creative and cohesive
    - Build a national data system and national maps.
    - Reach out to other communities and professions – landscape users, transportation planners – to bridge professional divides and engage in dialogue with others to reach common understanding to blend full suite of needs.
        - For example, the transportation community could benefit from having landscape-level maps and analysis to provide to the FHWA during the planning process.

- LCC Coordinators noted that new cooperatives must be given time to grow and mature while partnerships are built and nurtured.
- LCCs are committed to informing management into the future, but must be given the time to do so. Developing models and translating the data will take time and the LCCs are in the process of working towards these outcomes.
- Landscape-scale conservation should be looked at in a holistic way, similar to the way in which Tribal communities perceive the natural world in different time horizons and make decisions based on seven generations from the present.
- CSC and LCC coordination is becoming more robust as strategic work plans are developed, and policy direction emerges from stakeholders. In 2013, the Northwest CSC and North Pacific LCC aim to fully integrate and harmonize operations.

"Keys to LCC Success" Excerpt from Deputy Secretary David Hayes' Plenary Session

- Focus on the sharing of science and be the clearinghouse where regional managers go to make decisions
- Determine relevance by focusing on issues that are important to the region
- Avoid trying to do too much and focus on major regional conservation issues
- Document success and accomplishments by showing real, on-the-ground difference, sharing information, data and science
- Get everyone at the table to "put skin in the game" by focusing on collaboration with equal and diverse measure of representation with high-level representation