Effective conservation through collaboration and sound science

2013 Year in Review

PLAINS & PRAIRIE POTHOLES

LANDSCAPE CONSERVATION COOPERATIVE

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Cover photo: Rancher and son assess grazing cattle in the rolling prairie grasslands of South Dakota. Photo courtesy of Tim McCabe/U.S. Department of Agriculture.

Landscape Conservation Cooperatives

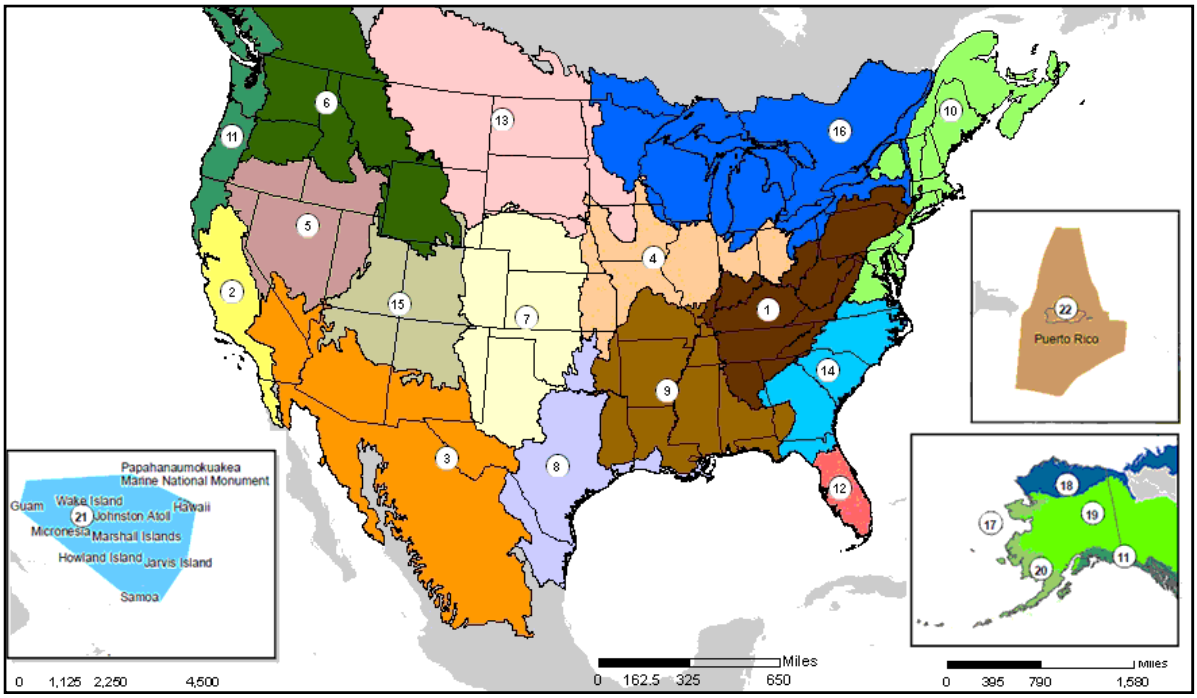
Landscapes capable of sustaining natural resources *for* current and future generations

Natural resources are essential to sustaining our health and quality of life. We, along with fish and wildlife, rely on these resources. However, the stressors that impact these resources have become too complex for any single agency or organization to effectively address.

With the signing of Secretarial Order No. 3289, the Department of the Interior launched a network of 22 Landscape Conservation Cooperatives (LCCs) to better integrate science and management to address broad-scale and complex natural resource challenges. By building a network that is holistic, collaborative, adaptive and grounded in science, LCCs are working to ensure the sustainability of our economy, land, water, wildlife and cultural resources.

The 22 LCCs collectively form a network of resource managers and scientists who share a common need for scientific information and interest in conservation. Each LCC brings together federal, state, non-governmental organizations, universities, and interested public and private organizations.

Our partners work collaboratively to identify best practices, connect efforts, identify science gaps and avoid duplication through conservation planning and design. Learn more about the LCC network at http://lccnetwork.org.



13 *Plains and Prairie Potholes LCC geography. Graphic courtesy of Department of Interior.*

Year In Review

Message from our Steering Committee Co-Chairs

The success of conservation in the 21st century depends on the conservation community's willingness and ability to form strong alliances, engage non-traditional allies and make improbable connections probable. Today's conservation challenges require us to take new approaches. The Plains and Prairie Potholes LCC is focused on providing scientific information and tools that will help resource managers across jurisdictions make informed decisions that benefit fish, wildlife and people.

Our partnership is strong and growing stronger. Our strength is amplified by our concerted effort to ensure our work is relevant, not only to the conservation community, but also to the American public. We do this by drawing connections between our lands and waters, and our local economies.

Cutting-edge science contributes to our ability to anticipate and adapt to changes unlike any we have seen in the past.

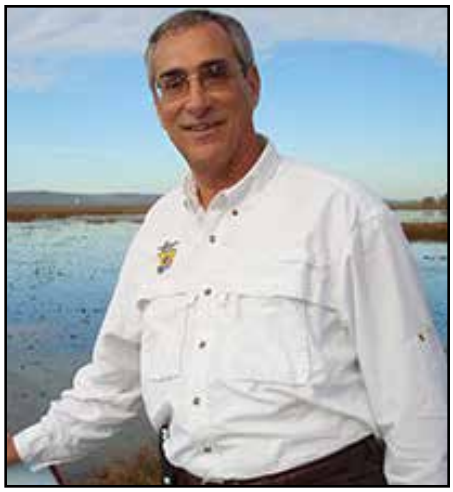
Our *2013 Year in Review* is a compilation of major milestones reached over the past year. We pay special attention to completed research and how the recommendations from those scientific investigations are being used by federal, state, tribal, non-governmental and private partners to implement effective conservation efforts.

Our LCC community has expanded over the past year to represent multiple disciplines and areas of expertise. This growth represents our progress in promoting conservation as a holistic solution to our pressing natural resource issues. Each member of our LCC community is key to our success.

We are collectively making new connections and championing collaborative conservation as the new model for implementing sound science in the 21st century.

Developing and delivering rigorous, objective scientific information to managers remains the focus of our partnership. The outcomes of our collaborative efforts will help ensure that future generations can appreciate the unique cultural and natural resources of the northern Great Plains and Prairie Pothole Region.

Thank you to our entire LCC community for your valuable contributions, from our steering committee members to our technical committee experts and project investigators. We look forward to continuing our important work together for the future of fish, wildlife and people.



Tom Melius, Regional Director
U.S. Fish and Wildlife Service - Midwest Region

Terry Steinwand, Director
North Dakota Game and Fish Department

Making a Difference for Conservation

The geographic scale of our LCC extends beyond physical boundaries and jurisdictions

Our partnership has collectively zeroed-in on cutting-edge science to shed light on the most vexing conservation issues impacting the Prairie Pothole Region and northern Great Plains.

We are dedicating resources to examining the impacts of energy development, shifting agricultural practices and climate change on local and regional economies, wildlife habitat and quality of life.

With challenges and opportunities in front of us, we have collectively aimed to work beyond individual state, provincial or political boundaries. Our research efforts span portions of Minnesota and Iowa to the Dakotas, Montana and Wyoming, and stretch into the Canadian provinces of Alberta, Manitoba and Saskatchewan.

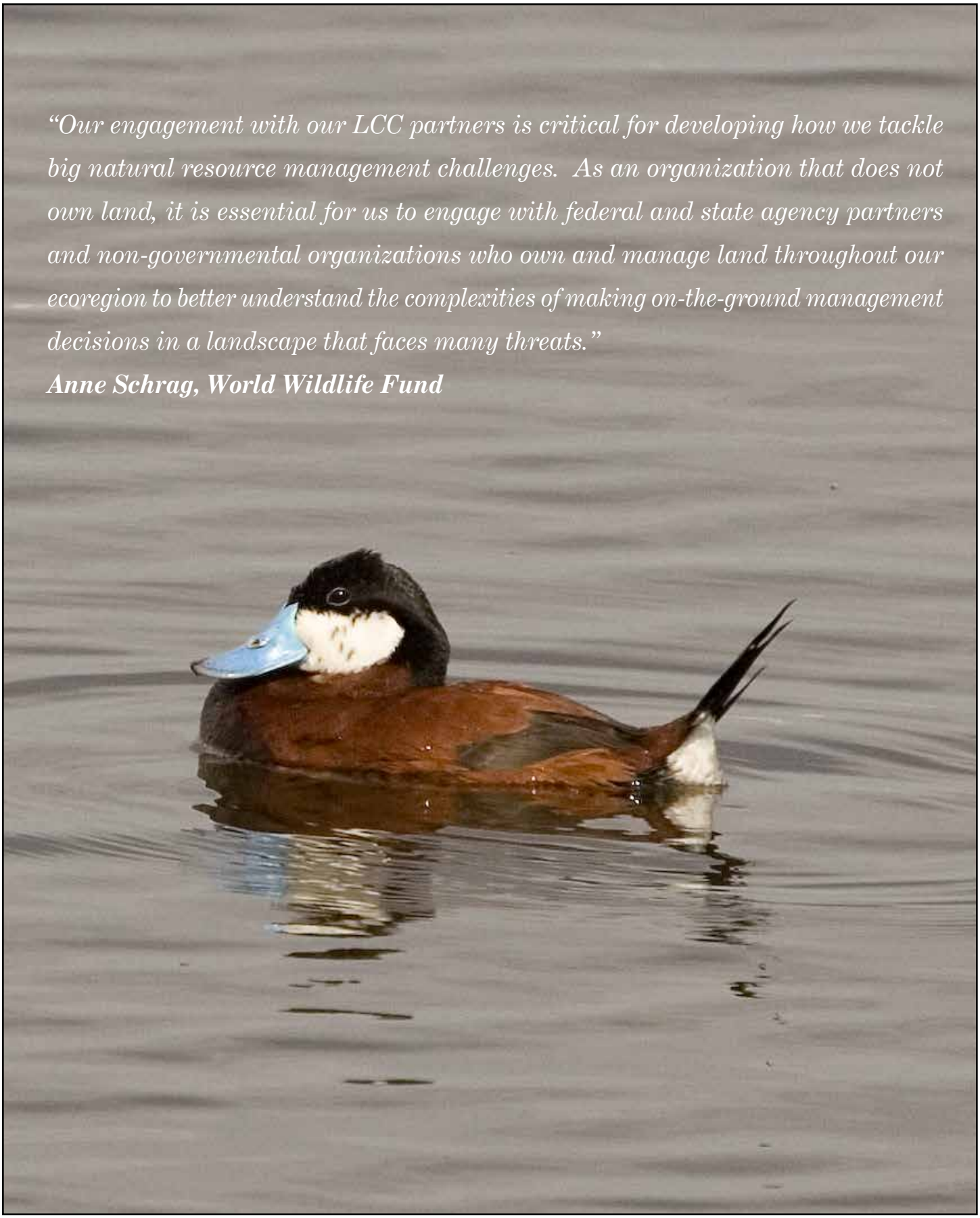
This past year, we worked across international boundaries to support research that is targeting wetland restoration to improve water quality while maximizing agricultural production in the U.S.-Canadian Souris River watershed.

The taxonomic scope of our research is inclusive, encompassing both aquatic and terrestrial, native and non-native, migratory, state and federally-managed species

We look beyond the scope of birds, mammals, fish or plants. We strive to address the ecological, economic and social systems upon which all of these species depend.

By thinking beyond the ecological health of our landscape, we are making connections that make science and conservation relevant to the broader public.

This year, project investigators with the University of Wyoming completed a study examining the interactions between water levels and climate change as they impact wetland plant, invertebrate and waterbird productivity in the Prairie Pothole Region. The study shows that levels and timing of precipitation events, coupled with shifts in temperature, impact the length of time water is available in wetlands. This sensitivity to climate change factors has major implications for a broad range of wetland-dependent species and has an impact on human water allocation. Read more about this study on page 21.



"Our engagement with our LCC partners is critical for developing how we tackle big natural resource management challenges. As an organization that does not own land, it is essential for us to engage with federal and state agency partners and non-governmental organizations who own and manage land throughout our ecoregion to better understand the complexities of making on-the-ground management decisions in a landscape that faces many threats."

Anne Schrag, World Wildlife Fund

Ruddy duck. Photo courtesy of Hargreaves.

Our LCC is forward-looking and examines both current challenges and emerging threats to our natural resources

The LCC enterprise continues to examine emerging threats to our natural resources, along with current challenges. We look at complex challenges through a lens that allows us to make informed projections for the future.

A collaborative research project led by the University of Wyoming, Ducks Unlimited, Inc., and the World Wildlife Fund that examines the likelihood of grassland conversion to agriculture, exemplifies this forward-thinking mentality. By examining Farm Bill programs, soil types and climate change scenarios, scientists can project which grasslands are most vulnerable to conversion.

States like Montana, Wyoming, North and South Dakota now have the science necessary to design conservation programs that proactively and effectively address this ongoing and future threat. Learn more about this project on page 15.

Sunrise at DeSoto National Wildlife Refuge. Photo courtesy of U.S. Fish and Wildlife Service.

Photo courtesy of Bureau of Land Management.

Our LCC is decision-focused and supports research that will help on-the-ground decision makers

All research projects that receive support from our LCC go through a rigorous review process by technical experts to determine the applicability of the science to on-the-ground management. We select projects based on their relevance to natural resources management, from local and national policy-making, to cross-jurisdictional land and water conservation and management activities.

This year, federal, provincial and non-governmental partners completed a *Landscape Patterns Environmental Quality Analysis*. The analysis identifies patterns in landscape change and use as it relates to achieving shared goals for natural resource conservation.

The analysis distills recommendations from 172 landscape ecology studies into concise pattern-based indicators of environmental quality as they relate to natural resources conservation and management objectives. Insights drawn from the report are guiding communities in conservation and management efforts across the Great Plains landscape.

The report and accompanying database provide resource managers from the local to regional level with measurable criteria for how human activities can be managed to improve environmental quality and promote effective natural resource conservation. Read more on page 16 to learn how management agencies and organizations are already using the recommendations from the analysis in conservation planning efforts.

Our LCC is adaptive and uses strategic habitat conservation as a model for conservation planning and monitoring

Through the integration of an adaptive management approach, LCC partners are improving management by building science support tools that help resource managers carry out the most effective conservation actions.

The LCC-supported native prairie adaptive management database has allowed scientists to directly link on-the-ground monitoring efforts with real-time prairie management options to treat invasive plants such as smooth brome and Kentucky blue grass. The database stores valuable monitoring data and keeps track of management actions taken on specific refuge and wetland management district units over time.

The data can be input into predictive models to generate specific management recommendations for refuge managers for the upcoming year. Those management recommendations for controlling invasive vegetation and increasing native vegetation include grazing, burning or a combination of both.

Conversion to cropland in western South Dakota. Photo courtesy of Day's Edge Productions.

Land planners visit Neutral Hills, overlooking Sounding Lake where a major transmission line is under construction. Photo courtesy of Ian Dyson.

Our LCC integrates social and economic implications into traditional conservation and management research

The breadth and complexity of current and future conservation challenges necessitates identifying and building relevancy between natural resources and people. Our LCC is engaging the expertise of social scientists, including economists and human dimension experts, to expand our view of effective conservation.

Of utmost priority to the LCC this year, and in coming years, is a refined focus on understanding the behaviors, attitudes and perceptions of targeted demographics that live and work within the northern Great Plains and Prairie Pothole Region.

This year, the U.S. Geological Survey and other LCC partners released a comprehensive analysis of the prairie pothole region, linking rural-well being to land use and economics. Partners in Montana, North Dakota, Minnesota and Iowa are using the study's findings to quantify how strengthening the non-farm rural economy can assist local governing officials as they work to support agriculture in the community. Learn more about this project on page 18.

By building linkages between the land and the goods and services upon which people depend, we aim to reinvigorate the land ethic so critical to conservation and management of our treasured natural resources. In the coming months, we are placing specific emphasis on private landowners and agricultural producers. We seek to understand the factors that incentivize this key stakeholder group to participate in conservation programs and to implement sustainable production practices.

By reducing the uncertainties related to social and economic dynamics, and by expanding our field of study to the interactions between people and the land, we will improve our on-the- ground conservation and communication efforts and revitalize the land ethic that defined generations past.

Our Dynamic GROWTH

We have skin in the game

Completed and ongoing research supported by our LCC continues to exemplify our success in pooling resources and identifying shared priorities for research that will benefit conservation decision-makers.

All new projects funded by the LCC in 2013 received financial, in-kind and/or technical support from multiple LCC partners, which emphasizes the deepening commitment of partners to contribute to landscape-scale conservation.

For example, the Natural Resource Conservation Service provided more than $1 million to implement conservation practices that benefit grasslands in the northern Great Plains. This on-the-ground action was fueled by recommendations from a LCC-supported carbon sequestration project.

As a second U.S. Geological Survey is working side by side with state, federal and non-governmental partners in Montana and South Dakota to examine the relationship between oil production and the spread of invasive plant species in the Williston Basin.

Additionally, the province of Manitoba has stepped forward to work alongside Ducks Unlimited, Inc. Canada on wetland conservation research in the Souris River watershed.

We are knitting together *the national LCC network*

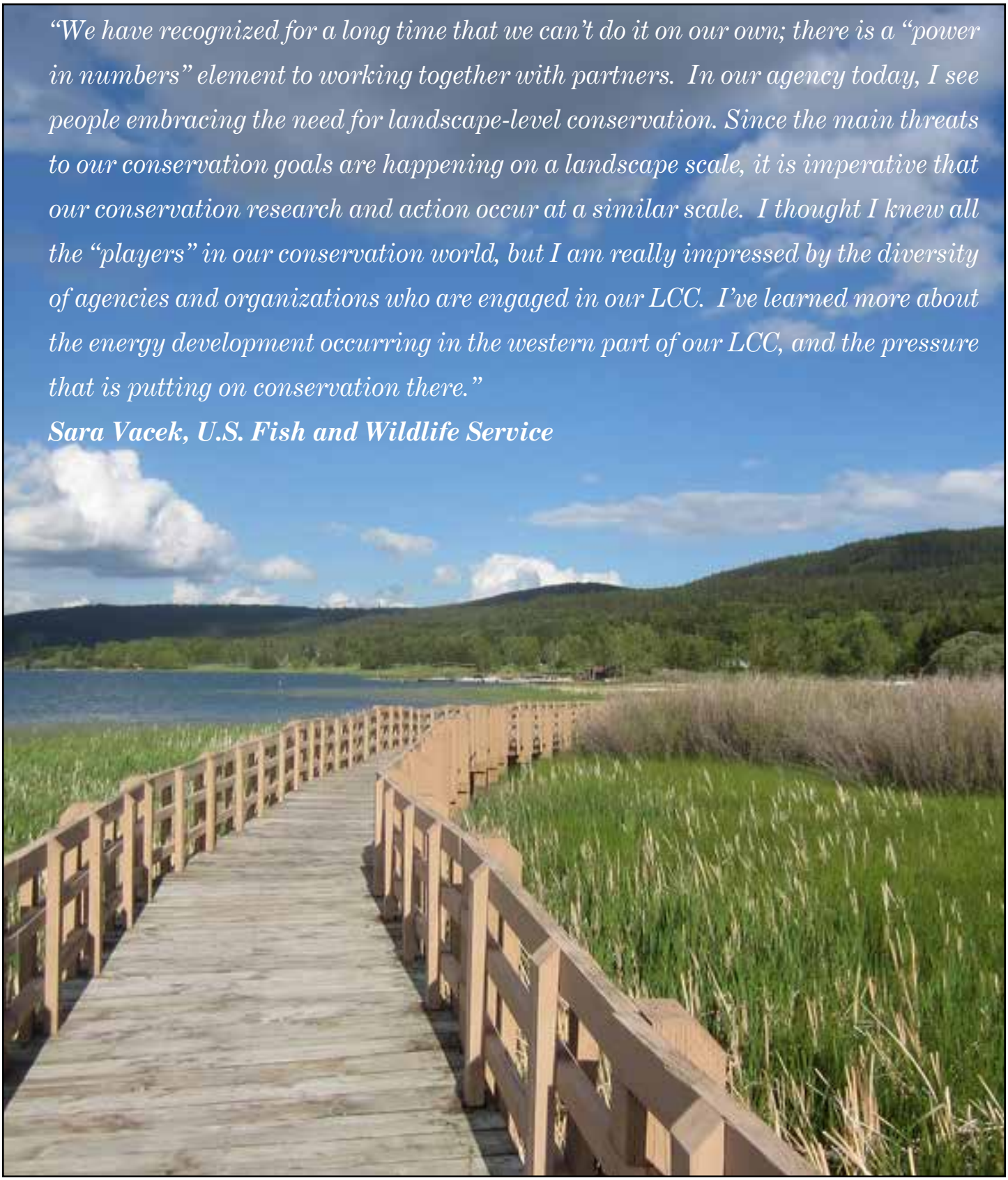
Our LCC is reaching out beyond our own geographic border to work as part of the broader Landscape Conservation Cooperative network.

In 2013 alone, the LCC partnered with multiple neighboring LCCs to the south, east and west on six large-scale research projects.

One of these multi-LCC projects examined the contributions of agricultural communities across the Mississippi River basin to a hypoxic zone in the Gulf of Mexico. This "Dead Zone" is created as a result of nitrogen and phosphorous run-off from Midwest farms, and lacks sufficient oxygen in the water to support aquatic life. Hypoxia can have a significant impact on economies dependant on commercial and recreation fisheries.

A second multi-LCC project focused on the use of high resolution satellite imagery to examine habitat changes in difficult to map areas across the United States over time. This imagery is helping conservation practicioners understand how agriculture and other land-use activities have impacted and may impact wildlife habitat in the future.

Our LCC also partnered with our western neighbors on a comprehensive human footprint analysis, which is aiding in conservation planning and design efforts in both the U.S. and Canadian portions of the northern Great Plains. Read more about this project on page 16.



"We have recognized for a long time that we can't do it on our own; there is a "power in numbers" element to working together with partners. In our agency today, I see people embracing the need for landscape-level conservation. Since the main threats to our conservation goals are happening on a landscape scale, it is imperative that our conservation research and action occur at a similar scale. I thought I knew all the "players" in our conservation world, but I am really impressed by the diversity of agencies and organizations who are engaged in our LCC. I've learned more about the energy development occurring in the western part of our LCC, and the pressure that is putting on conservation there."

Sara Vacek, U.S. Fish and Wildlife Service

Boardwalk at Elkwater Lakes in the Alberta portion of the Cypress Hills Interprovincial Park. Like the Sweetgrass and BearsPaw Hills, the Cypress Hills are a montane outlier on the prairies. Photo courtesy of Ian Dyson.

Narrowing our Focus

Land-Use *and* Human Dimensions

Wind turbines. Photo courtesy of U.S. Geological Survey.

Over the past year, our LCC has grown both in the breadth of our partnership, and the depth of our individual agencies' and organizations' commitment to targeting key priorities for conservation. These key priorities will guide our efforts now and in the coming months. Membership within our steering and technical committees has expanded. Multi-partner financial and technical support for our research reflects the collaborative and inclusive nature of our growing enterprise.

During an excellent summer meeting of technical committee members from across the partnership, the LCC welcomed representatives from the National Oceanic and Atmospheric Administration's National Weather Service and the South Dakota Cooperative Unit.

The National Weather Service presented detailed data on climate cycles across North Dakota, and the ongoing and potential future impacts of precipitation and temperature changes. This presentation inspired discussion on the potential for similar data collection efforts across the full reach of National Weather Service offices within the LCC geography.

The South Dakota Cooperative Unit presented an overview of audience-understanding, distinguishing between perceptions and attitudes of the general public, and more targeted groups like private landowners and hunter/angler communities.

From this discussion, technical committee members agreed to further refine the conservation community's need for targeted human dimensions research, specifically focusing on landowner perceptions of conservation opportunities.

Ducks Unlimited, Inc., presented ongoing research on land-use change in the Prairie Pothole Region and northern Great Plains, summarizing multi-partner efforts to examine how wetlands, grasslands and other wildlife habitat has changed over time as a result of shifting agricultural practices and other forms of habitat loss.

LCC partners also discussed the importance of communication and making conservation relevant to the American public, with specific emphasis on the nuances of how habitat loss and land-use change are communicated both within and external to the traditional conservation community.

From this discussion, technical committee members agreed that native prairie and wetland loss across the region, whether due to conversion to agriculture, energy development, or human population growth, is a high priority for the partnership. Collaboration through the LCC can provide value-added to all of our conservation partners as we work to develop policies and programs that reduce habitat loss across this economically and ecologically important landscape.

Expanding Our REACH

Communications remains a critical function of the LCC enterprise. This year, the LCC launched its revamped website (http://www.plainsandprairiepotholeslcc.org) and online workspaces, with more than 5,000 individual site visits since initial launch and more than 100 new site subscribers. Online workspaces are available through registration by steering committee and technical committee members.

In partnership with U.S. Geological Survey, the LCC released an economic analysis of the prairie pothole region, linking land-use and economics to rural-well being. This first of its kind analysis received extensive coverage through national communications channels, including the national U.S. Fish and Wildlife Service, U.S. Geological Survey, and LCC Network websites. With multiple research projects wrapping up and reaching completion, the LCC is working to augment communications efforts by partner agencies to ensure research results and recommendations are put into the hands of on-the-ground decision-makers.

The LCC also participated in a social media challenge alongside other Midwest LCCs, launching a "Learn Your Landscape" social media campaign on Facebook and Twitter to educate the public about natural resources challenges and opportunities across the northern Great Plains andPrairie Pothole Region.

Planning for the first Midwest LCC Communications Network meeting this winter is underway. Communications network members will be introduced to the purpose and value-added of LCCs across the Midwest landscape, and discuss the roles and responsibilities of the communications network to capitalize on shared resources to communicate about landscape scale natural resources issues.

The LCC participated in multiple stakeholder workshops and conferences to provide presentations on LCC activities, including two in-person meeting with the Secretary of the Interior focusing on the crises in the prairies and oil development in the Williston Basin. LCC staff also participated in the America's Grasslands Conference alongside other Midwest LCC coordinators and science coordinators from seven LCCs with prairie interests extending from Canada to Mexico.

Communication is a critical function of our partnership

"The LCC is a great way to stay informed about science needs and ongoing research projects happening throughout the region. I have learned about a number of projects and partnerships that I would not have otherwise been aware of without my participation in the LCC. The LCC spans a wide range of systems from east to west and does a great job of connecting the two halves of the partnership that otherwise may not communicate as frequently."

Marissa Ahlering, The Nature Conservancy

VISIT US: WWW.PLAINSANDPRAIRIEPOTHOLESLCC.ORG

Research HIGHLIGHTS

CROPS, DUCKS AND CLIMATE CHANGE

The Perfect Storm of Changes May Cause the Duck Factory to Move West

The northern Great Plains – one of the most diverse, intact grasslands left on the planet – provides habitat for a variety of sagebrush and grassland birds, some of which are threatened or of special conservation status, including the long-billed curlew, piping plover, mountain plover and greater sage-grouse.

The Prairie Pothole Region at the eastern boundary of the northern great plains is the most productive waterbird area in North America, producing up to 6.5 million ducks each year that migrate as far away as Arkansas.

The University of Wyoming, World Wildlife Fund and Ducks Unlimited produced a model of the likelihood of converting grassland to cropland and the impacts this may have on waterfowl populations in the Northern Great Plains. The model projects that under current economic and climate conditions, grassland in North Dakota is most at risk of being converted.

By 2030, if crop prices continue to increase, North and South Dakota will lose three million acres of additional grassland, while grassland acres in Montana, Wyoming and Nebraska will remain relatively constant.

Removing all government payments decreases the average probability of conversion by an average of three or 30 percent in areas dominated by cropland. Under climate change, the likelihood of conversion increases in areas with a high chance of conversion and decreases in areas with a low chance of conversion. Climate change may shift 10 to 20 percent of the waterfowl that previously settled in North Dakota to Montana and South Dakota.

"Across all the climate and economic scenarios we considered, grassland habitat and waterfowl production are most at risk in North Dakota," said lead author Dr. Ben Rashford.

Under all climate change scenarios, North Dakota will still hold a significant percentage of breeding waterfowl. However, if climate change shifts some waterfowl westward, the importance of wetlands in Montana and South Dakota may also increase in the future. Thus, devising a strategy that will protect waterfowl across the wetland habitats of the northern Great Plains will be essential to ensuring resilience in a changing future.

This recently completed research provides relevant data for decision-makers who must balance the need to produce food and fuel with the desire to protect habitat for important grassland and wetland species.

Pintail. Photo courtesy of Cliff Wallis.

Understanding the Human Footprint
Improving Environmental Quality Across the Northern Great Plains

Dramatic hoodoo landscape on the high western plains of north America, of great significance to the Blackfoot Confederacy and containing a large collection of rock carvings and paintings. Dry mixed grass prairie and Montana's Sweetgrass Hills shown in the background. Photo courtesy of Ian Dyson.

Many 21st century environmental challenges relate to the ways in which humans interact with and impact the natural environment. Managers from across public and private agencies, organizations and jurisdictions have come together to explore the relationship between our human footprint and environmental quality in Canadian and U.S. portions of the northern Great Plains.

The Landscape Patterns Environmental Quality Analysis, made possible through federal, provincial and partner collaboration and support, identifies patterns in landscape change and use as it relates to achieving shared goals for natural resource conservation. These project partners include the Plains and Prairie Potholes Landscape Conservation Cooperative (LCC), Great Northern LCC, Alberta Environment and Sustainable Resource Development, Department of National Defence, Crown Managers Partnership, Oldman Watershed Council, and Prairie Conservation Forum.

The cumulative impacts of human activities on the environment contribute to habitat loss, fragmentation, and changes to watershed hydrology and water quality. Impacts to land, water and biodiversity have been studied extensively by scientists, however, a comprehensive interpretation of these studies is necessary to provide decision-makers, from environmental planners to natural resources managers, with on-the-ground recommendations to improve environmental quality across broad landscapes.

Ian Dyson, lead project investigator with Alberta's Environment and Sustainable Resource Development, poses this question: "Can we achieve landscape level environmental quality by understanding, controlling and guiding the human footprint on our landscapes?"

The analysis distills recommendations from 172 landscape ecology studies into concise pattern-based indicators of environmental quality as they relate to natural resources conservation and management objectives. The studies selected for this analysis shed light on the ways in which patterns of land use and land cover influence ecological flows of water, nutrients, animals, and plants across a landscape.

The province of Alberta is integrating these indicators into a cumulative effects management approach to managing air, water, land and biodiversity, while promoting economic growth and world-class environmental monitoring as part of the Lower Athabasca Regional

Plan. Scott Milligan with Alberta Environment and Sustainable Resource Development says, "The analysis connects biodiversity, water quality and landscape features, and provides tangible evidence and recommendations to land managers undertaking regional and sub-regional planning in our province."

The Oldman Watershed Council is a community-based not-for-profit organization that provides leadership and guidance in watershed planning and management, water quality monitoring, and stewardship promotion across the 10,000 square mile (25,900 square kilometer) drainage area of southern Alberta's Oldman Basin. Executive Director Shannon Frank says the council is using the analysis as a prioritization tool.

"The report provides specific metrics that help watershed planners and communities set targets for what must be kept on the landscape to maintain the ecosystem services that people want and need," Frank said.

"With increasing development pressures it is more difficult to preserve intact landscapes so we must be able to prioritize what pieces of the landscape are critical to retain."

Of the water quality and quantity studies, the strongest association found in the report is that between vegetation cover and water quality. The analysis highlights that the proportion of native land cover in a landscape is a good indicator or environmental quality, species diversity, and riparian and watershed health, whereas the proportion of impervious surface and agricultural land cover are inverse indicators of the same characteristics.

Erin Sexton is the science coordinator for the Crown Managers Partnership, a network of resource managers working to develop and implement trans-boundary, collaborative solutions to ecosystem management across an 18 million acre region encompassing portions of Montana, Alberta and British Columbia known as the "Crown of the Continent." This partnership is also using the landscape analysis to inform land management activities across the region.

"No single agency has the mandate or resources to focus on the entire region so our network seeks to demonstrate collective institutional capacity across borders to address the cumulative impacts of human activities and land-use practices," Sexton said.

"Given the scale of the region, our working hypothesis is that coarse-scale land-use patterns and anthropogenic footprints correlate with environmental quality for indicators such as air quality, water quality, invasive species distribution and biological diversity. The breadth of literature reviewed and analysis conclusions support that hypothesis, showing that specific landscape patterns

Dana Blouin of The Nature Conservancy of Canada and Francois Blouin of the Alberta Conservation Association explain the acquisition and cooperative management practices among partners at Sandstone Ranch in Alberta.Wildlife found in the area includes mule deer, sharptailed grouse, gray partridge, raptors and a variety of small mammals, songbirds and elk. Photo courtesy of Ian Dyson.

are key to maintaining robust ecological function and species diversity."

The Department of National Defence's Canadian Forces Base Suffield is situated within the dry-mixed grasslands of southeastern Alberta and is home to native prairie vegetation and associated wildlife. Conclusions from the landscape analysis are guiding the development of a land management framework for the base, which will manage and sustain military training while fostering sound environmental stewardship.

Insights drawn from the report are guiding communities in conservation and management efforts across the Great Plains landscape. These include:

- *Resource managers should strive to protect large patches of natural vegetation, terrestrial connectivity, and uninterrupted vegetation in riparian corridors .*
- *Land cover and the configuration of landscape features are related, and the relative importance of each fluctuates at certain thresholds of landscape cover.*
- *Large patches of forest or other natural vegetation provide ecological services that cannot be duplicated by other elements.*
- *Linear corridors of vegetation can provide habitat connectivity and erosion control in an otherwise fragmented landscape.*

A report and accompanying database generated from this landscape patterns analysis provide resources managers from the local to regional level with measurable criteria for how human activities can be managed to improve environmental quality and promote effective natural resource conservation.

The searchable database considers scale and location, while including a broad range of keywords related to landscape ecology components, from specific species to broader ecological processes.

Through this easy-to-use format, the database provides a collection of empirically-based planning tools that may be applied to resources planning and monitoring across multiple geographic and contextual scales.

The analysis integrates ecological knowledge into land-use and land management decision-making by providing succinct, systematic and defensible recommendations that can be applied across a wide range of environmental and natural resources planning projects at the local and regional level.

"We are dealing with multiple activities on the landscape, multiple parts of the environment and multiple partners with distinct responsibilities and missions, from watershed and biodiversity planning to broader regional planning efforts both within and between jurisdictions," Dyson said. "Through this collaboration, we are all seeing common merit and relevance in understanding how the human footprint and landscape patterns relate to the outcomes we want to achieve as part of the bigger natural resource community."

View of the Middle Fork of the Flathead River taken from the Glacier Institute, an environmental education facility in Glacial National Park, Montana. Photo courtesy of Ian Dyson.

Rural Well-Being in the Prairie Pothole Region
Linking Land-use and Economics

Land-use in the prairie pothole region of the northern Great Plains has been shifting at an extraordinary rate, including changes in agriculture practices, the recent boom in petroleum production, and rising tourism, according to a new U.S. Geological Survey report.

The report examines how economic variables and rural development are linked to land use in the region and suggests that while agriculture remains an important economic, social and cultural driver, the long-term economic health of the prairie pothole region is dependent on a strong off-farm economy as well.

"This report shows that policymakers and land managers may want to think holistically about land-use change and understand the linkages between their decisions and aspects of community well-being," said William Gascoigne, the scientist who led the study.

"We set out to produce the most comprehensive report regarding land conditions, economic influence, and rural community well-being in the prairie pothole region to help inform their decisions," he said.

The report showed that although a vast amount of land in the region remains in farming — still a major employer in select counties — technological advances in agriculture and a depressed off-farm economy are threatening the economic contribution of this industry.

"We found that a strong farm economy and the persistence of family farms are just as, if not more so, dependent on a strong off-farm economy and labor market," Gascoigne said. "Although each community is unique, modern rural-development must go beyond agriculture and take sight of other aspects of rural communities, including what attracts people to the area."

The newly released report and fact sheet also demonstrated that

Waterfowl in flight. Photo courtesy of U.S. Fish and Wildlife Service.

Downtown Main Street in South Dakota. Photo courtesy of Justin Goetz.

native prairie grassland remains in decline, a large portion of lands enrolled in the U.S. Department of Agriculture's Conservation Reserve Program are once again being cultivated, and expanding petroleum production has just moved North Dakota past Alaska as the number two oil producer in the nation.

While agriculture and oil production are major economic players, the report also noted that tourism — largely wildlife-based in this region — is a top-three industry in both of the Dakotas and is growing at above the national average in these states.

"The farming community has long understood that diversity in agricultural operations is critical to economic productivity," said Rick Nelson, coordinator for the Plains and Prairie Potholes LCC, which funded the study.

"Local policy makers also know that tourism activities and outdoor recreation are key components of a healthy local economy. It is less understood how this economic activity is threatened by land-use change and loss of habitat. This study helps to quantify how an investment of time and resources in strengthening the nonfarm rural economy may greatly assist local governing officials as they work to support agriculture in the community."

The study conservatively estimates that expenditures on hunting and wildlife viewing are estimated to be contributing close to 10,000 jobs, $760 million in labor income, and $450 million in output to the regional economy. In addition, operational spending by the U.S. Fish and Wildlife Service National Refuge System and the Partners for Fish and Wildlife Program, including perennial habitat restoration, are supporting close to another 900 jobs, $40 million in labor income, and $50 million in output in the region.

Climate Change and Dwindling Wetlands
Impacts to People and Wildlife

Aerial view of wetlands in prairie pothole region. Photo courtesy of U.S. Fish and Wildlife Service.

Wetland hydroperiod, the length of time water is available in wetlands, is particularly sensitive to changes in precipitation, temperature and timing due to the variation of our climate. Shorter lengths of time that water is available has major implications for wetland-dependent species from wetland plants to waterfowl, as well as water availability for crops and livestock.

In 2013, researchers with the University of Wyoming completed a study projecting the availability of wetlands across the sage-steppe and grassland regions of the LCC geography under current and projected climate scenarios.

The researchers combined high resolution satellite imagery and remote-sensing data to build fine-scale maps of wetland hydroperiod and project how that may change over time. This powerful framework will help natural resources managers - both public and private - plan for future changes in water availability.

"We know wetlands are important to biodiversity, but they also have an impact on livestock and people," said lead investigator Dr. Melanie Murphy.

"If we have future conditions of much less precipitation, what does that mean for an area to have surface waters, and how does that impact farming, ranching, flooding?"

Researchers found that snowpack is the most significant indicator for whether or not a wetland will hold water. "Even if we have high precipitation levels in the form of rain in a given year, if we have low snowpack, water in wetlands are still projected to be low," Murphy said.

This research has implications for migratory flyways by impacting the availability of suitable breeding and stopover habitat for a variety of waterfowl and other migratory birds. Known as the nation's "duck factory," the Prairie Pothole Region contributes millions to the regional and national economy, providing hunting, birding, nature photography and other outdoors opportunities for both residents and visitors to the region.

Wetlands also act as a natural filtration system, filtering out toxins, pollutants and nutrients that can be detrimental for water quality - for people and wildlife. They also disperse excess water, thus reducing the negative impacts of flooding, a natural disaster that can significantly impact local and regional economies and community safety.

"It's clear that the availability of water in wetlands in the future will have significant impacts on both wildlife and people," Murphy said.

"This research gives us the information needed to better prepare for these impacts, and potentially take action to mitigate or reduce those impacts as a collective conservation community."

"With the accelerating industrialization and fragmentation of the northern Great Plains, delivering meaningful conservation impact has never been more important. Conservation success will be achieved by engaging a broad constituency of supporters, with a particular focus on communities living there, who share a common understanding of what intact grasslands provide and a common interest in conserving them. Once focused on shared goals, coordinated actions can be taken to slow loss and degradation by enlisting unified support, from the general public to the highest levels of public and private leadership. The LCCs working in the Great Plains give us a great starting point and perhaps represent our best hope for organizing around common goals to this end."

Jeff Nelson, World Wildlife Fund

Partners of the Prairie Conservation Forum review reclamation efforts for the Express Pipeline in the dry mixed grass to the south and west of the Cypress Hills in Alberta. Conservationists work together on reclamation efforts to conserve native grasslands. The pipeline carries crude oil from Hardisty, Alberta to markets in Montana, Utah, Wyoming and Colorado. Photo courtesy of Ian Dyson.

Our Promising FUTURE

Wildlife viewing at a national wildlife refuge. Photo courtesy of U.S. Fish and Wildlife Service.

For many of us in the natural resources field, the stressors impacting our land and water resources can seem complex and overwhelming.

Looking back over the past three years, we have challenged ourselves to build an effective approach to conservation, fueled by the united conviction that our unique land, water, fish and wildlife resources are important to our quality of life in North America, and across the globe.

Through our collective vision, and the collective commitment of our partner agencies and organizations, we can and are working to create a viable and sustainable future for these unique and essential resources.

Our LCC recognizes the potential of collaborative conservation. The days of competitive programs that segment financial resources and produce random acts of conservation are over. By providing access to external funds and resources, and information-sharing through collaborative partnerships, we are expanding resources and meeting the need for coordinated action and pragmatic landscape-level research. A partnership of partnerships, we are inspired by our concerted approach to identify research needs and solutions that effectively address our complex natural resource challenges.

Over the past three years, we have supported more than 30 cutting edge research projects that are testing hypotheses and answering complex questions. We are developing and delivering science, information and tools related to grassland conversion risk, climate change, energy development, fish passage, native prairie and sage-steppe management, and the socio-economic characteristics of the northern Great Plains and Prairie Pothole Region. As we move into our fourth year, we are seeing on-the-ground implementation of the recommendations generated by these projects.

The Plains and Prairie Potholes LCC is paving the way for the future through a 21st century model for conservation. Looking to the future, we must continue to communicate the importance of our cooperative approach to conservation and management while emphasizing the relevancy of our work to the American public.

It has often been said that we won't get the future we hope for but the future we work hard to create. The science we produce, coupled with the use of that science to inform decision-making, will allow our partnership to work toward a future where conservation is relevant, valued and an integral part of our society.

Rick Nelson
LCC Coordinator

www.PlainsandPrairiePotholesLCC.org

US Army Corps of Engineers

Montana Fish, Wildlife & Parks

Iowa Department of Natural Resources

Ducks Unlimited

USGS science for a changing world

USDA ars

WWF

prairie habitat joint venture

National Fish Habitat Partnership

The Nature Conservancy

NRCS

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