

The Future of the Landscape Conservation Cooperatives:

A White Paper for the National Forum on Landscape Conservation

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“The findings and conclusions in this article are those of the author(s) and do not necessarily represent the views of the U.S. Fish and Wildlife Service.”

1. Introduction

Cooperative conservation has been a priority for the Department of the Interior (DOI) since the early 2000s. Landscape Conservation Cooperatives (LCCs) were established to provide science capacity and technical expertise for meeting shared natural and cultural resource priorities. As a natural outgrowth of DOI’s interest in collaboration across large scales, the Landscape Conservation Cooperatives got their start in September 2009, with the signing of Secretarial Order No. 3289 (S.O. 3289) by then-Secretary of the Interior, Ken Salazar. **“Addressing the Impacts of Climate Change on America’s Water, Land, and Other Natural and Cultural Resources”** represented efforts to establish “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.” As part of S.O. 3289’s implementation, the Department of Interior established LCCs, to be administered primarily through the U.S. Fish & Wildlife Service (USFWS) but also Bureau of Reclamation, National Park Service, and Bureau of Land Management. The SO also established Climate Science Centers, administered through the U.S. Geological Survey. LCCs were established to facilitate coordinated responses to climate change and other stressors on a landscape-scale basis, where it was recognized that “Interior bureaus and agencies must work together, and with other federal, state, tribal and local governments, and private landowner partners, to develop landscape-level strategies for understanding and responding to climate change impacts.” The emphasis on climate change in the SO for LCCs was because it was expected Congress would implement a cap-and-trade program and DOI would require collaborative partnerships around climate change adaptation to meet that need. When cap-and-trade legislation was not enacted, the emphasis on environmental stressors for LCCs has naturally become more diverse, with varying levels of emphasis on climate change as determined by the needs of the partnerships.

In federal fiscal year (FY) 2010, Congress appropriated \$20 million in base operations to establish the first 9 LCCs and the USFWS Science Applications program to provide administrative support to the LCC Network. In FYs 2011 and 2012, the remaining 13 LCCs were stood up bringing the total number of LCCs

to 22. Subsequent appropriations to support LCCs have ranged from \$20 - \$30 million, with the most recent allocations (FY16 and 17) at approximately \$24 million. Each LCC is allocated between \$400,000 and \$1,000,000 annually to support staff and science projects. The current President's FY18 budget request has targeted LCCs and associated Science Support within USFWS for elimination.

Early Genesis of LCCs

The genesis of LCCs was built on a long history and foundation of landscape-scale conservation which has evolved over the last century, and especially over the last 40 years. In particular, the Migratory Bird Joint Venture program is often pointed to as a taxonomically-focused model for landscape-scale conservation. Joint Ventures operate as non-regulatory partnerships in support of national and international bird conservation plans. LCCs are designed to operate through a similar structure of a non-regulatory, voluntary partnership, but with a broader purpose of sustaining natural and cultural resources in the face of a changing climate and other global changes.

A key figure in the early genesis of LCCs was Sam Hamilton, former Director of the USFWS. Sam's philosophy and early thinking on large-scale conservation had been richly influenced during his time as Regional Director of the USFWS Southeast Region, and through his direct participation as Chair of the Lower Mississippi Valley Joint Venture (LMVJV) Management Board. Sam's work with Charles Baxter, LMVJV Coordinator, produced a number of cutting-edge, science-management conservation accomplishments, in particular the development of large-scale geospatial datasets and decision-support tools that enabled partners to visualize conservation impacts at a landscape scale. Sam and Charles were also some of the early pioneers in developing strategies for mitigating climate change impacts in the Lower Mississippi Valley through carbon sequestration actions by restoring bottomland hardwood forests over large acreages. Much of this work was done in the early 2000's during the time of the George W. Bush administration, even though the Bush administration didn't formally recognize climate change as an important environmental issue until 2006.

When Sam Hamilton was approved as Director of the USFWS in 2009, he brought all of his experience and long history of landscape conservation thinking, and passion for tackling the climate change issue¹, to Washington, D.C. with him. His thinking was influenced, by a seminal document authored by Charles Baxter² in 2006, entitled "Responding to the Changing Nature of Conservation: An Open Letter to the Directorate on Shaping the Service Future". In this open letter, Baxter lays out a case for an emerging conservation paradigm in the 21st century that is more of a "conservation enterprise" that consists of well-integrated components of planning, implementation, monitoring, evaluation, and research.

¹Testimony of Sam D. Hamilton, Regional Director, Southeast Region, U.S. Fish and Wildlife Service, Department of the Interior, before the House Appropriations Subcommittee on Interior, Environment and Related Agencies, Regarding Climate Change. April 26, 2007 -

<https://www.doi.gov/sites/doi.gov/files/migrated/budget/appropriations/2008/upload/08HamiltonTestimony.pdf>

² From USFWS/NCTC – Conservation Heroes: "Charles described both his legacy and his hopes for the future of American Conservation; '21st century resource challenges facing the wildlife community at large and the service in specific is not of making transformational change within the conservation discipline and society as a whole. It is one of transitioning from the 20th century resource management business model to a 21st century conservation science business model. The Service is uniquely positioned, and perhaps even obliged, to lead by example'."

Standing Up and Organizing LCCs

The first 3 years of LCC existence involved standing up LCCs and establishing administrative structure(s) and procedures to facilitate an effective working relationship with LCC partners: hiring staff, including coordinators, science coordinators, and other support staff (e.g., geospatial specialists, data management staff, communications specialists, etc.); establishing Steering Committees and other partner-based committees or working groups; developing charters and other LCC governance documents to guide LCC activities; identifying science priorities and establishing processes for funding science projects approved by Steering Committees.

By 2013, the LCC Network had adopted a vision³ and was in the process of developing its first network-wide Strategic Plan. The Network had also begun to organize itself into a LCC Coordinator's Team (LCT), LCC Science Coordinators' Team (LSCT), LCC Communications Team, and LCC Data Management team to further solidify the organizational and functional elements of the LCC Network by meeting regularly through monthly phone calls and establishing communities of practice. In 2012, discussions began by a diverse group of stakeholders on whether or not to establish an LCC Council which would work with the National LCC Coordinator and LCC Network to further the goals and objectives of the Network. Other early accomplishments of the LCC Network included the completion of the Network's first Strategic Plan⁴ in 2014 and a LCC Network Conservation Science Plan⁵ in 2015.

The LCC Council was established and met for the first time in February 2014, and has met regularly since. The purpose of the LCC Council, as expressed in its charter⁶ is to "support the cooperative conservation and sustainable resource management efforts of the LCC Network, to assist the LCC Network in achieving its goals, to contribute to building a constituency of partners, and to help sustain the LCC initiative." The LCC Council is comprised of up to 31 members, representing federal, state, tribal, international, non-governmental organizations, and major partnerships, and is currently chaired by Lynn Scarlett of The Nature Conservancy, and Tony Wasley of the Nevada Department of Wildlife.

Individually, LCCs are self-directed by a Steering Committee comprised of federal, state, tribal, non-governmental, and other organizations that collectively represent the multi-jurisdictional conservation interests and stakeholders of the LCC geography. Most LCCs also establish science teams and other work groups (e.g., geomatics, data management, human dimensions, communications) to facilitate the technical and scientific objectives of the LCC. Collectively, the LCC Network is comprised of the vast array of organizations and individuals that are represented on LCC Steering Committees and teams, the LCC Council, and LCC staff. Currently, the LCC Network is represented by more than 300 organizations and over 1,000 individuals.

³ LCC Vision - Landscapes capable of sustaining natural and cultural resources for current and future generations.

⁴ <https://lccnetwork.org/resource/landscape-conservation-cooperative-network-strategic-plan>

⁵ <https://lccnetwork.org/resource/science-plan>

⁶ LCC Council Charter - https://lccnetwork.org/sites/default/files/LCC_Council_Charter_9-21-15.pdf

National Academy of Sciences Review of LCCs

In 2015, the National Academy of Sciences (NAS) convened an ad hoc Committee⁷ to conduct a review of LCCs, which had been mandated by Congress in their FY2014 appropriations language. The review was completed in December of that same year, and a report was subsequently published, entitled “A Review of the Landscape Conservation Cooperatives”⁸. That report contains a summary of the early accomplishments of LCCs (Chapter 6, pp. 61-71). The Committee concluded the LCCs had made important strides in accomplishing many early objectives related to organization such as successfully convening steering committees, establishing a governance process, developing strategic plans, and identifying shared goals and objectives. In addition, most LCCs had conducted vulnerability assessments, developed various geospatial data products and decision support tools, developed landscape conservation designs, and initiated collaborative multi-LCC projects such as the Mississippi River/Gulf Hypoxia Initiative. For detail on some of these efforts see the appendix. All of these examples were identified by the NAS as representative of good early progress by the LCC Network.

Even with the numerous early accomplishments of LCCs cited in the NAS review, the Committee believed that the LCC program was too early in its existence to conclude “whether the LCC program has resulted in measurable improvements in the health of fish, wildlife, and their habitats,” as requested by Congress. Even so, the NAS review concluded that “the nation needs to take a landscape approach to conservation and that the U.S. Department of the Interior is justified in addressing this need with the Landscape Conservation Cooperatives,” and “that the LCC Network is unique in that no other federal program is designed to address landscape conservation needs at a national scale, for all natural and cultural resources, in a way that bridges research and management efforts.” These conclusions reaffirmed the critical importance of landscape-scale conservation in the 21st century, and that LCCs were uniquely suited to address this critical need.

The NAS Committee also made several recommendations to improve the performance of LCCs, including how they interact with other large-scale conservation programs and how they evaluate their progress:

- “DOI should review the landscape and habitat conservation efforts, especially the Joint Ventures and the LCCs, to identify opportunities for improved coordination between these efforts.”
- “Special consideration should be given to the limited capacity of state agency partners to participate in multiple efforts simultaneously.”
- “The LCC and CSC programs should be more clearly delineated. They should explicitly state how their research efforts differ and how they complement each other, identify and build on existing

⁷ Committee on the Evaluation of the Landscape Conservation Cooperatives; Board on Atmospheric Sciences and Climate; Board on Agriculture and Natural Resources; Division on Earth and Life Studies; National Academies of Sciences, Engineering, and Medicine

⁸ National Academies of Sciences, Engineering, and Medicine. 2016. *A Review of the Landscape Conservation Cooperatives*. Washington, DC: The National Academies Press. DOI: 10.17226/21829.

examples of coordination across the LCC Network, and make adjustments as appropriate. At the regional scale, LCC coordinators and CSC federal directors should coordinate their activities, including calls for proposals, as much as possible to avoid duplication of effort.”

- The NAS review acknowledged the importance of Landscape Conservation Design to LCC efforts, but found LCC Network guidance about Design should be improved.
- “Establishment of metrics at the individual and network-wide scales should become a high priority.”
 - LCCs should conduct a network-wide evaluation on an ongoing basis to guide the work of the LCC Network as a whole. LCCs should also perform periodic evaluations for specific LCCs that have existed long enough to have had a perceptible impact on “end outcomes.” Performance measures should align with LCC Network strategic goals.
 - The LCC Network should improve its evaluation process to better capture the contributions made by all partner agencies or groups toward common objectives.

In response to the NAS review of LCCs, the LCC Network undertook a multi-faceted effort to address the Committee’s recommendations. Teams were established to: 1) implement actions to facilitate more effective coordination between LCCs and other landscape-scale partnerships (i.e., Joint Ventures and Fish Habitat Partnerships) and between LCCs and Climate Science Centers; 2) develop guidance on LCC-supported Landscape Conservation Designs; and 3) update the LCC Network Strategic Plan and establish performance metrics.

2. Summary of Existing Challenges/Barriers

The election results of 2016 fundamentally changed the course of landscape conservation within the federal government. After more than a decade of solid leadership in the realms of climate change and landscape conservation, the mindset of the current administration is to discontinue the federal government’s investments, both financial and staff capacity, in the LCC program. They also suggest that other partners may assume the management of LCCs, albeit with little to no financial resources or capacity from the federal government.

The NAS Review of LCCs addressed the likely outcomes of a divestiture of funding and capacity support for LCCs, or programs like LCCs; it’s worth citing that section of the report in this white paper:

“As outlined above, important lessons can be learned from other landscape conservation programs that have existed much longer. Critical components that are important for such collaborative efforts include a unifying theme, strong stakeholder engagement, adaptive management, strategic planning efforts, metrics to aggregate project impacts, leveraging, and a lead agency that provides resources and leadership. Based on the discussion above, the LCCs have most of these components in place. As discussed in Chapter 3, the overall LCC Network’s goals, structure, and functions are consistent with the landscape approach, including the components outlined above, and therefore it should be in a position to deliver on its long-term

goal of improving cultural and natural resource management. However, a firm financial commitment seems essential to sustaining the LCCs.⁹

Without adequate funding or staff support, LCCs and the LCC Network will cease to exist as a systematically-organized functional force in landscape conservation. There are discussions ongoing among LCC Council members and within some individual LCCs to continue operations under the management of non-federal partners. While this may prove to be a viable solution to at least maintain some level of continuity for specific LCCs or in some sections of the country, it will be important to guard against these efforts becoming a series of disconnected landscape conservation efforts that may not be meaningful at the national and international scale. Furthermore, no single non-federal partner—and particularly states—have a mandate or jurisdiction that allows or encourages them to coordinate at a coast-to-coast geographic or international level; this suggests that federal coordination is warranted if it's done with full recognition and appreciation for the individual authorities and mandates of individual partners in the LCCs.

Issues include discontinued funding, lack of capacity, and lack of political and institutional support. Because of the importance of landscape conservation as documented by the NAS in their review, and all of the foregoing information, strong support from leadership is needed at the Department and USFWS levels. Another challenge has been the “pause” the DOI has placed on all meetings of advisory groups and committees while they review the charter, charges, and membership of the 200 plus boards, committees, subcommittees, commission, and other internal and external advisory bodies. Since May 2017, employees (coordinators and other DOI employees) have been unable to organize LCC meetings, resulting in abrupt cancellation or postponement of LCC Steering Committee meetings during a critical time when the steering committees could be evaluating alternative organizational funding, and governance models. Also, several long-standing senior executive staff who provided critical leadership in the development and sustaining of LCCs have been reassigned as part of the new administration's agency transformation efforts. These challenges have resulted in lack of consistent direction for LCC Network staff as the work they have been dedicated to for seven years, and they themselves, face an uncertain future. These are critical challenges that must be addressed by the broader community interested advancing landscape-scale conservation actions.

A challenge since the beginning, the initial roll-out of LCCs in 2010 was poorly executed -- many partners felt the LCCs were forced on them (the concept was created by a limited number of staff in a single agency and did not engage partners in its creation). As a result, the LCCs were not uniformly embraced by partners. While the “roll-out” can never be undone and early resistance or lukewarm acceptance from some partners has persisted, positive strides in partner relationships have been achieved in recent years. There is interest in the program such that there are occasional Congressional requests for briefings on the LCC program and the previously uninterested House has provided funding in their last two appropriations bills.

⁹ National Academy of Sciences - A Review of the Landscape Conservation Cooperatives: Chapter 6: An Assessment of the Early Accomplishments and Likely Long-Term Outcomes and Impacts of the Landscape Conservation Cooperatives Network; pg.71. Note: underline is emphasis added and not a verbatim citation.

Another long-running challenge experienced by virtually all LCCs is the challenge of partner fatigue.

This issue is one referenced in the NAS Review of LCCs, specifically as it applies to state fish and wildlife agencies, and may be a cause of some of the resistance that LCCs have experienced over the years. Partner fatigue can result when a partner lacks the staff capacity to effectively participate in partnership-driven conservation efforts. In some cases, agencies simply do not have the staff capacity to provide representatives to sit on all geographically- or topically-relevant Steering Committees or Boards. For example, several states have 4 or 5 LCCs which cross their state boundaries and it can be challenging to participate in even one steering committee. In other cases, there are multiple landscape-scale partnerships that may overlap LCC geographies, and it can be difficult for some partners to participate in all of these efforts. The NAS Review of LCCs recognized partner fatigue as a challenge for LCCs, and recommended that LCCs and Joint Ventures and Fish Habitat Partnerships coordinate more effectively, partly in response to that challenge, but also to ensure there is not redundancy between the programs, and to increase overall conservation outcomes. To address this limitation in some regions, a constellation of LCCs have combined initiatives on a particular topic or split out topics among themselves, resulting in states or organizations choosing which LCC to participate in based on their perceived relevance of those topics. Another related challenge is that participants in the LCC Network may not communicate with their home organizations about the work of the LCC and how it is benefiting their organization's mission and goals. This can leave organization leadership with the belief that the LCCs are not useful to them and not contributing to their needs.

A final, multi-faceted challenge impacting the LCC Network since its earliest days is its identity. Given that LCCs were established through a DOI SO, LCCs inherently have a responsibility to develop responses to global changes, including climate change. Lacking a unifying vision, the LCC Network has established a variety of priorities, reflecting the diversity of their partners and their partnerships' priorities, and to some extent, the regional and cultural differences that exist across the Network. This has been effective at ensuring development of priorities locally but has presented challenges with developing an overall unifying vision for the Network and in communicating what the Network is. Related to this is confusion surrounding how LCCs, CSCs, JVs, and Fish Habitat Partnerships and other partnerships are unique and complementary. In addition, as part of their self-directed nature, LCCs were given no standard guidance on data management, including where data is housed, resulting in a collection of individual LCC databases and only a limited, static, single repository of information, products, and tools from all LCCs, making it difficult to assess cumulative contribution of the Network. All of this, initial skepticism about the network, and the fine tension between the self-directed nature of each LCC and being part of a network has contributed to lack of understanding even by some who have engaged in the LCCs as to what the LCCs are, how they are different, and what their value added is. Obviously, there is a need to clearly define identify, including uniqueness and added value. In recent years, the LCC Network has had extensive discussions around the idea of "an ecologically connected network of landscapes and seascapes", and this is emerging as a potential unifying purpose for LCCs.

3. The Legacy of LCCs

In its short history, the LCC Network has accomplished a great deal, building from scratch a network of 22 LCCs across the North American continent, Pacific Ocean and Caribbean Sea. The network of groups

and individuals actively participating in LCCs has grown to over 300 different agencies and organizations, representing thousands of individuals across a diverse conservation community. The LCC Network has also achieved much innovative and collaborative science, through a variety of funding mechanisms that has leveraged not only USFWS LCC dollars and scientific capacity, but funding and capacity from a wide variety of governmental and non-governmental agencies as well. It is not within the scope of this white paper to provide an overview of the science accomplishments that have been supported through the LCC network; however, Appendix A provides a listing of many of these projects and accomplishments, and the authors invite readers to review them to get a sense of the broad spectrum of work that has been completed through the LCC Network. Rather than a one-off list of research studies, the LCC Steering Committees have largely directed systematic and sequential packages of projects that reflect stakeholder-driven needs for science and tools that have direct input from end users through a co-development model.

LCC admirers often hone in on the power of the Cooperatives and how important collaboration across boundaries and jurisdictions has been. The projects and products that are the result of these collaborations are diverse and vast with many influencing on-the-ground conservation decisions (Appendix A). The LCC Network has been addressing the challenge of having 22 separate places to archive, update, and search information, and by November all of these tools and projects will be housed in [ScienceBase](#), a publicly available, centralized, on-line repository created by USGS. This repository may serve as a model for displaying and transferring project outcomes produced by other programs inside and outside federal agencies.

In finalizing their response to the NAS review, the LCC Network is completing a Performance Evaluation framework for large scale conservation collaboratives that can serve as a foundation for other network's efforts. Originally envisioned as a path forward for the LCC Network, it is hoped this framework can provide guidance and lessons learned for future landscape conservation networks in developing measures important to assessing network effectiveness and accomplishments.

The LCC Network has also completed guidance on Landscape Conservation Design that it hopes will be used by others who want to conduct collaborative conservation planning at large scales. A definition of design and 8 characteristics were identified: 1) Collaborative/Multi-sector/Partner-Driven; 2) Shared Goals; 3) Holistic/System Level; 4) Conservation Features; 5) Desired Future Conditions; 6) Assessment/Situation Analysis; 7) Strategies; and 8) Iterative/Adaptive. Based on their experiences in developing designs, staff also created a set of 50 recommended practices which included demonstrative case studies. This detailed document on recommended practices is expected to be used by practitioners who are initiating their own designs. An interactive Mapper explores 26 of the LCC-supported Designs currently being developed. All of the LCC guidance developed in response to the NAS review can be found at <https://lccnetwork.org/issue/landscape-conservation-planning-and-design>.

The LCC Network experiment has revealed the importance of collaboration across scales as large as the North American continent and across the entire Pacific Islands. LCCs have demonstrated there is a willingness among diverse interests to come together, set shared priorities and work collectively to achieve common goals while also working within the constraints of their own organization's missions,

expertise, and authorities. This 21st century conservation paradigm offers hope (and essential) for ensuring our important natural and cultural resources are sustained in the future. We can do more together than we can ever accomplish separately.

4. Recommendations for Moving Forward

At the time of this writing, the future of the LCC Network remains uncertain. While the President's FY18 budget discontinued LCC funding, the House Appropriations committee has included funding for LCCs in its budget bill, and the Senate has yet to determine its budget. Most LCC staff are federal employees, and are required to support the President's budget request (including no funding for LCCs in FY18), although the President's request also includes language encouraging other entities to manage the Network¹⁰. One thing is certain, should the LCC Network continue, it will change significantly; there are some efforts underway involving key partners, particularly states, to determine the essential functions of the Network and how those might be continued into the future.

The Resilient Lands and Waters initiative produced a report containing numerous challenges and lessons learned from seven partnerships working at large scales. Those recommendations are appropriate to consider as we contemplate a future landscape conservation network¹¹. Additionally, if the network continues without federal support and ultimately transforms, the following essential elements should be incorporated into a new collaborative landscape conservation enterprise:

1. **Ensure all relevant organizations are involved in and have ownership** in the discussion of how to transform the network.
2. Every effort should be made to **ensure diversity in funding and in-kind resources**; ideally all partners would contribute (and be recognized for) resources to the partnership whether it be expertise, office space, funding, or staff coordination capacity. We have learned the "backbone" function is essential to maintaining the partnerships -- coordinators must exist.
3. **Participation and buy-in from states (fish and wildlife agencies) and federal land managing agencies is essential.** These agencies have a fundamental responsibility for managing the nation's trust resources, and thus must be at the table contributing to the success of any landscape-scale conservation enterprise.
4. **Be explicit about the partner's authorities** -- i.e., recognize that State Fish and Wildlife Agencies, Tribes, USFWS and NOAA are co-trustees for wildlife resources, having specific, complementary, and sometimes overlapping authorities. Recognize other authorities for cultural resources; all partners must recognize those authorities and acknowledge their roles.

¹⁰"In FY2018, the Service encourages other LCC participants—such as States and other entities—to assume management of LCCs in the absence of dedicated FWS funding." (<https://www.fws.gov/budget/2018/FY2018-FWS-Greenbook.pdf>)

¹¹ 2016. The Resilient Lands and Waters Initiative. A report to the Council on Climate Preparedness and Resilience and the Joint Implementation Working Group of the National Fish, Wildlife, and Plants Climate Adaptation Strategy. <https://www.wildlifeadaptationstrategy.gov/pdf/RLW-Final-Report.pdf>

5. **Make strategic, concerted efforts to coordinate with existing partnerships, including Joint Ventures, Fish Habitat Partnerships, and the Network for Landscape Conservation.** Consider joint meetings or other ways to avoid partner fatigue. Develop a common purpose and vision among these groups, with distinct messages on the need for landscape conservation, and how the partnership entities should interact and coordinate in the future. Demonstrate synergy and complementarity with other entities in visioning conservation purposes.
6. **Identify, advocate for, and develop a funding stream(s) for implementation of conservation strategies.** The most successful conservation initiatives are those with effective plans and consistent, secure funding for implementation, tracking, evaluation, and application of performance metrics for adaptive iteration and refinement of conservation strategies.
7. **Create a common, comprehensive data management system** from the beginning that is easily accessible in one location.
8. **Refine and use the performance evaluation framework for evaluating effectiveness.** Plan for this from the initiation of the transformation.
9. Carefully **consider the tension between the need to be a locally-driven partnership and the benefits of being part of a network** with common elements such as data management, communications, development of a core identity, and distinction from other entities that could be perceived as like elements.
10. **LCC partnerships provide what is recognized in Adaptive Leadership as “holding environments”**—as there are relationships and norms already established within the steering committees that allow them to quickly begin work on major emerging issues when they arise. This isn’t to say there aren’t challenges, but existing partnerships are more prepared to work together than if they were coming together for the first time.
11. **Ensure that participants are communicating effectively within their home organizations**--both relaying important contributions and efforts of the partnership, as well as gathering input from their colleagues to ensure they best represent their organization’s views as steering committee members. We have found that participating organizations and especially executive leadership frequently are not aware of the significant contributions the LCCs are making to help them meet their objectives.
12. As demonstrated in this white paper, **communication of successes and benefits of partnership is essential** so that all are aware of the contributions and can use them and communications should happen frequently by the partnership and the organizations that belong to it.

The NAS concluded that the landscape approach to conservation is important for the future of natural and cultural resources in our country. If this important work is to continue, network participants and the interested conservation community at-large must be prepared to take a larger role in supporting a network of collaborative conservation while relying less on federal government support. Discussion within the conservation community needs to happen quickly to explore viable options and move to action to continue a North American-and-beyond, integrated landscape conservation network. The LCC Network has demonstrated successes and identified lessons learned that can be used to shape a new and improved next iteration forward.

Appendix A

LCC	Accomplishment	Description	Other Accomplishments
Multi-LCC - Gulf Coast Prairie, Gulf Coastal Plains & Ozarks, South Atlantic, Appalachian, Peninsular Florida, and Caribbean	<p>Southeast Conservation Adaptation Strategy (SECAS)</p> <p>http://secassoutheast.org/</p>	<p>SECAS is a shared, long-term vision for lands and waters to sustain fish and wildlife populations and improve the quality of life for people across the southeastern U.S. and Caribbean.</p> <p>The SECAS plan, with a target date of 2060, enlists business, industry, and the military — entities not typically synonymous with conservation — to help set shared priorities and provide regional focus for investments across organizations, disciplines, and partnerships to maximize on-the-ground results.</p> <p>SECAS was initiated by the 15 states of the Southeastern Association of Fish & Wildlife Agencies (SEAFWA) and the federal Southeast Natural Resource Leaders Group. In setting up the Strategy, southeast state fish and wildlife agency directors through SEAFWA made a specific request to the U.S. Fish and Wildlife Service to use the six southeast LCCs as the foundation for the collaborative partnership.</p>	<p>SECAS Blueprint: The SECAS Blueprint stitches together the work of the six LCCs into one map of shared conservation and restoration priorities across the Southeast U.S. and Caribbean, which can be used to illustrate how local decisions fit into a larger landscape. The LCCs also provides forums for state, federal, private sector and non-governmental organizations to identify science needed for success.</p>
Multi-LCC - Eastern Tallgrass Prairie and Big Rivers (lead), Upper Midwest and Great Lakes, Great Plains, Gulf Coast Prairie, and Desert	<p>Ecological Places in Cities (EPiC)</p> <p>https://tallgrassprairiebcc.org/issue/urban-conservation</p>	<p>EPiC uses a “Collective Impact” approach to convene the ecological and urban communities to integrate both science and socioeconomics objectives in a Landscape Conservation Design that guides and promotes urban conservation practices, using the</p>	<p>A Monarch’s View of the City – guidebook and tools for urban planners: The Tallgrass Prairie LCC, in partnership with the Keller Science Action Center at the Field Museum in Chicago and the U.S. Fish and Wildlife Service, have developed a set of tools to inform the creation of pollinator habitat in the places we</p>

		<p>Monarch flyway as an initial test-run for broader urban conservation priorities.</p> <p>With funding from the U.S. Fish and Wildlife Service and multiple LCCs, experts at the Field Museum of Chicago are leading “A Monarch’s View of the City” to develop ecologically and socially relevant map-based designs. This initiative of the emerging EPiC network is focused initially on key metropolitan areas along the butterfly’s migration corridor: Chicago, Kansas City, Minneapolis-St. Paul, and Austin, Texas.</p> <p>This EPiC initiative provides planning tools, landscape conservation plans, on-the-ground habitat development, and workshop guidelines to help communities get started. By incorporating geographic, biological, and social science data, the framework prototypes defined objectives, metrics, stakeholders, and best management practices to match each city.</p> <p>One of EPiC’s first milestones is a partnership with the City of St. Louis mayor’s Office of Sustainability to expand and evaluate the Milkweeds for Monarchs project that is establishing over 350 monarch gardens through engagement with 50 schools and liaisons to 79 neighborhoods to commemorate the city’s 250th anniversary.</p>	<p>live, work, and play. The tools were developed in four pilot cities – Austin, Chicago, Kansas City, and Minneapolis-St. Paul – and they can be modified to expand to more cities. We are currently working with partners to share these tools and inform monarch conservation delivery in cities and towns across the monarch butterfly’s migration corridor. This initiative shows that cities do matter for monarch conservation, and can be places where both people and pollinators can thrive. https://tallgrassprairiebcc.org/issue/monarch-butterflies</p>
<p>Multi-LCC - Plains and Prairie Potholes, Upper</p>	<p>Gulf Hypoxia Initiative</p>	<p>Runoff from the Midwest and Mississippi Alluvial Valley currently</p>	<p>Precision Conservation Blueprint upgrades to version 1.5: To date, over a dozen diverse</p>

<p>Midwest and Great Lakes, Eastern Tallgrass Prairie and Big Rivers, Appalachian, Great Plains, Gulf Coast Prairie and Gulf Coastal Plains and Ozarks</p>	<p>https://tallgrassprairielcc.org/issue/gulf-hypoxia</p>	<p>contributes the greatest nutrient load to the Gulf of Mexico hypoxic zone to the point where large areas off the Gulf coast can no longer support living aquatic species.</p> <p>Modifying the design or shifting the location of conservation practices, including grassland habitat, can provide benefits for wildlife, water quality, biofuels and agriculture, making program dollars go farther and appeal to more land managers.</p> <p>The Precision Conservation Blueprint v1.5 consists of multiple, measurable objectives representing:</p> <ul style="list-style-type: none"> ● Sector-based interests of wildlife, water quality, energy and agriculture; ● A tiered set of conservation strategies to achieve those objectives within five production agriculture systems — corn and soybeans, grazing lands, floodplain forest, rice and cotton; and ● A modeling approach to determine where to best implement those actions within four key ecological systems of the Mississippi River Basin. <p>Additional scenario planning for landscape change could provide forecast and adaptation in response to ecological or economic drivers.</p> <p>The Precision Conservation Blueprint</p>	<p>agencies and organizations have used the multi-LCC Gulf Hypoxia Initiative - Precision Conservation Blueprint to inform conservation investments for their programs. For example, Decatur County (IN) revised its County Comprehensive Plan utilizing the data layers to show how protection of locally important habitats can contribute to larger Gulf hypoxia goals. The Upper Mississippi River & Great Lakes Region Joint Venture utilized the Blueprint to target waterfowl habitat conservation investments based on biological and social parameters. Future applications could connect coverage of planning tools from the western CHAT and southeast SECAS across the Mississippi Basin. Over this past year, The Conservation Fund updated the online Blueprint with more than 75 new data layers.</p>
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<p>Multi-LCC</p>	<p>Vulnerability Assessment for the Gulf of Mexico</p> <p>https://lccnetwork.org/resource/GCVA</p>	<p>The Gulf Coast Vulnerability Assessment (GCVA) evaluated the effects of climate, sea level rise, and urbanization on four Gulf Coast ecosystems and 11 associated species, highlighting the vulnerability of salt marsh habitats and Kemp’s Ridley sea turtles.</p> <p>The GCVA and its highly collaborative team of 12 organizations and >60 experts received the U.S. Fish and Wildlife Service’s inaugural Sam D. Hamilton award for “transformational conservation science.”</p>	<p>Incorporating Future Change into Current Conservation Planning: Evaluating Wetland Migration along the Gulf of Mexico under Alternative Sea Level Rise and Urbanization Scenarios: The Gulf Coastal Plains and Ozarks, Gulf Coast Prairie, Peninsular Florida, and South Atlantic LCCs partnered to develop a decision support tool that identifies where future coastal wetlands are likely to persist, to “migrate” inland, and to be lost under various scenarios of both sea level rise and future urbanization. The model also identifies where current and future development are likely to come into conflict with marsh migration due to sea-level rise. Because salty water is a threat to infrastructure development as well as many plants and animals, the models could be combined with information on pipeline and/or transmission line locations to identify pinch points and prioritize action to conserve both gray and green infrastructure.</p>

<p>Multi-LCC - Great Basin, Great Northern, Southern Rockies, Plains & Prairie Potholes</p>	<p>Support for Greater Sage-grouse Conservation</p> <p>https://lccnetwork.org/issue/sage-steppe</p>	<p>LCCs across the western U.S. have provided vital support to the 11-state coalition created to conserve the greater sage-grouse. LCC work has informed the design of wildland firebreaks, sagebrush steppe habitat restoration, and assessments of the health of sage grouse in areas targeted for conservation efforts. State and federal land and wildlife managers are now using a comprehensive geospatial map and database to share the best available science and build a comprehensive picture of sage-grouse conservation.</p> <p>Building on work from previous years, the Great Basin LCC continues to support research into sagebrush habitat conservation and rehabilitation. In partnership with the Western Association of Fish and Wildlife Agencies' (WAFWA) Fire and Invasives Team and the Bureau of Land Management, the Great Basin LCC supported the development of a strategic, multi-scale approach to manage threats to sagebrush ecosystems, Gunnison sage-grouse and greater sage-grouse in the eastern range using resilience and resistance concepts. The approach is described in a report published by the U.S. Forest Service Rocky Mountain Research Station in December 2016.</p> <p>The Great Northern LCC supported the</p>	<p>The scale of sage-steppe conservation currently being implemented overshadows any previous efforts. The four relevant LCCs — Great Northern, Southern Rockies, Plains and Prairie Potholes and the Great Basin LCCs — and USDA's Natural Resources Conservation Service through the Sage Grouse Initiative are currently investing in spatially targeted sage-grouse habitat conservation practices and acquisition of perpetual conservation easements that benefit sage-grouse and other sage-steppe species.</p> <p>Likewise, substantial partnership-driven efforts are underway through the Intermountain West Joint Venture, Western Association of Fish and Wildlife Agencies. In addition, the four relevant LCCs are investing in the development of science products and further collaboration through a Sage Steppe Forum.</p> <p>The level of science, planning, and habitat conservation delivery in the sage-steppe presents a unique opportunity for the LCCs to help their partners build a lasting and durable construct for sage-steppe conservation.</p>
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<p>Multi-LCC - Aleutian & Bering Sea Islands, Western Alaska, North Pacific, and Arctic</p>	<p>Coastal Resilience and Adaptation Workshops http://www.northernlatitudes.org/</p>	<p>Four Alaskan LCCs convened five regional workshops focused on helping decision makers of tribes, communities and agencies access information and build professional networks to help them adapt to rapidly changing conditions on Alaska's coasts. These workshops, held in late 2016, were organized by 17 entities and attracted 300 decision makers from 52 tribes as well as 16 state and federal agencies.</p> <p>Participants in these workshops focused on resilience and adaptation tools, opportunities and needs. Many participants commented how it was a unique and powerful experience to work with so many agencies, Tribes, and research partners in an environment designed so that all participants had a voice and could learn from each other.</p> <p>These workshops have led to the formation of a group calling itself "Adapt Alaska" that intends to continue to promote and champion resilience and adaptation measures in western Alaska and throughout the state.</p>	

<p>Aleutian and Bering Sea Islands</p>	<p>Commercial Shipping Vulnerability Analysis</p> <p>https://absilcc.org/science/SitePages/MVT%20gifs.aspx</p>	<p>Each year, thousands of deep-draft vessels transit the Aleutians using trans Pacific and other transportation routes through the Bering Sea, which poses a variety of significant environmental risks to the landscape’s natural including contaminant spills, disturbance of marine mammals and seabird habitat, invasive species introductions, and direct mortalities resulting from collisions.</p> <p>The Aleutian & Bering Sea Islands (ABSI) LCC supported the first-ever analysis of these shipping routes, which was used to informed to establish five Areas To Be Avoided (ATBAs) in the Aleutians by the U.S. Coast Guard to the International Maritime Organization.</p> <p>The recommended routes promote safer vessel transit and reduce potential risk to seabird colonies by 17%, and to endangered Steller sea lion rookeries and haul-outs by 21%, while adding only a tiny fraction to the overall distance of the voyage between the Pacific Northwest and Asia. The recommend ATBAs went into effect in 2016 and the vast majority of vessels are following the guidelines, resulting in less risk of vessel groundings and disruption in operations.</p>	<p>Simulation Marine Traffic Model: The Aleutian & Bering Sea Islands LCC and partners developed a simulation model to better show how various projections associated with increased marine traffic in the Bering Sea may occur in coming decades. These simulations are able to help communities and managers better understand future patterns of traffic in the Bering Sea region as a whole, and look more specifically at possible changes in key areas of concern like the Bering Strait.</p> <p>Following vessel activity analysis and considering vessel type, transit routes, route timing, routing speed, and ports of call, ABSI developed a novel agent-based, spatially-explicit, baseline model of current marine vessel traffic patterns. The LCC then applied projections about changes in traffic volume from a report by the U.S. Committee on the Marine Transportation System detailing the 10-year projections of traffic through the Bering Strait to develop a possible future scenario of vessel activity.</p> <p>This work builds on ABSI’s three-year effort to help managers and communities understand vessel traffic in the Bering Sea and Aleutian Islands that has helped to establish safer vessel operations in the Aleutians. Project partners include the National Park Service, Geo-dimensions LLC, and the Wildlife Conservation Society.</p> <p>https://lccnetwork.org/resource/disabled-vessel-drift-bering-sea-and-aleutian-islands</p>
<p>Appalachian</p>	<p>Appalachian Energy Forecast Model</p>	<p>The Appalachians are a landscape filled</p>	<p>Tennessee River Basin Network: The</p>

	<p>http://applcc.org/energy/</p>	<p>with globally significant biological diversity and cultural resources that provides essential benefits to large cities and surrounding human communities. The region is also rich in energy resources that meet national and regional demands for energy.</p> <p>As natural gas, oil, and wind energy development expand along with traditional coal, there is an increasing need for research to inform discussions on how to meet immediate and future energy needs while sustaining the health of natural systems.</p> <p>To help address this need, the Appalachian LCC with The Nature Conservancy released a study and online mapping tool that addresses traditional and emerging energy development potential and trends across the region stretching from Alabama to New York.</p> <p><i>Assessing Future Energy Development</i> provides needed research to inform discussions among policy makers, regulators, industry, conservation organizations, and the public on how to realize the benefits of increased domestic energy production while protecting essential natural resources</p> <p>The online mapping tool showcases where wind, shale gas, and coal energy development trends may overlap with important natural resources and</p>	<p>Appalachian LCC proud to be a major player in the launch and growth of the Tennessee River Basin Network, which has brought together many of the actors doing conservation in the region. The TRBN has developed a Conservation Action Map, a film inventory, and led the LCC to engage with states, land trusts and the Refuge system through science delivery workshops. The development of this Network is due to the members/partners of the AppLCC.</p> <p>Appalachian NatureScape: The NatureScape Design is a new paradigm in the U.S. as an integration of ecological and cultural resources across large landscape. Though the final product has not rolled out yet -- Landscape Conservation Design - 2nd ver. Integrated with Aquatic Condition Index Model Input – we believe it will have a major impact on how local partners prioritize and do conservation moving forward. It’s been our opportunity to start the conversation with a diverse audience related to landscape conservation planning. http://applcc.org/plan-design/conservation-design</p> <p>Vulnerability of Species and Habitats to Large-scale Impacts in the Appalachians: The Appalachian LCC supported the development of new vulnerability assessments for 41 species and three habitats in the biodiversity-rich Appalachians. The conservation community can view and search each of these assessments by relative ranking or vulnerability scores, conservation status ranks, state and subregion of assessment, and higher taxonomy. In addition, NaturServe compiled</p>
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Arctic	<p>Terrestrial Environmental Observation Network</p> <p>http://arcticlcc.org/projects/teon</p>	<p>The LCC is contributing to a large-scale monitoring network (TEON) that is monitoring and describing changes to one of the most rapidly warming areas of North America. TEON helps to elucidate effects of changing climate, hydrology, and permafrost on wildlife, habitat, and infrastructure in the Arctic.</p>	<p>Operational Polar Bear Den Mapping: SnowDens-3D: The Arctic LCC partnership, including industry, developed a desktop application to map and predict polar bear denning habitat on the Arctic coast. By quickly identifying areas likely to have polar bear dens, the app helps guide winter exploration and development activities and avoid costly delays during the busy construction season. The models integrate snow physics, high-resolution digital terrain models, and bear biology to produce refined and accurate maps predicting suitable polar bear den habitat.</p> <p>http://arcticlcc.org/projects/management/polar-bear-den-habitat-model/polar-bear-den-blog/</p>
California	<p>California Central Valley</p> <p>http://climate.calcommons.org/project/california-rangelands-assessments</p>	<p>California’s Central Valley contains more than 18 million acres of rangelands, which support a \$3 billion cattle and sheep business and are an integral part of California’s cultural heritage and regional economy. Unfortunately,</p>	<p>Pacific Coast Sea Level Rise: Threats to the Pacific coast include rising sea levels, shifting precipitation patterns, erosion, and changing frequency and intensity of storms. USGS, with support from the CA LCC, is modeling sea level rise to help develop adaptation strategies</p>

		<p>California’s rangelands are threatened by land-use changes and shifting climate conditions. With support from the California LCC, a partnership of ranchers, watershed groups, planners, and land managers are examining possible effects from changing future conditions. They are using this information to inform their management practices, ensuring that California’s rangelands and the services they provide are maintained for future generations. This will also help government agencies design effective conservation plans that consider changing conditions, as well as inform water agencies about potential changes to water supply.</p>	<p>across the Pacific coast to provide valuable ecosystem services such as filtering pollutants from water and buffering cities from storm surge and flooding.</p> <p>Coastal models help natural resource managers at National Wildlife Refuges, State Parks, military bases, and other locations plan for future flooding. Refuge managers in California, Oregon and Washington use the models to predict how tidal wetlands may change over time from marshes to deeper water habitats. This scenario planning leads to better long-term restoration decisions for priority species and habitats. The CA LCC is convening other managers to identify how to incorporate climate science into management actions.</p> <p>https://californialcc.org/sites/default/files/basic/Pacific%20Coast%20Sea%20Level%20Rise.pdf</p>
<p>Caribbean</p>	<p>Conservation Action Teams http://caribbeanlcc.org/themes/</p>	<p>The CLCC Conservation Action Teams (CATs) are where science meets the road. These strategic teams work together on science-based actions that facilitate conservation of land and seascapes. Members include public servants in government agencies, community leaders, advocates, educators, scientists and researchers, students, business owners, and concerned citizens.</p> <p>The following CATs have been working since 2015 and have been approved by the CLCC Steering Committee:</p>	<p>Climate Change Projections and Maps of Potential Future Temperature and Rainfall Scenarios for Puerto Rico: In 2015, the CLCC completed a three-year project with SE CSC funding and a postdoctoral student at the U.S. Forest Service International Institute of Tropical Forestry that used previously completed statistically downscaled climate projections to spatially model and map potential effects of climate change on ecological life zones, increasing energy demands, and drought indices from 1960-2099, using Puerto Rico as a test case.</p> <p>The results provide potential future condition</p>

		<ul style="list-style-type: none"> ● Protected Areas (PA-CAT): to provide information and guidance in support of the establishment and management of comprehensive protected areas systems in the U.S. Virgin Islands and Puerto Rico. ● Offshore Cay Systems (Cay-CAT): to develop a Landscape Conservation Design (LCD) for the network of 750+ offshore cay systems in Puerto Rico and the U.S. Virgin Islands with participation from the British Virgin Islands. ● Dune Building and Stabilization with Vegetation (Dune-CAT): to enhance the chances of restoring and protecting Puerto Rico’s dunes by synthesizing guidelines and methods and working to identify candidate beaches that can accommodate stabilization with vegetation. 	<p>maps for Puerto Rico’s temperature, precipitation and life zones. This study unearthed that life zones may shift from wetter to drier zones with the possibility of losing most, if not all, of the subtropical rainforests and extinction risks to rainforest specialists or obligates. Future ecological conditions may result in new ecosystems and new communities. Consequences could include more extreme water supply deficits in the future, a daunting possibility as Puerto Rico had one of the worst droughts in its history in 2015 with five-day water rationing in many metropolitan communities.</p> <p>http://caribbeanlcc.org/press-release-new-study-explores-consequences-of-projected-climate-changes-in-temperature-and-rainfall-for-puerto-rico/</p>
Desert	<p>Springs in the Desert</p> <p>https://desertlcc.org/resource/springs-life-sustaining-resources-desert</p>	<p>Isolated by arid landscapes, springs in the Southwest U.S. are critical resources for wildlife, plants, and human uses of the land. Although springs are abundant in the Sky Island Region, they have been poorly documented and little studied. They also suffer from extensive human modification and are among the most threatened ecosystems.</p> <p>The Desert LCC provided funding to support Sky Island Alliance, Northern Arizona University, and the Museum of Northern Arizona to inventory springs and develop monitoring protocols. The</p>	<p>Landscape Conservation Design: The Desert LCC supports numerous collaborative conservation initiatives, including pilots underway to develop <u>landscape conservation designs</u> for three desert eco-regions [view a story map].</p> <p>The <u>Big Bend - Río Bravo and Lower Río Conchos (Dos Ríos) Pilot Area</u> includes more than 9 million acres in Texas and Chihuahua. It is at the heart of the Chihuahuan Desert and a core area for decades of bi-national conservation. The highly diverse landscape of desert grasslands, sky islands, streams, riparian corridors, and springs has one of the</p>

		<p>project also created methodologies for citizen science volunteers to inventory, assess, and monitor these waters.</p> <p>Data collected through this project and previously existing data from various cooperating agencies is now available online through the Desert LCC Springs Inventory Database. The database includes information about springs-dependent species and evaluation of changing demands on groundwater. The database also provides a much-needed landscape level context for making management decisions.</p> <p>Resource managers in Arizona’s Pima County, with help from Sky Island Alliance, are using the springs inventory and tools to track the health of their water resources and determine priorities for spring restoration on county lands as part of their Sonoran Desert Conservation Plan. Sky Island Alliance has also worked with the Coronado National Forest to prioritize spring restoration activities over the next two to three years.</p> <p>Other Desert LCC partners are furthering this effort by developing a citizen science smartphone app. When launched, this app will allow citizens to help monitor these water sources, thereby increasing the availability of data and providing managers with information about how springs are faring throughout the region.</p>	<p>highest levels of biodiversity and endemic species among the world’s arid and semi-arid ecosystems. The pilot area is characterized by the Rio Grande/Bravo, the second longest river in the U.S., which serves as the primary source of drinking water for communities in the U.S. and Mexico.</p> <p>The <u>Transboundary Madrean Watersheds</u> span Arizona, New Mexico, Sonora, and Chihuahua. The region harbors 4,000 vascular plant species, the highest diversity of mammals, birds, bees, and ants anywhere in the conterminous U.S., and provides habitat for species found nowhere else in the world. This area will likely experience some of the greatest changes in temperature and water availability in North America.</p> <p>The <u>Eastern Mojave Desert</u> is important for shrubland habitat, connectivity for desert tortoise and a host of imperiled and endemic species. It contains the 175-mile long Amargosa River called the “hide and seek” river because of its inclination to travel underground, and occasionally resurface at lush oases within the dry desert environment. The ecosystems of this landscape provide recreation opportunities for residents and visitors.</p> <p>https://desertlcc.org/issue/landscape-conservation-planning-and-design</p>
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<p>Eastern Tallgrass Prairie and Big Rivers</p>	<p>Pigs, Prairie & Power – Bioenergy and Multifunctional Wildlife Habitat</p> <p>https://tallgrassprairiebcc.org/news/private-companies-participate-proof-concept-biomass-effort</p>	<p>Smithfield Foods and Roeslein Alternative Energy have successfully installed modular bioenergy refineries in northwest Missouri with the intent of combining diverse prairie plantings and hog waste from covered lagoons to produce clean renewable natural gas through anaerobic digestion processes - improving air and water quality, while significantly reducing soil erosion, and producing wildlife habitat, food, energy and local economic growth.</p> <p>As an extension of the Prairie STRIPs project, researchers from Iowa State University are quantifying wildlife benefits in the first phase of this \$120 million bioenergy project. The next phase will expand to 20,000 acres of prairie around 88 hog manure lagoons, located on nine finishing farms. The addition of native prairie grasses and forbs as an additional feedstock will help stabilize the gas production while augmenting the current production from hog manure and ultimately producing pipeline-quality natural gas with the energy equivalent of 17 million gallons of diesel fuel each year. Demand for grass feedstock around livestock facilities could result in as much as 30 million acres of prairie across the mid-continent.</p>	<p>See A Monarch’s View of the City (EPiC)</p> <p>Prairie Restoration: The Tallgrass Prairie LCC facilitates community dialogue and supports activities that determine where and how to focus prairie projects for biodiversity conservation, taking advantage of large- and small-scale opportunities to guide prairie restoration in key physical locations on the landscape. The LCC supports refinement of technical methods, planning, coordination, education, and scientific research on prairie restoration topics.</p> <p>The Prairie Reconstruction Initiative (PRI) is a collaborative, ground-up effort to identify, research, and take steps to resolve uncertainties in the process of prairie reconstruction with the goal that future efforts are cost-effective and meet management objectives.</p> <p>PRI is composed of land managers, scientists, and other prairie practitioners organized into working groups led by an advisory team (PRIAT). Working groups include:</p> <ul style="list-style-type: none"> ● Reconstruction and Management Database: Development of a web-based database to gather and store information on prairie reconstruction practices. ● Literature Review: Compile and organize published and unpublished literature related to prairie reconstruction to be made available to the community of practice. ● Monitoring: Development of vegetation monitoring protocols to track key
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<p>Great Basin</p>	<p>Rangeland Fire Prevention, Management and Restoration in the Great Basin</p> <p>https://greatbasinlcc.org/rangeland-fire-prevention-management-and-restoration</p>	<p>The Department of the Interior identified the Great Basin LCC as a primary source of science in the Integrated Rangeland Fire Management Strategy. The Strategy will help guide federal, state and local priorities for years to come, and the Great Basin LCC is proud to have a prominent role in this important program.</p> <p>The LCC played an integral role in developing the Rangeland Fire Science Plan and, in collaboration with other partners, helped develop an online science information portal for managers tackling rangeland fire across the Great Basin.</p> <p>The LCC partnership continues to support cutting-edge research that will aid fire prevention, management and restoration efforts, such as conducting large-scale research and demonstration projects for control of cheatgrass and other invasive annual grasses. Great</p>	<p>Great Basin Consortium: The Great Basin LCC works closely with public and private groups to identify opportunities for collaboration. The LCC has a key role in leading the Great Basin Consortium, a group that includes dozens of agencies, organizations, universities and research institutions.</p> <p>Great Basin Fact Sheet Series: The Great Basin LCC collaborated with several groups to produce the Great Basin Fact Sheet Series, published by the Great Basin Fire Science Exchange. The series includes 14 fact sheets on topics ranging from invasive annual grasses to grazing management to seeding and transplanting techniques. Each fact sheet is reviewed by both managers and scientists with expertise on the information addressed.</p> <p>The Great Basin LCC science on the <i>most highly important conservation issues</i> is being used to inform management on 3 out of every 4 acres in our region. LCC science-based tools and information are integrated in dozens of land</p>

		<p>Basin LCC staff also served on the writing team for the Actionable Science Plan, an action-oriented blueprint for acquiring scientific information to support the Strategy.</p> <p>The increase in large wildfires has substantially increased the need for big sagebrush seeds. The Great Basin LCC has supported studies on sagebrush seeding and outplanting success to identify seed sources. The LCC has also supported research to examine the effects of altered fire regimes and fuel treatments.</p>	<p>use plans, resource management plans, fish and wildlife conservation plans.</p>
<p>Great Northern</p>	<p>Ecological Connectivity Project</p> <p>https://sites.google.com/site/gnecoc/connectivity/</p>	<p>The geography of the Great Northern LCC is home to some of the most intact landscapes, wild mountains and iconic megafauna found in North America. But as human populations grow, habitats shrink and climates shift, the region faces increasing threats.</p> <p>To safeguard natural resources, ecological connectivity—the flow of species and ecological processes across landscapes—is imperative. Connectivity between protected areas has been identified as the single most important action for successful adaptation to change.</p> <p>The Great Northern LCC’s Ecological Connectivity Project is partnering with diverse, transboundary stakeholders to develop an LCC-wide connectivity conservation strategy based on high</p>	<p>Crown of the Continent Landscape Conservation Design/Transboundary Conservation Initiative and Climate Adaptation Partnership: The Great Northern LCC supports the Crown Managers Partnership, which is working with university and agency partners on credible science-based approaches to identify the current condition of indicators (baseline) and to track and document changes over time (trend). The effort’s working assumption is that visible land use changes influence most indicators, so significant emphasis is placed on landscape metrics, augmented by supplemental work on individual indicators as required.</p> <p>High Divide Landscape Conservation Design/High Divide Collaborative: The Heart of the Rockies Initiative (HOTR) employs landscape science to inform collaborative planning and actions to conserve the rich cultural and wildlife heritage, and the</p>

		<p>quality science and spatial modeling. The strategy informs management actions which, when implemented locally, also scale up to enhance wildlife dispersal and landscape integrity across the vast Great Northern geography.</p> <p>The goal is to ensure a permeable landscape with connectivity across aquatic and terrestrial ecosystems, which includes wildlife species movement, gene flow, population migration, dispersal, life history, and biophysical processes.</p> <p>The strategy aims to manage for connectivity by keeping large core habitats as functionally large as possible (e.g., wilderness, national parks and adjacent areas) and by maintaining broad zones that connect core habitats for wildlife movement.</p>	<p>economic and ecological integrity of the High Divide region. Capacity funding from the Great Northern LCC enabled the HOTR to transform coarse-grain science—emerging data on landscape integrity and connectivity, crucial habitats, and climate change—to fine-grain science, which partners are using to inform their decisions on site-specific conservation actions. Building upon this fine-grain science, the HOTR is working to identify and evaluate future landscape configurations that address the needs of local communities and conserve unique landscape resources. This evaluation is foundational to the High Divide Collaborative (a group of 50+ partners), which is identifying strategic on-the-ground actions to conserve the integrity of their lands and the broader landscape for wildlife and the ecosystem services such as forests and rangelands that support livelihoods. https://heart-of-rockies.org/</p>
<p>Great Plains</p>	<p>Great Plains Native Fish Conservation Areas</p> <p>https://greatplainslcc.org/project/watershed-based-conservation-planning-inform-selection-and-implementation-network-native</p>	<p>Freshwater resources in the Great Plains provide for the well-being of wildlife and human communities. However, dramatic alterations to these resources over the last century have resulted in sharp declines of native fish and other freshwater species.</p> <p>In 2014, a Great Plains LCC-supported assessment helped identify conservation actions that would benefit 28 priority fish species in rivers and streams of the Great Plains. The assessment also identified eight watersheds critical to the preservation</p>	<p>Support for Coordinated Bird Monitoring: The Great Plains LCC provides support for a multi-year, multi-partner coordinated bird monitoring effort across the landscape. The Integrated Monitoring in Bird Conservation Regions (IMBCR) program provides information vital to the continued management of a number of bird species recognized as conservation priorities by various local, state, and federal wildlife plans.</p> <p>This project addresses a long existing gap in the monitoring of local and regional changes in at risk bird populations over time. The resulting bird data will be used to guide</p>

		<p>of regional, native fish diversity.</p> <p>Using this assessment as a starting point, the Great Plains LCC and the Southeast Aquatic Resource Partnership launched an ambitious project in 2015 to develop multi-species, watershed-based conservation assessments and science strategies throughout the Great Plains. The Great Plains LCC and Texas Parks & Wildlife Department held a series of watershed-based workshops with regional managers to gather feedback on priorities for native fish communities and identify science needs to help guide potential conservation actions.</p>	<p>effective and efficient management of bird populations in a way that could avoid the need for listing these species in the future.</p> <p>https://greatplainslcc.org/project/integrated-monitoring-within-bcr%E2%80%99s-creating-wildlife-monitoring-grid-gplcc</p>
<p>Gulf Coast Prairie</p>	<p>Conservation Blueprint</p>	<p>In 2016, the Gulf Coast Prairie LCC completed its Conservation Blueprint 1.0 landscape conservation design (LCD). We developed a first cut of conservation priorities for 11 of the 17 broadly defined habitat types identified in the Science Strategy. We used a “coarse filter” approach based on existing datasets and an agreed-upon rule set for making decisions. For the “fine filter” LCD process, the Science Team designated a zone within the Colorado River watershed of Texas, extending from the Edwards Plateau to the Gulf Coast.</p>	<p>Mottled Duck Decision Support Tool: The Gulf Coast Prairie LCC funded a project by Texas A&M University in conjunction with the Gulf Coast Joint Venture and the U.S. Fish and Wildlife Service to develop a spatially explicit decision support tool for guiding habitat conservation for western Gulf Coast mottled ducks. The tool can help partners target habitat areas that are most likely to boost the duck’s breeding success, at the same time benefitting other grassland and wetland dependent species throughout the area.</p> <p>A follow-up evaluation of the LCC-supported Mottled Duck Decision Support Tool demonstrated the accuracy and effectiveness of this tool, which is now being used by LCC partners to guide habitat restoration in grasslands and wetlands along the Gulf Coast of Texas and Louisiana.</p>

			<p>https://lccnetwork.org/project/evaluation-and-refinement-decision-support-tool-mottled-duck-habitat-conservation-western</p> <p>Texas Sportfish: Guadalupe Bass is an economically and ecologically important endemic species in Texas. The Gulf Coast Prairie LCC funded science to clarify this fish’s requirements for instream flow, the water that remains in rivers. Research for management applications is also identifying how to restore river-floodplain connectivity to benefit Alligator Gar, an important sport fish in the Trinity River of Texas. Both of these Texas-based projects will help guide river management decisions that seek to support these economically important sport fisheries as well as many other forms of aquatic life.</p> <p>https://gulfcoastprairielcc.org/science/science-projects/understanding-how-river-flow-affects-guadalupe-bass-and-other-species/</p> <p>Northern Bobwhite: The Gulf Coast Prairie LCC funded two projects to provide a more detailed understanding of how grassland habitat fragmentation and loss and the impacts of habitat fragmentation over a 40-year period have affected Northern Bobwhite in Texas and Oklahoma. Both studies confirmed that habitat fragmentation — caused by changes in agricultural land use, housing, and mining development — have contributed to this popular game bird’s long-term decline.</p> <p>https://gulfcoastprairielcc.org/science/science-projects/habitat-loss-and-fragmentation-effects-in-the-management-of-northern-</p>
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			<p>bobwhites-and-eastern-meadowlarks/</p> <p>https://lccnetwork.org/project/impacts-habitat-fragmentation-northern-bobwhites-gulf-coast-prairie-landscape-conservation</p>
<p>Gulf Coastal Plains and Ozarks</p>	<p>GCPO Conservation Blueprint</p> <p>https://gcpolcc.org/blueprint-for-conserving-the-future</p>	<p>It started with the development of an Integrated Science Agenda, which identified nine priority habitat systems within the GCPO, continued with an Ecological Assessment process that compiled, created, analyzed and synthesized dozens of geospatial data layers into a landscape-scale assessment of each of those nine systems, and is finally being integrated into a Blueprint that will guide partners in their conservation planning throughout the GCPO geography.</p> <p>This work has been transformational in its development of new data layers, for example, the Inundation Frequency layer. Also our efforts to inventory and aggregate all known prairie locations from a wide variety of sources. We hope to keep that effort alive, possibly through plant conservation alliances, and are unaware of any other project that does that across states and agencies the way we are doing it.</p>	<p>Landscape Scale Assessment of Floodplain Inundation Frequency in the GCPO: This project, supported by the Gulf Coastal Plains and Ozarks LCC, represents the first attempt to map floodplain inundation frequency at the landscape scale in the south central United States. Using 15-40 images per Landsat scene, it establishes a wide range of possible flood frequencies and their relationship to a variety of rising and falling river stages. This method represents a flexible approach that can be configured to define habitat availability for a variety of terrestrial and aquatic species and can also be used in conjunction with other information to identify areas appropriate for planning future flood risk management strategies (including levees and set backs) in large river floodplains.</p> <p>https://gcpolcc.org/project/landscape-scale-assessment-floodplain-inundation-frequency-gcpo</p> <p>Open pine system research projects, which has refined and improved our understanding of open pine systems and the needs of species that use those systems.</p> <p>Gulf Coastal Plains and Ozarks Landowners: Ecosystem Service Supply, Demand, and Values: The GCPO LCC commissioned the region’s first quantitative assessment of</p>

			<p>ecosystem service supply, demand, and values from 6,000 private landowners. The multi-year project involved three separate research institutions, thousands of private landowners, and hundreds of conservation providers across much of the Gulf Coastal Plains and Ozarks geography.</p> <p>The components of the project included a high-level mapping of ecosystem service supply in the GCPO region; a survey of landowners’ reasons for owning lands, concerns, interaction with conservation programs, and valuation of key ecosystem services; and a social network analysis of conservation service providers within the region.</p> <p>The top concern expressed by landowners within the GCPO region — who rated themselves on average as “extremely concerned” — was drinking water quality. Moderate concerns included: drinking water quantity; chemical drift; wildfires; insect pests; invasive species; soils erosion; and, loss of forest, farmland, natural areas, wildlife habitat, and pollinators.</p> <p>The GCPO LCC commissioned the study because it recognized that in a region where landownership is largely private (~90%), successful natural resource conservation must leverage the collective efforts of private landowners. To do so, conservation practitioners must understand and appreciate what drives landowner management decisions and determine how these values can then be</p>
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			<p>translated into specific results, often in the form of ecosystem goods and services.</p>
<p>North Atlantic</p>	<p>Nature's Network http://www.naturesnetwork.org/</p>	<p>Nature's Network is a collaborative effort supported by the North Atlantic LCC that responds to a critical need identified by the 13 Northeast states for seamless, regional information to support conservation of priority species. Incorporating information on thousands of at-risk species, iconic game species, rare habitats, vital river systems, and more, Nature's Network offers scientific consensus on some of the highest conservation priorities in the region and creates new opportunities for partners to work together.</p> <p>Nature's Network is also a valuable resource that can contribute to a host of benefits for people including clean air and water, food production, recreational opportunities, and robust ecotourism economies.</p>	<p>Connect the Connecticut: Connect the Connecticut is a partner-driven effort to develop a shared vision for sustaining the future of the four-state Connecticut River watershed. http://connecttheconnecticut.org/</p> <p>Coastal Resiliency: Coastal resilience is an increasingly important topic as impacts from climate change such as accelerated sea level rise and enhanced storm intensity gain prominence. The Disaster Relief Appropriations Act of 2013, which was motivated by Hurricane Sandy-related damage, supported many projects throughout the affected region.</p> <p>The North Atlantic LCC is working with the Department of the Interior, its bureaus, and the broader conservation community to coordinate Hurricane Sandy resiliency science projects, identify science needs, and help guide future restoration investments.</p> <p>The North Atlantic LCC supported a project to inventory modifications to beach and tidal inlet habitats from Maine to North Carolina using Google Earth imagery during three time periods: before Hurricane Sandy, immediately after the storm, and three years after post-storm recovery efforts. The inventory covers the entire breeding range of the federally endangered piping plover (<i>Charadrius melodus</i>), providing a birds-eye view of the coastline that offers new perspective for local,</p>

			<p>state, and federal resource managers working to increase resilience.</p> <p>The final products — including habitat assessment reports, Microsoft Excel databases, Google Earth data layers, and Data Basin shapefiles — were designed to provide a baseline to help managers anticipate future changes that could affect human and natural coastal communities. All of the products are available on the Beach and Tidal Habitat Inventories product page on the North Atlantic LCC's website.</p> <p>The North Atlantic LCC funded the development of a Decision Support Framework for Sea-Level Rise Report by the U.S. Geological Survey that indicates which areas along the Northeast coastline are likely to flood as a result of sea-level rise, and which are likely to respond dynamically by moving or changing.</p> <p>The framework is of particular interest to real estate developers. With information about where to expect flooding and where to expect habitat movement, developers can work with resources managers can plan and respond to changes with the most appropriate actions and decisions. For example, if a salt marsh is likely to move inland in response to sea-level rise, developers might avoid siting projects in surrounding upland areas to allow for marsh migration in the future.</p> <p>http://northatlanticlcc.org/teams/coastal-resiliency</p>
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<p>North Pacific</p>	<p>Traditional Ecological Knowledge</p> <p>http://www.northpacificlcc.org/project-type/traditional-ecological-knowledge</p>	<p>Strong human cultures (including numerous Tribes and First Nations) have thrived on the North Pacific region's abundant resources since the last ice age, developing a rich body of Traditional Ecological Knowledge (TEK). <u>TEK</u> is an understanding about the relationships among species and ecosystems acquired by Tribes and indigenous and local people over hundreds or thousands of years and handed down the generations through traditional stories and beliefs. TEK can play a fundamental role in preserving natural and cultural resources by bridging human and environmental systems.</p> <p>Across the North Pacific LCC, more than 150 Tribes and First Nations continue to live, work, and gather resources to support their traditional ways of life. The North Pacific LCC has funded a variety of TEK projects to aid in the conservation of 'first foods.' These projects include the development of a risk model that predicts where subsistence berry plants will be most resistant to harvest-decimating moth attack; Pacific salmon vulnerability assessments; and a study of projected changes to ocean conditions and to freshwater habitat and the effects of these changes on the life cycles of Pacific eulachon and Pacific lamprey.</p>	<p>Human Health and Environmental Indicators in the Salish Sea: Coastal communities along the Salish Sea are highly vulnerable to such factors as ocean acidification, sea-level rise, and increased land use. The health of the Swinomish Indian Tribal Community is particularly threatened by environmental changes affecting their food sources and way of life. Support from the NPLCC along with multiple regional partners have assisted the Swinomish in studying the environmental factors that affect the health and wellbeing of their community. The process of determining these indicators have been shared with other Tribes around the nation and have offered a way for Tribes to best manage their resources in favor of a healthy community.</p>
<p>Northwest Boreal</p>	<p>Northwest Boreal Monitoring System</p>	<p>More than 30 experts in areas of wildfire, vegetation, permafrost,</p>	<p>Implementing the Canadian-based BEACONS Project in the US through Alaska BLM</p>

	<p>https://lccnetwork.org/news/lcc-funded-project-spotlight-northwest-boreal-monitoring-system</p>	<p>contaminants, and invasive species are determining how to collect research and monitoring data that can be used across the vast forests, mountains, and glaciers of the boreal forest in Alaska and Canada, regardless of the jurisdictional boundaries. This is among Northwest Boreal LCC partners’ first steps of creating a coordinated monitoring system to detect changes in the northern forest.</p> <p>The idea is not to launch a new and expensive monitoring network, but rather to find what commonalities exist in current monitoring programs or what small tweaks would allow for data to scale and be meaningful to other researchers in a landscape setting. The work has focused on finding the metrics that best capture change and determine what minimum standards for collecting data would make the data usable.</p>	<p>planning: The BEACONS Project’s Conservation Matrix Model including ‘ecological benchmarks’ is a science-based framework for proactive and flexible conservation planning to facilitate conservation and sustainable use of natural resources.</p> <p>http://www.beaconsproject.ca/</p>
<p>Pacific Islands</p>	<p>Hawaiian Islands Terrestrial Adaptation Initiative</p> <p>http://piccc.net/project/hawaiian-islands-terrestrial-adaptation-initiative/</p>	<p>The Pacific Islands Climate Change Cooperative established the Hawaiian Islands Terrestrial Adaptation Initiative to bring together USFWS, USGS, NPS, other federal and state partners, and NGOs to address land and water impacts in Hawaii. The Hawaiian Islands encompass a dynamic region featuring iconic habitats and unique species that are threatened by land use change, invasive species, and population growth and development. Convening multiple stakeholders and working towards the same vision of resilient, healthy, sustainable lands and water is reducing</p>	<p>Hawaii’s Native Forest Birds: The Pacific Islands LCC and partners throughout the state of Hawai’i and the federal government, completed a vulnerability assessment focused on native Hawaiian bird species. Native forest birds, a vital part of Hawaiian culture and ecosystems, have been under threat for many years due to habitat loss and degradation, predators, and disease. The research examined the impacts of temperature and precipitation shifts for each bird species and found that the ranges will likely be drastically reduced for all of the birds by 2100. Most of these are projected to have less than 100 square kilometers left of livable</p>

		<p>duplicity across federally funded programs. This collaboration reduces duplication and expedites on the ground efforts to conserve our wildlife, natural spaces, and fisheries that sustain our people.</p>	<p>habitat by the end of the century. The research concluded that the state of Hawai'i should begin looking at ways to avert some of the worst projected impacts by pursuing major collaborative efforts targeting protection, conservation, and recovery actions.</p> <p>https://lccnetwork.org/resource/vulnerability-assessment-hawaiis-native-forest-birds-piccc-story-map</p> <p>Local and Traditional Ecological Knowledge in Hawai'i to Adapt to Future Change: With funding from the Pacific Islands LCC, community members from Ka'ūpūlehu (North Kona, Hawai'i Island) and researchers from the University of Hawai'i at Mānoa collaborated in a project to learn from <i>local ecological knowledge to understand the impacts of a changing climate and preserve key cultural and natural resources in Ka'ūpūlehu, Hawai'i.</i></p> <p>This community-based research has multiple products and outcomes. One of these investigated the role of Traditional Ecological Knowledge (TEK) in adaptation to social-ecological change over an extended time period. This included drawing on ethnographic and historical writings, Hawaiian language newspaper articles, legal documents, journals kept by missionaries and explorers, as well as the teachings from both traditional and more recently established mo'olelo (oral histories) and 'ōlelo no'ēau (proverbs), and interviews with community members. This rich reservoir of wisdom helped the researchers understand how coping strategies and indicators of social resilience have changed over time; the role of TEK in resilience; and the implications for</p>
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			<p>climate adaptation.</p> <p>To help convey this diverse and large body of information, Ku‘ulei Keakealani lineal descendants and community leaders in Ka‘ūpūlehu created a ‘timeline of adaptation’ telling the stories of the land and how people have responded and adapted to their environment over the generations.</p> <p>An important finding from this research is that TEK, cultural identity, and their relationships to environmental stewardship are locally seen as the basis for social resilience in this community, which means it is critical to understand TEK systems as alive and adaptive, not just a thing of the past that is set in stone. This research also demonstrated that designing meaningful adaptation strategies requires close partnerships with communities and community-based approaches. https://lccnetwork.org/news/future-behind-us-learning-local-and-traditional-ecological-knowledge-hawai%E2%80%99i-adapt-future</p>
<p>Peninsular Florida</p>	<p>State Alignment/Florida State Wildlife Action Plan Integration</p> <p>http://peninsularfloridalcc.org/page/priority-resources-conservation-targets</p>	<p>The Peninsular Florida has been working closely with Florida Fish and Wildlife Conservation Commission (FWC) staff to align the PFLCC Priority Resources and Conservation Targets (indicators) with the Florida State Wildlife Action Plan (SWAP). Through cooperative efforts, the PFLCC Priority Resources and the majority of FWC’s SWAP ecosystems have been developed from the same base data set (Florida Cooperative Land Cover) and identify the same systems as priority. The PFLCC Conservation</p>	<p>PF Landscape Conservation Design: The PFLCC has completed version 1 of its Blueprint. The blueprint was developed based on input from PFLCC Steering Committee members and partners/ stakeholders. Florida has a wealth of spatial data and conservation assessment products. The PFLCC built upon these data sets, primarily the Critical Lands and Water Identification Project (CLIP) data and the Florida Cooperative Land Cover data. In developing the Priority Resources and Conservation Targets, the PFLCC hosted three web workshops and five in person workshops</p>

		<p>Targets are being adopted for the FWC’s SWAP monitoring plan design and implementation.</p>	<p>(31 half-day topic focused sessions). http://peninsularfloridalcc.org/page/floridas-cooperative</p> <p>Florida Strategic Plan for Sustaining Military Readiness through Conservation Partnerships: The Peninsular Florida LCC partnered with the U.S. Air Force and other agencies/organizations to develop “The Florida Strategic Plan for Sustaining Military Readiness through Conservation Partnerships.” The goal of this project was to identify a regional natural resources management approach to help minimize encroachments threats to Air Force missions and identify partner-leveraged conservation opportunities throughout the state of Florida.</p> <p>The Plan prioritized conservation opportunities that provide Air Force with mission flexibility, buffering to military lands, and mitigation for listed, candidate, proposed and state-listed species. This partnership has resulted in the development of landscape-level planning for Air Force installations in Florida that are in line with strategic conservation plans recommended by the Peninsular Florida LCC.</p> <p>http://peninsularfloridalcc.org/page/pflcc-af-partnership</p>
<p>Plains and Prairie Potholes</p>	<p>Rural Well-being in the Prairie Pothole Region https://plainsandprairiepotholeslcc.org/news/rural-well-being-prairie-pothole-region-linking-land-use-and-economics</p>	<p>Since the PPP LCC geography is approximately 90% privately owned, the LCC saw a need to understand the social, economic, political, and historical aspects of conservation on private lands. As a result, the PPP LCC partners agreed that one of its primary areas of</p>	<p>Attitudes toward Participation in Farm Bill Programs: Land use decisions on the farms and ranches that dominate the geography of the Prairie Pothole region dramatically influence the abundance of fish and wildlife. A variety of Farm Bill programs offer incentives intended to encourage decisions that translate</p>

		<p>focus will be work on human dimensions to more fully understand why land owners make conservation decisions and develop innovative ways to incentivize conservation. For example, the LCC funded a study by USGS to evaluate the impacts of land use change, economics, and rural well-being in the Pothole region.</p>	<p>into continued or expanded habitat on the landscape. But participation in these programs continues to decline, often accompanied by a move toward increased conversion of native habitat to agricultural use that further erodes conservation interests.</p> <p>To learn what factors drive participation in Farm Bill programs, the Plains and Prairie Potholes LCC collaborated with the South Dakota Cooperative Fish and Wildlife Research Unit to conduct surveys of landowners in Iowa, Minnesota, the Dakotas, and Montana. These surveys addressed issues of perceived importance specific to each state, and more generally measured attitudes and behaviors towards participating in a variety of conservation programs, general wildlife values, general attitudes related to land use, reasons for participating and not participating in farm programs, succession planning, and some demographic variables.</p> <p>The recommendations report can help LCC partners better understand landowners and predict landowner response to various types of farm programs, develop more effective communication strategies, and develop programs to better address landowners concerns and needs.</p>
<p>South Atlantic</p>	<p>South Atlantic Conservation Blueprint http://www.southatlanticlcc.org/blueprint/</p>	<p>The South Atlantic Conservation Blueprint (Blueprint) is cross-boundary, cross-organization, living spatial plan that prioritizes areas for shared conservation action in the geography. It is designed as a resource for conservation action and investment,</p>	

		<p>which identifies areas for shared action at the ecosystem level. The data-driven online tool includes all the terrestrial, freshwater, and marine ecosystems of the South Atlantic.</p> <p>The American Planning Association is currently partnering with the South Atlantic LCC to improve the Blueprint’s integration between natural and built environments near and within cities; rethink traditional urban planning approaches to urban green infrastructure as well as traditional approaches to conservation and the urban environment, and to identify opportunities for greater collaboration in the future.</p> <p>The DOI Wildland Fire Resilient Landscapes program used the South Atlantic Conservation Blueprint to bring in more than \$1.75M over two years in prescribed fire funding in priority longleaf pine focus areas. This funding would not have been available in the Southeast without the support of the Blueprint.</p>	
<p>Southern Rockies</p>	<p>State Crucial Habitat Assessment Tools (CHATs)</p> <p>https://lccnetwork.org/project/srlcc-support-state-chat-data-community-scdc</p>	<p>In 2013, the Western Governors’ Association completed its CHAT spanning 16 western states. Now managed by the Western Association of Fish & Wildlife Agencies (WAFWA), CHAT is an important tool supporting decision-making across the region. The CHAT was completed in part through more than \$1 million in funding from many western LCCs.</p>	<p>Managing for Future Water Supplies in the Intermountain West: Led by researchers at Utah State University with participation by local water districts and public utilities in Utah, this Southern Rockies LCC-supported project increased the predictability in decision-making for future water supply for the Bear River. This river is the largest contributor to the Great Basin and the only significant new source of future water supply for the burgeoning</p>

		<p>The Southern Rockies LCC provided funds to the states of Utah, Arizona, New Mexico, Wyoming, and Colorado to support development of the individual states' CHATs. These tools provide a decision support system to better incorporate wildlife values, sensitive animals and plants, and important ecosystem features into land use decision-making to reduce conflicts and surprises.</p> <p>A pilot project is underway that is designed to help state and federal wildlife managers securely store and share data in the CHAT. The State CHAT Data Community (SCDC) — composed of five core states (Idaho, Kansas, Utah, Nevada, and Washington), four newly participating states (Alaska, California, Montana, and New Mexico); the Great Northern and Southern Rockies LCCs; and federal partners — is working to deliver tools that enhance data integration across landscapes.</p> <p>The SCDC aims to: help the states keep the CHAT maps and website current; provide federal partners with increased online access to state data used in creating the CHAT maps; and, provide CHAT states with increased online access to federal data that states can incorporate into the CHAT mapping process.</p>	<p>Wasatch Front.</p> <p>A tool developed from the reconstruction of historic streamflows of the Bear River was used in Utah's first operational prediction for Great Salt Lake water levels for a five-year period. The project also reduced uncertainty for climate model projections of future water availability in the basin. https://southernrockieslcc.org/project/building-decadal-prediction-extreme-climate-managing-water-supply-intermountain-west</p> <p>Collaboration with American Indian Tribes and Pueblos: More than 30 federally recognized American Indian tribes exist across the SRLCC geography. These sovereign nations constitute the fourth largest landholdings in the SRLCC. Tribes have the longest, continual experience with climate, wildlife, the land and natural resources in North America. Coordinating with the Department of Interior Climate Science Centers, the SRLCC works to apply scientific tools to increase understanding of climate change and to coordinate an effective response to its impacts on tribes and on the land, water, fish and wildlife, and cultural heritage resources of first nations.</p> <p>There are many categories of cultural resources including archeological resources, cultural landscapes, traditional uses, traditional cultural places, and historic and prehistoric structures. All of these cultural resource categories can serve to inform us about human and natural environment interactions across the larger landscape.</p>
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			<p>https://southernrockieslcc.org/issue/cultural-resources</p>
<p>Upper Midwest and Great Lakes</p>	<p>Aquatic Connectivity Initiative https://greatlakeslcc.org/group/great-lakes-aquatic-connectivity-collaborative</p>	<p>The Upper Midwest and Great Lakes LCC developed a Great Lakes-wide framework for making resource decisions about aquatic connectivity. Decision-support tools have been developed to balance the competing goals of increasing connectivity to restore native fish populations while maintaining barriers to prevent expansion of sea lamprey and other invasive species. The LCC organized a “Aquatic Habitat Connectivity Collaborative” of all major stakeholders to establish regional connectivity goals agreed on by governments, industries, NGOs, and the public to move toward an optimally connected network of rivers and the Great Lakes.</p> <p>Because of the Great Lakes LCC, the issue of aquatic habitat connectivity is being considered from a landscape perspective for the first time, and tools have been developed to help with decision-making.</p>	<p>Coastal Conservation: Extending from Lake Huron’s Saginaw Bay to Lake Erie’s Western Basin, the LCC’s landscape conservation design initiative developed two decision-support tools. A coastal wetlands prioritization tool prioritized existing wetlands for protection and management, reflecting wetland conditional health based on monitoring data collected over the past five years throughout the entire Great Lakes basin. A ranked list of wetlands will be available as a by-product from this deliverable – the first of its kind. A second tool has been developed to prioritize converted wetlands for restoration. These tools can now be used to inform the selection of locations where restoration, enhancement, and protection of wetlands should occur. They will also be used in support of the broader coastal wetlands Landscape Conservation Design for this region, a process which is underway. https://greatlakeslcc.org/issue/coastal-resilience</p>

<p>Western Alaska</p>	<p>Coastal Change</p> <p>https://westernalaskalcc.org/projects/SitePages/coastal.aspx</p>	<p>In 2012, the Western Alaska LCC launched an effort to improve the availability of information, knowledge, and tools about “Changes in coastal storms and their impacts.” The convening strength of the LCC was critical in bringing diverse stakeholders from agencies, Alaska Native Tribes and Organizations, and researchers together to develop a roadmap for making progress on this critical topic.</p> <p>As a result of LCC-seeded projects, coupled with many efforts led and funded by partners in the LCC, we now have: improved ocean surface circulation models that incorporate wind, ice and storms for all of Alaska’s oceans; 50% more National Water Level Network Stations in western Alaska; the first documentation of tectonic plate shifts across western AK to inform sea level rise models; extensive mapping of coastal characteristics (ShoreZone); erosion and accretion estimates; a process/pattern for assessing community vulnerability; storm surge impact projections for critical waterbird habitat; community-led erosion monitoring; improved storm and flood warning tools for communities; and much more. Most importantly, we have a coalition of partners who now trust each other and consistently reach out to collaborate on activities.</p>	<p>Climate Projections for Salmon Habitat: The fresh water streams and lakes of western Alaska are critical habitat for the nation’s Pacific salmon with at least 50% of the world’s sockeye salmon breeding in its water in the Bristol Bay region alone. The LCC took steps to create the foundation to provide key information necessary for making projections of how these habitats may change into the future.</p> <p>To do this, the LCC developed minimum standards for data collection, launched voluntary water temperature monitoring networks with community, agencies, non-governmental organizations and private industry groups to double the amount of data available for regional analyses in western Alaska. The LCC also worked with researchers to highlight the importance of these data and provide temperature threshold information that will be crucial to understanding how salmon may respond to habitat changes in the future.</p> <p>https://westernalaskalcc.org/projects/SitePages/freshwater.aspx</p>
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