

Fine, Karlene K.

From: Dan Casey <dcasey@abcbirds.org>
Sent: Monday, December 02, 2013 4:48 PM
To: -Info-IC Outdoor Heritage
Subject: Proposal submittal: Conservation of Long-billed Curlews
Attachments: OHF Grant application ABC.docx; OHF budget-form ABC.docx; Conservation Strategies for the Long-billed Curlew.docx

To Whom it May Concern:

American Bird Conservancy is pleased to submit the enclosed grant request to the North Dakota Outdoor Heritage Board for consideration during your current funding cycle. We are engaged in an effort to enhance the delivery of conservation practices on private lands, through a cooperative effort with the Natural Resources Conservation Service, in the seven southwestern counties of North Dakota. The activities proposed are part of a larger, range-wide effort to meet the habitat needs of the Long-billed Curlew, a declining shorebird species dependent on grassland habitats. We have attached a "Conservation Strategies" document which sets the context for this effort. Privately-owned rangelands are a critical part of the conservation strategy for this and other declining grassland birds, and their needs can be met with sustainable grazing and haying practices.

Please contact me if further materials are needed. Thank you in advance for your consideration of this request.

Dan Casey

Daniel Casey
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Outdoor Heritage Fund Grant Application

The purpose of the North Dakota Outdoor Heritage Fund is to provide funding to state agencies, tribal governments, political subdivisions, and nonprofit organizations to:

Directive A. Provide access to private and public lands for sportsmen, including projects that create fish and wildlife habitat and provide access for sportsmen;

Directive B. Improve, maintain, and restore water quality, soil conditions, plant diversity, animal systems and to support other practices of stewardship to enhance farming and ranching;

Directive C. Develop, enhance, conserve, and restore wildlife and fish habitat on private and public lands; and

Directive D. Conserve natural areas for recreation through the establishment and development of parks and other recreation areas.

Exemptions

Outdoor Heritage Fund grants may not be used to finance the following:

- A. Litigation;
- B. Lobbying activities;
- C. Any activity that would interfere, disrupt, or prevent activities associated with surface coal mining operations; sand, gravel, or scoria extraction activities; oil and gas operations; or other energy facility or infrastructure development;
- D. The acquisition of land or to encumber any land for a term longer than twenty years; or
- E. Projects outside this state or projects that are beyond the scope of defined activities that fulfill the purposes of Chapter 54-17.8 of the North Dakota Century Code.

Application Deadline

Applications for the first grant round cycle are due on **December 2, 2013 at 5:00 p.m. CST.** All information, including attachments, must be submitted by that date. See instructions below for submission information.

Instructions

It is our intent to have this form available on line. However, until that on-line form is available we are asking that you submit your application as a Word document. Please download this Word document (available on the Industrial Commission/Outdoor Heritage Fund Program website at <http://www.nd.gov/ndic/outdoor-infopage.htm>) to your computer and provide the information as requested. You are not limited to the spacing provided except in those instances where there is a limit on the number of words. After completing the application, save it and attach it to an e-mail and send it to outdoorheritage@nd.gov .Then submit the Word document as noted in the following paragraph.

Attachments in support of your application may be sent by mail to North Dakota Industrial Commission, ATTN: Outdoor Heritage Fund Program, State Capitol – Fourteenth Floor, 600 East Boulevard Ave. Dept. 405, Bismarck, ND 58505 or by e-mail to outdoorheritage@nd.gov . The application and all attachments must be received or postmarked by the application deadline. You will be sent a confirmation by e-mail of receipt of your application.

You may submit your application at any time prior to the application deadline. Early submission is appreciated and encouraged to allow adequate time to review your application and ensure that all required information has been included. Incomplete applications may not be considered for funding. **Any item noted with an * is required.**

Oral Presentation. Please note that you will be given an opportunity to make a ten-minute Oral Presentation at a meeting of the Outdoor Heritage Fund Advisory Board tentatively scheduled for the week of January 13, 2014. These presentations are strongly encouraged.

Open Record. Please note that your application and any attachments will be open records as defined by law and will be posted on the Industrial Commission/Outdoor Heritage Fund website.

Name of Organization * **American Bird Conservancy**

Federal Tax ID# * **521501259**

Contact Person/Title * **Daniel Casey, Northern Rockies Conservation Officer**

Address * **33 Second Street East**

City * **Kalispell**

State * **Montana**

Zip Code * **59901**

E-mail Address * dcasey@abcbirds.org

Web Site Address (Optional) www.abcbirds.org

Phone * **406-756-2681**

Fax # (if available) **406-756-2682**

List names of co-applicants if this is a joint proposal

MAJOR Directive: (select the Directive that best describes your grant request)*

Choose only one response

Directive A. Provide access to private and public lands for sportsmen, including projects that create fish and wildlife habitat and provide access for sportsmen;

Directive B. Improve, maintain, and restore water quality, soil conditions, plant diversity, animal systems and to support other practices of stewardship to enhance farming and ranching;

Directive C. Develop, enhance, conserve, and restore wildlife and fish habitat on private and public lands; and

Directive D. Conserve natural areas for recreation through the establishment and development of parks and other recreation areas.

Additional Directive: (select the directives that also apply to the grant application purpose)*

Choose all that apply

Directive A. Provide access to private and public lands for sportsmen, including projects that create fish and wildlife habitat and provide access for sportsmen;

Directive B. Improve, maintain, and restore water quality, soil conditions, plant diversity, animal systems and to support other practices of stewardship to enhance farming and ranching;

Directive C. Develop, enhance, conserve, and restore wildlife and fish habitat on private and public lands; and

Directive D. Conserve natural areas for recreation through the establishment and development of parks and other recreation areas.

Type of organization: (select the category that describes your organization)*

State Agency

Political Subdivision

Tribal Entity

Tax-exempt, nonprofit corporation, as described in United States Internal Revenue Code (26 U.S.C. § 501 (c))

Project Name*

Conservation of Long-billed Curlews on Private Lands in SW North Dakota

Abstract/Executive Summary. An Executive Summary of the project stating its objectives, expected results, duration, total project costs and participants.* (no more than 500 words)

American Bird Conservancy (ABC) respectfully requests an 15-month grant of \$41,994 to serve as match for an ongoing \$140,000 grant from the National Fish and Wildlife Foundation (NFWF) and other sources to enable ABC and partners to accelerate delivery of United States Department of Agriculture (USDA) Farm Bill Program conservation practices delivered by the Natural Resources Conservation Service (NRCS) in the Northern Great Plains to support populations of Long-billed Curlews and other species of conservation concern. This project is part of a full-life cycle Long-billed Curlew conservation program ABC is leading through its Migratory Bird Program and complements ongoing work in Mexico, the United States and Canada. Our project is designed to work closely with District Conservationists and their staff in a seven-county area in southwestern North Dakota (and adjoining counties in Montana and South Dakota), to identify conservation opportunities on private land that enhance habitat for grassland birds while providing sustainable grazing and hay production opportunities. We are doing this through analysis of existing curlew and habitat data, consultation with NRCS and North Dakota Game and Fish (NDFG) personnel, and directed outreach to key landowners already willingly enrolled in cost-shared NRCS conservation practices. Our objective is to implement production-compatible best management practices for Long-billed Curlews on a minimum of 1,280 ac of private lands in North Dakota by 1 July 2013, and to identify additional lands for implementation beyond that date. We have identified several NRCS programs with potential for this effort, including the Conservation Stewardship Practices (CSP), Environmental Quality Incentives Program (EQIP), Conservation Reserve Program (CRP), and Wetland Reserve Program (WRP). We are implementing this program through an ABC Conservation Specialist stationed in the Hettinger, ND office of the NRCS. We are seeking funding to support that position, to enhance our outreach efforts, and to provide funding for fencing to implement grazing programs to reach seasonal management objectives for habitat conditions on lands already under easement (under the WRP program in particular).

Amount of Grant request \$ * 41,994

Total Project Costs \$* 226,602

(Note that in-kind and indirect costs can be used for matching funds)

Amount of Matching Funds \$ 184,608

If applicable

Please indicate if the matching funds will be in-kind, indirect or cash.

Cash: \$165,000

In-kind: \$ 19,608

Source(s) of Matching Funds

If applicable

National Fish and Wildlife Foundation: \$140,000

Northern Great Plains Joint Venture: \$25,000

In-kind Citizen Science monitoring: \$10,000

In-kind Indirect: \$4,620

Certifications *

I certify that this application has been made with the support of the governing body and chief executive of my organization.

I certify that if awarded grant funding none of the funding will be used for any of the exemptions noted on Page 1 of this application.

Narrative

Organization Information – Briefly summarize your organization’s history, mission, current programs and activities. *

Include an overview of your organizational structure, including board, staff and volunteer involvement. (no more than 300 words)

American Bird Conservancy (ABC) is a 501(c)(3), not-for profit organization whose mission is to conserve native birds and their habitats throughout the Americas. ABC is the only U.S.-based group with a major focus on bird habitat conservation throughout the entire Americas. ABC acts across the full spectrum of threats to birds to safeguard the rarest bird species, restore habitats, and reduce threats, unifying and strengthening the bird conservation movement. ABC advances bird conservation through direct action and by finding and engaging the people and groups needed to succeed, regardless of their political, economic, or social point of view. ABC seeks innovative, fair solutions to difficult issues.

ABC aspires to lead bird conservation by analyzing issues using the best available science; facilitating networks and partnerships; sharing information; developing and implementing collaborative strategies; and establishing measurable outputs. We do this with a diverse but efficient staff that includes regional positions working to deliver habitat conservation on public and private lands, through partnerships. One strong element of our domestic habitat program is to recognize and enhance the value of working lands (grazing, agriculture, forestry) by bringing the best current science to pragmatic, collaborative solutions. We are supported by membership, private and government grants, and governed by a Management Board consisting of 19 people with broad and deep experience in the private and public sectors. Our Northern Rockies Conservation Officer is Daniel Casey, who has more than three decades of experience working on bird conservation in the West, and has served on the technical committees of the Prairie Potholes, Northern Great Plains and Intermountain West Joint Venture. Our Long-billed Curlew Specialist, Cheryl Mandich, has a strong background in range management and landowner relations, and is working closely with NRCS staff to deliver this program.

Purpose of Grant – Describe the proposed project identifying how the project will meet the specific directive(s) of the Outdoor Heritage Fund Program *

Identify project goals, strategies and benefits and your timetable for implementation. Include information about the need for the project and whether there is urgency for funding. Please indicate if this is a new project or if it is replacing funding that is no longer available to your organization. Identify any innovative features or processes of your project.

The continued decline of Long-billed Curlew populations over the last two decades has resulted in this species being a conservation focus on every level of government in the United States and Canada, and a major regional conservation effort in Mexico. In 2009, the U.S. Fish and Wildlife Service estimated the total population of Long-billed Curlews at <170,000 individuals. As a result, it is a target species for conservation action throughout its range, and in most State Conservation Plans in the West including North Dakota. Roughly 50% of the breeding LBCU population is found in the Northern Great Plains. The species is not currently listed as threatened or endangered, and its habitat needs can be met in working agricultural landscapes with appropriate management.

The principal known threat is habitat loss or degradation throughout the Long-billed Curlew's range. Sufficient scientific data, and committed partners now exist to halt the decline of this species, but greater resources and a coordinated, tri-national effort is needed to succeed. ABC has undertaken an effort to generate these resources and develop public/private partnerships aimed at producing a measurable (10%) increase in Long-billed Curlew populations in ten years through its Migratory Bird Program. One long-term goal of our program is to incorporate new best management practices for the species into the management of more than one million acres of public and private lands representing the LBCU's key breeding, migratory, and wintering habitat. We have identified continental and regional focal areas for the conservation of the species, where implementing sustainable practices on private lands is essential to meeting these objectives.

Under a current, two year, U.S. Fish and Wildlife Service Neotropical Migratory Bird Conservation Act grant, ABC has already begun implementation of several key actions to move toward range-wide conservation of Long-billed Curlews. We have worked with Canadian and U.S. partners to compile and develop urgently needed Best Management Practices (BMPs) and recommended conservation strategies for Long-billed Curlews on their breeding grounds (sagebrush, agricultural and grassland habitats), and to identify focal areas for conservation. We are also working with partners in Mexico to protect and improve management of a key wintering site for 30% of the LBCU population. We are working with the western state NRCS offices to integrate these BMPs into their landowner incentive programs, including their Sage Grouse Initiative, and to promote the Long-billed Curlew BMPs to priority private landowners in focal areas with a goal of improving the management of least 10,000 acres of private lands in the Intermountain West over the next two years. Simultaneously, we have been providing public and private conservation partners throughout the breeding range of the Long-billed Curlew with the BMPs and maps of focal areas to implement strategic conservation for this declining species. ABC's "Conservation Strategies for the Long-billed Curlew" has been forwarded to the Outdoor Heritage Fund Program along with this proposal.

With NFWF funding, we have expanded these efforts geographically into those portions of the Northern Great Plains known to support populations of Long-billed Curlews and are taking specific steps to accelerate delivery of NRCS Farm Bill Program conservation practices there, including seven North Dakota Counties: Adams, Billings, Bowman, Golden Valley, Hettinger, Slope and Stark. We are seeking funding from the Outdoor Heritage Fund to provide match and additional impetus to this NFWF-funded project, initiated in July 2013. We are obligated to raise \$140,000 in non-federal matching funds no later than June 2014, and we intend to continue the project and its successes into 2015 and beyond. We are asking for \$12,144 to implement much-needed conservation measures

during our current NFWF contract, and an additional \$29,850 in funding to support salary and travel for our Conservation Specialist for 6 months to pursue North Dakota opportunities identified and initiated during our ongoing work, through March 2015.

We are working with our NRCS partners to identify specific opportunities to enhance conservation program and practice delivery. Throughout much of their breeding range in the Northern Great Plains, CRP practices have the potential to meet the needs of breeding curlews, particularly where native mixed grasses and forbs have been planted (e.g. practices CP2, CP4D), or where there is willingness to switch to native vegetation. However, all seven of the North Dakota counties in our project area have recently expired CRP acreage, with 15,000 to 30,000-ac having expired in Hettinger County alone. It is imperative that we identify those places and landowners currently or recently enrolled that support Long-billed Curlews, and those interested in enrolling, as part of our overall strategy to enhance the value of CRP practice delivery in the region. In the face of continuing drought, expiring contracts and other pressures on native grassland habitats, we hope to implement guided management actions in strategic locations to provide BMPs for curlews and associated species of conservation concern.

Specifically, during this grant, ABC and partners will:

1. In close cooperation with NRCS staff, develop specific prescriptions for grazing, haying, planting or fencing that can be delivered through existing (e.g. CRP, EQIP, WHIP) or modified (e.g. Special EQIP) conservation practices.
2. Refine Northern Great Plains focal areas and identify priority willing private landowners within those focal areas for conservation delivery (ongoing);
3. Target landowner outreach by the Conservation Specialist in partnership with NRCS staff to recruit landowners for enrollment in incentive and cost-share programs. Focal area counties include those known to be inhabited by curlews, dominated by private land ownership, and where CRP enrollment declines are expected to be the greatest;
4. Enhance education efforts for regional landowners and managers regarding the value of native grasslands to birds, in the context of conservation practices/incentives/management options available to them;
5. Implement BMPs on a minimum of 1,280 ac of private land in southwestern North Dakota by June 2014, and assess initial curlew response.

One of the opportunities we have identified is to implement experimental grazing and/or haying on Wetland Reserve Program (WRP) easements to enhance their value to Long-billed Curlews and other grassland bird species reliant on shorter grass structure. There are 28 WRP easements totaling 6,248 ac in our North Dakota project counties. Managed grazing/haying on these lands will provide added wildlife benefits and added forage value to livestock producers while maintaining the soil and water quality protection afforded by the NRCS-funded easements on the selected sites. They are innovative not only in facilitating non-emergency use of the grassland resources on these easements, but in designing management to provide for a suite of species not typically targeted by NRCS conservation practices (which are often aimed at maintaining more residual cover). Effective fencing and monitoring should show that more utilization of these lands will not compromise their value to soil and water protection, and will increase their value to a group of bird species in need.

We will use the requested funding to help identify key sites for BMP implementation in our seven North Dakota counties, and to build such temporary (electric) or permanent perimeter/cross-fencing as is necessary to manage grazing to meet our objectives on a minimum of four private land parcels. All fencing would be designed so as not to compromise wildlife movements. Consistent with the Outdoor Heritage Fund objectives, we will favor those landowners who provide public access whenever possible. Our cost assumptions in the proposal are based on building 2 miles of fencing. Fencing and grazing would be done to allow rotational management, in order to maintain values to wildlife dependent on taller/dense cover, but to facilitate reaching the following desired habitat conditions spelled out in our BMPs, while simultaneously meeting the needs of participating landowners:

Manage Grazing Appropriately

- Remove tall, dense residual vegetation before the spring arrival/pre-laying period (graze in fall/winter). Target date: 15 March (adjusted regionally/locally)
- Adjust timing and intensity of grazing to leave grass cover 10-30 cm tall by the time of nest initiation. Target date: 15 April (adjusted regionally/locally).
- Retain 5% of grasses and forbs in taller condition (30-40 cm) for broods.
- Avoid grazing during the incubation and nestling period, to avoid potential for trampling. Target dates: 15 April – 15 July (adjusted regionally/locally)

Halt Habitat Conversion

- Maintain or manage for grassland block sizes of >120 acres.

Emphasize Native Grasses and Forbs

- Avoid seeding with non-natives (e.g. crested wheatgrass).
- Use locally-appropriate native bunchgrass/forb seed mixes for restoration and revegetation efforts.
- Where necessary, manage taller non-native grass cover with grazing, mowing or fire to maintain low profile vegetation prior to the nesting season.

Management of Project – Provide a description of how the you will manage and oversee the project to ensure it is carried out on schedule and in a manner that best ensures its objectives will be met.*

Include a brief background and work experience for those managing the project.

To assist the Northern Rockies Conservation Officer in achieving the outcomes described above, ABC has employed a full-time Long-billed Curlew Conservation Specialist for fifteen months (July 2013 – Sept. 2014) based out of the NRCS Field office in Hettinger (Adams County). Her position is currently funded by our NFWF grant through 1 July 2014, and by the NGPJV for three months thereafter. She reports to the Northern Rockies Conservation Officer to report on project progress, and to the District Conservationist in Hettinger for day to day office tasks. We have incorporated frequent coordination meetings with NRCS staff from all affected counties into our project coordination.

Dan Casey is ABC's Northern Rockies Conservation Officer, based out of Kalispell Montana, and will serve as the project lead. Dan is the past chair of the Montana and Western Working Group of Partners in Flight, and primary author of the Montana PIF Bird Conservation Plan. He has served on the Technical Committees of the Intermountain, Prairie Potholes and Northern Great Plains Joint

Ventures, and authored the landbird chapters of the Implementation Plans for both the IWJV and the PPJV. He is recently completed a project funded by NRCS under their Conservation Effects Assessment Program (CEAP) to assess the potential population effects of CRP, EQIP and WHIP practice delivery across the Intermountain West (BCRs 9, 10 and 16) on three sagebrush obligate landbirds and two grassland species, including the Long-billed Curlew. That work relied on modeling conducted for the IWJV that uses landcover and condition classes, with associated occupancy and density information by species, to predict carrying capacity of the landscape and population responses to habitat change. Dan led the effort to compile BMPs, focal areas and recommended management actions for curlews under the current tri-national NMBCA grant.

Dan Casey, Susannah Casey and Cheryl Mandich of ABC will be responsible for most of the GIS work needed to identify focal areas, potential and known curlew habitat, and key landowners. NRCS staff in all three states have reviewed and endorsed our project, and we will work with them throughout the project for guidance in site selection and landowner contacts.

Cheryl Mandich, ABC's Long-billed Curlew Conservation Specialist, moved to Hettinger to begin work in the NRCS office in August 2013. She has a background working with GIS and on landscape-level habitat restoration for Greater Sage-Grouse, in Wyoming. She has a strong working knowledge of agricultural landscapes, use of natives in habitat restoration, range management and landowner relations. She has established strong working relationships with NRCS and agency personnel in the project area.

ABC's staff is coordinating closely with Sandy Johnson of NDGF, and with the Northern Great Plains Joint Venture, their science and technical staff, and existing Sage Grouse Initiative partner biologists in the region to ensure that Joint Venture objectives, decision support tools and spatial prioritization are all fully utilized in the identification of focal areas and desired future conditions. We will continue to use landcover and ownership information to identify those private parcels with the best potential for curlews, focusing on those parcels with at least 120 acres.

Evaluation – Describe your plan to document progress and results. *

How will you tell if the project is successful? Please be specific on the methods you will utilize to measure success. Note that regular reporting, final evaluation and expenditure reports will be required for every grant awarded.

This project will expand Long-billed Curlew NRCS private land work in the Northern Great Plains, and result in contact with a minimum of 300 private landowners in LBCU focal areas in North Dakota, Montana and South Dakota to encourage enrollment in NRCS programs. More than 1,280 acres in southwestern North Dakota will be enrolled in conservation practices to meet desired habitat conditions for the species (part of 6,250 acres in the three states). It is an important part of a larger, tri-national, public/private, multi-partner initiative led by ABC to halt the decline of Long-billed Curlews and complements Long-billed Curlew NRCS work being launched in August 2012 elsewhere across the range of the species.

This project will help measurably meet conservation goals of the NRCS, U.S. Fish and Wildlife Service Long-billed Curlew Conservation Plan, and the North Dakota State Wildlife Action Plan. We will focus in part on those counties and land units currently enrolled in CRP practices, but due to expire, particularly those where native grass and forbs have been (or could be) planted by willing landowners. We will also focus on the 28 WRP easements in the seven southwestern North Dakota

counties. Other Species of Conservation Concern that will benefit from conservation actions taken on behalf of Long-billed Curlews include Sprague's Pipit, Greater Sage Grouse, Lark Bunting, McCown's and Chestnut-collared Longspurs, Grasshopper Sparrow and Mountain Plover.

We will measure our success by broad acceptance of our focal areas and BMPs for the Northern Great Plains, by the number of priority private landowners contacted in Great Plains curlew focal areas, and by the number of acres enrolled in NRCS programs such as CRP, and the number of acres where important Long-billed Curlew habitat conservation practices are applied (objective >1,280 in North Dakota). Documentation of improved curlew site occupancy and reproductive performance will be documented through surveys conducted by the landowners, volunteers recruited through state agencies or NGO partners. This effort is included in the budget as in-kind match. Much of the response by LBCU is anticipated to be beyond the two year project period covered by this project.

Financial Information

ATTACHMENT: Project Budget – Using the standard project budget format that is available on the website at <http://www.nd.gov/ndic/outdoor-infopage.htm> , please include a detailed total project budget that specifically outlines all the funds you are requesting.*

The project budget should identify all matching funds, funding sources and indicate whether the matching funds are in the form of cash or in-kind services. As noted on the standard project budget format, certain values have been identified for in-kind services. Please utilize these values in identifying your matching funds. **NOTE: No indirect costs will be funded.**

I certify that a project budget will be sent to the Commission*

Sustainability – Indicate how the project will be funded or sustained in future years. *

Include information on the sustainability of this project after all the funding from the Outdoor Heritage Fund has been expended and whether the sustainability will be in the form of ongoing management or additional funding from a different source.

ABC is committed to continuing efforts to implement full life-cycle for the Long-billed Curlew, throughout its range, for at least the next 5-10 years. We will seek funding from diverse sources to continue this work. One objective of the current project is to demonstrate that we can get best management practices for the species directly incorporated into NRCS conservation practice criteria and design, which will maintain conservation delivery over the long term. We anticipate asking both NFWF and the NGPJV for additional funding for this project in 2015 and beyond.

Partial Funding – Indicate how the project will be affected if less funding is available than that requested. *

We are less likely to deliver conservation on our target acreages if less funding is available than requested, and our project may lose continuity.

Scoring of Grants

All applications will be scored by the Outdoor Heritage Fund Advisory Board after your ten-minute oral presentation. The ranking sheet(s) that will be used by the Board is available on the website at <http://www.nd.gov/ndic/outdoor-infopage.htm> .

Awarding of Grants

All decisions on requests will be reported to applicants no later than 30 days after Industrial Commission consideration. Applicants whose proposals have been approved will receive a contract outlining the terms and conditions of the grant. Please note the appropriate sample contract for your organization on the website at <http://www.nd.gov/ndic/outdoor-infopage.htm> that set forth the general provisions that will be included in any contract issued by the North Dakota Industrial Commission. Please indicate if you can meet all the provisions of the sample contract. If there are provisions in that contract that your organization is unable to meet, please indicate below what those provisions would be. *

Responsibility of Recipient

The recipient of any grant from the Industrial Commission must use the funds awarded for the specific purpose described in the grant application and in accordance with the contract. The recipient cannot use any of the funds for the purposes stated under Exemptions on the first page of this application.

If you have any questions about the application or have trouble submitting the application, please contact Karlene Fine at 701-328-3722 or kfine@nd.gov

Budget Standard Form

Please use the table below to provide a detailed total project budget that specifically outlines all the funds you are requesting and if there are any matching funds being utilized to fund this project. Please note if the matching funds are in the form of cash, indirect costs or in-kind services. The budget should identify all other committed funding sources and the amount of funding from each source. Match can come from any source (i.e. private sources, State and Federal funding, Tribal funding, etc.) Note match funding is not required but an application will be scored higher if match funding is provided. (See Scoring Form.)

Please feel free to add columns and rows as needed. Please include narrative to fully explain the proposed budget.

Note that NO INDIRECT COSTS will be funded from the Outdoor Heritage Fund.

Project Expense	OHF Request	Applicant's Match Share (Cash)	Applicant's Match Share (In-Kind)	Applicant's Match Share (Indirect)	Other Project Sponsor's Share
Fencing (materials and labor)	\$ 12,144	\$	\$	\$	\$
Conservation Specialist: Salary	\$ 26,550	\$	\$	\$	\$79,600 (NFWF) \$13,275 (NGPJV)
No. Rockies Conservation Officer: Salary	\$	\$	\$	\$	\$25,379 (NFWF)
Migratory Bird Program Director: Salary	\$	\$	\$	\$	\$ 5,446 (NFWF)
Travel, Conservation Specialist	\$ 3,300	\$	\$	\$	\$ 7,525 (NFWF) \$ 2,775 (NGPJV)
Travel, No. Rockies Conservation Officer	\$	\$	\$	\$	\$ 4,225 (NFWF)
Travel Support, Volunteers	\$	\$	\$	\$	\$ 2,500 (NGPJV)
Mailings/Printing	\$	\$	\$	\$	\$ 3,000 (NFWF)
ABC Indirect	\$	\$	\$ 9,608	\$13,000(NFWF) \$ 2,275 (NGPJV)	\$
Rent	\$	\$	\$	\$	\$ 6,000 (NFWF)
Monitoring			\$ 10,000		
Total Project Costs	\$ 41,994	\$	\$ 19,608	\$ 15,275	\$ 149,725

DRAW TEXT BOX FOR DETAILS HERE

Salary/benefits for Conservation Specialist: 6 mo. (0.5 FTE) at \$53,100
 Travel: 6 mo. at 1,000 mi/month = 6,000 mi @ \$0.55/mi
 Fencing: 2 mi of fencing, materials and labor @ \$ 6,072/mi.
 (based on the mean cost of four fence types: interior electric polyline (\$0.20/ft); high tensile electric (\$0.89/ft), barbed wire (\$1.48/ft), and woven wire (\$1.93/ft), from the Iowa Extension Service at <http://www.extension.iastate.edu/agdm/livestock/html/b1-75.html>);
 See below.
 Indirect (overhead) at 22.88%

Woven wire fence

The woven wire fence (see Table 1) employs a brace that uses two 8-inch diameter posts and a 4-inch diameter cross-brace at each end. Posts between the braces are steel "T" posts alternated with 4-inch diameter pressure-treated wood posts. All posts are spaced 12 feet apart with one strand of barbed wire at the top.

Table 1. Construction costs for woven wire fence (Based on a 1,320 ft. fence)

Item	Amount	Cost per unit	Total cost
Wood posts (8-in diameter)	4	\$ 28.00	\$ 112.00
Wood posts (4-in diameter)	57	9.00	513.00
Steel posts (6.5 ft)	55	5.00	275.00
Staples and clips	10 lb	1.80	18.00
Barbed wire (12-gauge)	1,320 ft.	.06	79.20
Woven wire (48 in)	1,320 ft.	.70	924.00
Labor and equipment	42 hr	15.05	<u>632.11</u>
Total			\$ 2,553.31
Total per foot			\$ 1.93

Barbed wire fence

Materials for the barbed wire fence (see Table 2) are similar to the woven wire fence except that five strands of 12-gauge barbed wire are substituted for the woven wire and single strand of barbed wire.

Table 2. Construction costs for barbed wire fence (Based on a 1,320 ft. fence)

Item	Amount	Cost per unit	Total cost
Wood posts (8-in diameter)	4	\$ 28.00	\$ 112.00
Wood posts (4-in diameter)	57	9.00	513.00
Steel posts (6.5 ft)	55	5.00	275.00
Staples and clips	10 lb	1.80	18.00
Barbed wire (12-gauge)	6,600 ft	.06	396.00
Labor and equipment	39 hr	16.25	<u>633.75</u>
Total			\$ 1,947.75
Total per foot			\$ 1.48

High-tensile electrified wire fence

The high tensile electrified fence (see Table 4) uses five strands of 12.5 gauge high tensile wire with three charged and two grounded wires. Bracing uses three 8-inch diameter posts and two 4-inch diameter cross braces on each end. With the exception of brace posts, steel "T" posts spaced 25 feet apart are used. One quarter of the cost of an electric energizer is included in the cost of the 1,320 foot fence, assuming that such a unit would be used to energize at least a mile of fence. Wire tension on this fence is maintained with springs and ratchet type tensioning devices.

Electrified polywire fence (for interior use only)

The polywire fence (see Table 5) uses one strand of polywire. With the exception of the end posts, fiberglass rod posts are used and spaced 40 feet apart. One-fourth of the cost of an electric energizer is included in the cost of 1,320 feet of fence, assuming that such a unit would be used to energize at least a mile of fence. If substituting polytape for polywire, the total will increase by about \$40 because polytape costs about twice as much as polywire. If substituting high-tensile wire for polywire, the cost will increase by about \$125-\$150 (change includes switching to five-eighths inch diameter fiberglass posts).

Table 4. Construction costs for high-tensile electrified wire fence (Based on a 1,320 ft. fence)

Item	Amount	Cost per unit	Total cost
Wood posts (8-in diameter)	6	\$ 28.00	\$ 168.00
Wood posts (4-in diameter)	4	9.00	36.00
Steel posts (6.5 ft)	52	5.00	260.00
Insulators	285	35.00	99.75
Springs	5	7.00	35.00
Strainers	5	3.50	17.50
High tensile wire	6,600 ft	.025	165.00
Energizer	.25	110.00	27.50
Cut-out switch	1	7.50	7.50
Ground/lightening rods	4	16.00	64.00
Labor and equipment	18 hr	16.25	<u>292.50</u>
Total			\$ 1,172.75
Total per foot			\$.89

**Table 5. Construction costs for electrified polywire fence (for interior use)
(Based on a 1,320 ft. fence)**

Item	Amount	Cost per unit	Total cost
Wood posts (4-in diameter)	2	\$ 9.00	\$18.00
Fiberglass posts (3/8-in x 4 ft)	33	1.75	57.75
Insulators	2	.80	1.60
Post clips	42	.30	12.60
Polywire	1,320 ft	.03	39.60
Energizer	.25	110.00	27.50
Cut-out switch	1	7.50	7.50
Ground/lightening rods	4	16.00	64.00
Labor and equipment	2 hr	16.25	<u>32.50</u>
Total			\$ 261.05
Total per foot			\$ 0.20
Cost for adding 1 strand of polywire (wire, clips, insulators)		53.80	53.80 or .04 per ft.

In-kind services used to match the request for Outdoor Heritage Fund dollars shall be valued as follows:

- Labor costs \$15.00 an hour
- Land costs Average rent costs for the county as shown in the most recent publication of the USDA, National Agricultural Statistics Services, North Dakota Field Office
- Equipment Any equipment purchased must be listed separately with documentation showing actual cost.
- Equipment usage Actual documentation
- Seed & Seedlings Actual documentation
- Transportation Mileage at federal rate
- Supplies & materials Actual documentation

More categories will be added as we better understand the types of applications that will be submitted. We will use as our basis for these standards other State and Federal programs that have established rates. For example the North Dakota Nonpoint Source Pollution Management Program has established rates. If your project includes work that has an established rate under another State Program please use those rates and note your source.

Approved by OHF Advisory Board: October 17, 2013

Approved by Industrial Commission: October 22, 2013

Conservation Strategies for the Long-billed Curlew

Focal Areas, Desired Habitat Conditions and Best Management Practices

September 2013

American Bird Conservancy



Daniel Casey photo

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Executive Summary

Long-billed Curlew (curlew) populations have declined throughout much of their range. The species is on the American Bird Conservancy (ABC) Watch List, is a U.S. Fish and Wildlife Service (USFWS) Bird of Conservation Concern, is a Species of Concern in Canada, and was identified as a Species in Greatest Need of Conservation in the State Wildlife Action Plans of most states in which it breeds. Both the U.S. and Canadian Shorebird Plans list the species as “highly imperiled”. Our intent with document was to move forward with several recommendations from the USFWS Status Assessment and Conservation Action Plan for the species. Our goals are to implement habitat protection, enhancement and management alternatives to ensure no net loss of Long-billed Curlew nesting habitat throughout its breeding range, and increase populations by 30% over 30 years (through 2043). We identified significant threats and opportunities, selected 12 continental and additional draft regional focal areas for curlew conservation, and present recommended best management practices (and standards) to implement at rangewide, ecoregional and focal area scales. The latter fall into five categories: 1) Manage grazing appropriately; 2) Halt habitat conversion; 3) Emphasize native grasses and forbs; 4) Avoid disturbance during sensitive periods; and 5) Adjust certain agricultural practices. Effective conservation of the Long-billed Curlew will require concerted efforts by agencies, non-government organizations, landowners and citizen scientists to ensure that important breeding sites and habitats are identified and managed to meet the habitat needs of the species. Tracking of opportunities, population and occupied habitat estimates, and conservation accomplishments will be facilitated by setting up a registry system for each of the continental and regional focal areas.

Acknowledgments

Much of the impetus and background came from the excellent Status Assessment prepared by Suzanne Fellows and Stephanie Jones of the U.S. Fish and Wildlife Service, and from a compilation of management effects compiled by the Northern Prairie Wildlife Research Center of the USGS, led by Jill Dechant, Doug Johnson and others. Tanya Luszcz and Dick Cannings provided key resources and comments regarding the Canadian portion of the bird’s range. The leadership of the Intermountain West, Playa Lakes, Rainwater Basin and Northern Great Plains Joint Ventures have all highlighted the needs of the curlew as a conservation priority, and continue to provide support for improving the science and cooperation required for its conservation. David Younkman, Jay Carlisle, Mike Denny, Rob Cavallaro, Cole Lindsey, Sidra Blake, and Brad Andres provided input and comments to preliminary drafts of this document.

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Introduction

Long-billed Curlew (*Numenius americanus*) (curlew) populations have declined throughout much of their range, and no longer occupy much of the eastern portion of their historic range, which once reached the Great Lakes (Fellows and Jones 2009). Habitat conversion has been a primary factor in these declines, especially across the Great Plains, as native grassland habitats were converted to cropland. As much as 75% or more of the Great Plains grasslands in the U.S. and Canada (Pitt and Hooper 1994) have undergone such conversion. Certain agricultural habitats, most notably flood-irrigated or sub-irrigated hayfields, can provide important seasonal feeding habitats for curlews, but few are used for nesting, and most row crops are entirely unsuitable. Urban/suburban growth and energy development have also replaced, altered and fragmented habitat. Although livestock grazing can be compatible with the habitat needs of curlews, nest trampling can be an issue, and in many cases, the seasonality or intensity of grazing result in conditions not compatible with the needs of nesting curlews. Because of these trends and concerns, the Long-billed Curlew is on the ABC Watch List, is a U.S. Fish and Wildlife Bird of Conservation Concern, and was identified as a Species in Greatest Need of Conservation in the State Wildlife Action Plans of most states in which it occurs. Both the U.S. and Canadian Shorebird Plans list the species as “Highly Imperiled”.

The U.S. Fish and Wildlife Service (Fellows and Jones 2009) and Environment Canada (2013) have compiled status assessment and conservation action (management) plans for the species which summarized the legal status, range, population status, habitat requirements and threats across its range in the U.S. and Canada. Those plans also provided sets of recommendations and priority actions, along with detailed state and provincial summaries of the species’ status across its range in all seasons. Our intent with this document is not to reiterate the material presented in those documents, but rather to move forward with some of their recommendations, notably:

- Determine micro- and macro- habitats
- Improve curlew breeding habitat in North America including publishing recommendations as Best Management Practices
- Improve curlew breeding habitat and Best Management Practices - Northern Prairies.
- Improve curlew breeding habitat and Best Management Practices - Great Basin and sagebrush grasslands.
- Improve curlew breeding habitat and Best Management Practices - shortgrass prairies.
- Determine minimum habitat requirements.
- Develop habitat use models and use Long-billed Curlew survey information to identify locations of key sites.

- Adopt and implement best management practices for agricultural and industrial activities to manage human (impacts) at key sites.
- Develop conservation agreements with private landowners that focus on conservation of native grasslands at key sites.
- Ensure Long-billed Curlew needs are considered in any new or updated management plans for public grassland areas.

USFWS (2009) Status Assessment and Conservation Action Plan for the Long-billed Curlew:
http://www.fws.gov/mountain-prairie/species/birds/longbilled_curlew/BTP-LB-Curlew-rev-9-14-09.pdf

Environment Canada (2013) Management Plan for the Long-billed Curlew in Canada:

Background

Long-billed Curlews currently breed from Texas to central British Columbia, and from Nebraska to California, reaching their highest relative abundance in those parts of their range with intact grassland landscapes (Figure 1). Recent Breeding Bird Survey (BBS) data indicate a significant downward trend for North America as a whole. They are declining through much of the eastern portion of their range, with some regional increases in the central and western/northwestern portions (Figure 2).

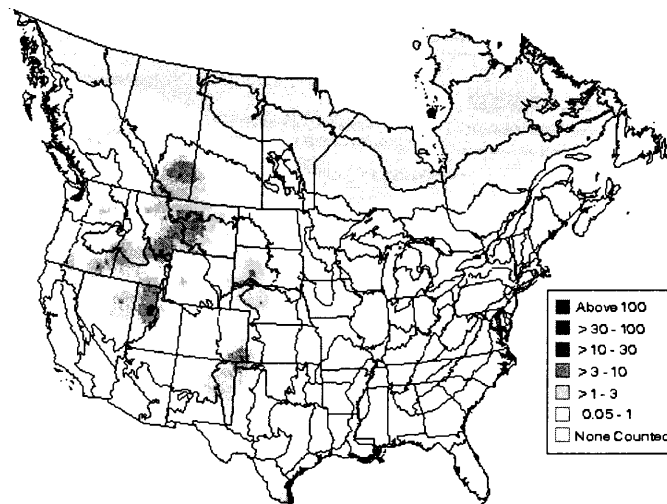


Figure 1. Current distribution and relative abundance of the Long-billed Curlew from BBS data, 2007-2011.

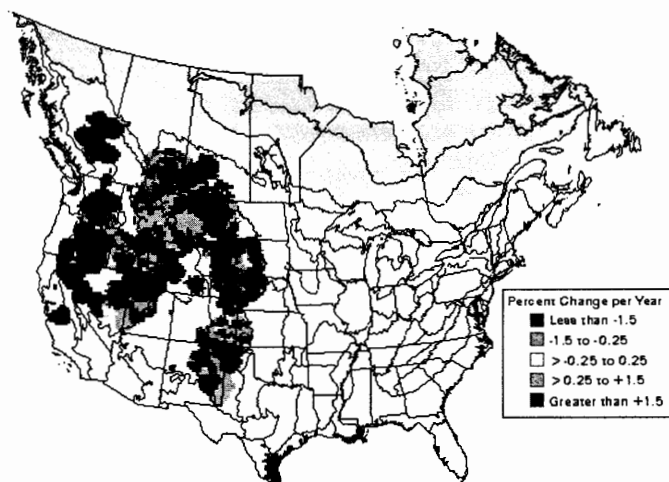


Figure 2. Long-billed Curlew population trend map, from Breeding Bird Survey data, 2007-2011.

Conservation Targets and Goal Statement

Our goal is to implement habitat protection, enhancement and management alternatives adequate to ensure no net loss of functional Long-billed Curlew habitat, throughout its breeding range in North America. Furthermore, to do this as part of a full life-cycle approach to conserving curlew populations throughout their range in the Americas, including important migration and wintering areas. As part of this conservation delivery, we will strive to build the tools necessary to assess progress against attainable population and habitat targets.

Population and Habitat Objectives

The U.S. Shorebird Plan (Brown et al. 2001) originally proposed an objective to increase the population of Long-billed Curlew by 30% from 20,000 to 28,500. The USFWS Status Assessment and Conservation Action Plan (Fellows and Jones 2009) revised the population estimate to approximately 160,000, but did not specifically retain the objective to increase the population by 30%. ABC and the Intermountain West Joint Venture (IWJV) used our Habitat and Populations Strategies (HABPOPS) database to develop another bottom-up (habitat-based) population estimate for the species, and to test whether a 30% increase is reasonable or achievable. We are now working to find ways to highlight those landscapes with the most potential for conservation success. Our bottom-up estimate of Long-billed Curlew populations in the IWJV portions of BCRs 9, 10 and 16 (235,000) exceeded, but fell within the 95% confidence interval of, the continental estimate (161,181; range 120,882 – 549,351) of Jones et al. (2008).

The 2013 IWJV Implementation Plan included assessment of the potential population effects of various conservation scenarios across a significant portion of the species' range. Our calculations included regional population estimates, but it is the percent (%) response, not necessarily the number of birds, that gives us an idea of the level of effort needed to stabilize or increase populations of the species. Previous conservation scenarios (Altman and Casey 2006) for seven agricultural habitat types, 24 grassland habitat types, and 11 shrub-steppe/savanna habitat types in the IWJV revealed that a 51% population increase could be achieved by converting 1.7 million ac of agricultural land to grassland; managing 5.7 million ac of currently occupied grassland habitats to increase nesting density; and manipulating 1.2 million ac of shrub-steppe and savanna to improve suitability and/or increase nesting densities. There are approximately 28.9 million ac of agricultural, grassland and shrub-steppe or savannah that we deemed at least partially suitable as breeding habitat for this species within the IWJV. Our combined scenario therefore represented treating 22% of the targeted habitats to produce a 51% increase in the population.

Converting 10% of the 17.1 million ac of suitable agricultural lands within the IWJV range of the Long-billed Curlew to moderately suitable grassland would yield about a 1% overall increase in the IWJV population, mostly because we estimate that less than 2% of the population currently nest in these agricultural habitats. In grassland habitats, our modeling predicted the greatest gain in curlew numbers would come from managing to raise densities in 5.7 million ac of occupied areas (a 42% population increase). Any management actions taken to improve grassland habitat conditions across significant portions of the species' range would likely increase both the amount of suitable habitat and the quality of occupied habitat (as expressed by increased bird densities) in combination. Continued scenario testing with our improved HABPOPS model (<http://data.prbo.org/partners/iwvj/iwvjmap.php>) will allow us to refine these estimates of the amount of habitat needed to achieve population goals, and to track conservation successes.

Our modeling predicted that guided habitat manipulations on 27% of the 4.4 million ac of suitable shrub-steppe and savanna habitats (to emphasize grassland elements) would yield an 8% overall increase in the IWJV population, by nearly quadrupling the number of curlews in the population segment using these habitats. Although significant population increases could be achieved in these habitat types through shrub and tree removal/reduction, this is also the habitat where meeting the needs of other priority bird species dependent on sagebrush or juniper/pine habitats might take conservation priority (e.g. Greater Sage-Grouse, Brewer's Sparrow, Gray Flycatcher, Pinyon Jay).

Based on the HABPOPS outputs, the IWJV adopted the 30% trend-based objectives of the North American Shorebird Plan, applying them to our population estimates for each BCR-State

polygon in BCRs 9, 10 and 16 within the joint venture (Table 1). The Playa Lakes Joint Venture has also developed specific habitat and population objectives for curlews in each state within BCR 18. Those are presented within our Recommended Actions and Management Guidelines by Ecoregion (page 32). There have been few other efforts to delineate curlew population or habitat objectives at ecoregional or finer scales, but broader objectives have been outlined by both the USFWS (Fellows and Jones 2009) and Environment Canada (2013).

Table 1. Estimates of Long-billed Curlew (LBCU) occupied acres, populations, and population objectives by state-BCR polygon within the IWJV.

Species	BCR	State	Occupied Acres	Population Estimate	% of BCR IWJV Population	Trend-based Objective	Population Objective
LBCU	9	CA	545,600	11,900	6%	1.3x	15,500
LBCU	9	ID	2,421,800	57,000	31%	1.3x	74,100
LBCU	9	NV	1,366,900	27,600	15%	1.3x	35,900
LBCU	9	OR	3,088,200	53,700	29%	1.3x	69,800
LBCU	9	UT	665,700	14,600	8%	1.3x	19,000
LBCU	9	WA	1,031,000	20,400	11%	1.3x	26,500
LBCU	9	WY	600	10	<1%	1.3x	10
Subtotal: BCR 9 in the IWJV			9,119,800	185,210			240,810
LBCU	10	CO	89,200	800	2%	1.3x	1,000
LBCU	10	ID	253,800	4,500	10%	1.3x	5,900
LBCU	10	MT	966,600	7,400	16%	1.3x	9,700
LBCU	10	OR	726,300	12,000	25%	1.3x	15,600
LBCU	10	UT	73,300	600	1%	1.3x	800
LBCU	10	WA	60,900	600	1%	1.3x	800
LBCU	10	WY	1,732,000	21,400	45%	1.3x	27,800
Subtotal: BCR 10 in the IWJV			3,902,100	47,300			61,600
LBCU	16	CO	5,900	100	1%	1.3x	130
LBCU	16	ID	1,500	30	<1%	1.3x	40
LBCU	16	NM	327,200	5,300	79%	1.3x	6,900
LBCU	16	UT	25,500	300	4%	1.3x	400
LBCU	16	WY	39,300	1,000	15%	1.3x	1,300
Subtotal: BCR 16 in the IWJV			399,400	6,730			8,770
Total: BCRs 9, 10 and 16 in the IWJV			13,421,300	239,240			311,180

Conservation Objectives

- Adopt continental and regional focal area as a geographic framework for directed, partnership-driven conservation of Long-billed Curlew breeding habitat on public and private lands.
- Identify key habitats occupied by Long-billed Curlews or suitable for restoration, and achieve no net loss of Long-billed curlew nesting habitat over the next 30 years (through 2043).
- Protect, restore and/or enhance enough grassland, shrub-steppe and agricultural habitats to achieve a 1% increase in Long-billed Curlew populations per year, toward an objective of increasing the population by 30% by 2043 (increase carrying capacity on 5.2 million acres).
- Based on the analyses done by the IWJV, annual conservation targets for BCRs 9, 10 and 16 should include the addition or improvement of:
 - 34,000 ac of agricultural habitats;
 - 114,000 ac of grassland habitats; and
 - 24,000 ac of shrub-steppe habitats with significant grassland elements.
- Support and adopt the long-term PLJV objectives of 5 million acres of shortgrass prairie, 1.2 million acres of mixed grass prairie, 80,000 acres of prairie dog towns, and 10,000 acres of playas conservation in BCRs 18 and 19.
- Achieve conservation on a minimum of 1.5 million acres of Long-billed Curlew breeding habitats by 2018.
- Establish a conservation registry for each continental and regional focal area which documents conservation opportunity and progress, including:
 - Long-billed Curlew population estimates (additional monitoring and inventory);
 - ownership and habitat summaries identifying opportunity and stewardship responsibility;
 - estimates of occupied acres;
 - identification of acreage under long-term stewardship (conservation estate);
 - identification of sites and acreage where best management practices and habitat restoration/enhancement have been applied; and
 - accomplishment reporting for partnerships.

Section I – Habitat Needs

Guided enhancement of agricultural, grassland and shrubsteppe habitats and landscapes for Long-billed Curlews requires knowledge of the specific habitat and landscape characteristics needed by the birds, at ecoregional scales. During their rangewide breeding season surveys in support of the USFWS 2009 status assessment, Saalfeld et al (2010) detected most curlews in shorgrass prairie (52%) and pasture grasslands (37%), finding negative correlations with coniferous forest and scrub-shrub, but positive correlations with wetland presence at landscape scales (Saalfeld et al. 2010).

Dechant et al (1999) provided a thorough summary of the rangewide variation in habitat selection by curlews (<http://www.npwrc.usgs.gov/resource/literatr/grasbird/lbcu/lbcu.htm>). Virtually all studies of have indicated that relatively short graminoid vegetation is among the key habitat variables selected by nesting curlews. Changes in vegetation height resulting from grazing, mowing, fertilization, and moisture (precipitation or irrigation) can all influence habitat selection and curlew nest success (Bicak et al. 1982, Redmond and Jenni 1986, Paton and Dalton 1994). Preferred grass heights have been described variously across the range as from <10 cm (Bicak et al 1982) to <30 cm (Pampush 1980). They also seem to require bare ground elements, some (though sparse) additional tall forb or shrub cover. Though they do nest in some areas far from permanent water sources, areas within 1-3 km of wetlands (playas, potholes, wet meadows) are preferred. As noted by Fellows and Jones (2009), habitat relationships seem to vary widely enough across the range of the species that it is difficult to derive uniform prescriptions. Here we present general themes, followed by summary tables from Dechant et al (1999) organized by ecoregion.

Following the tables, we identify significant threats and opportunities that deserve immediate action. We then present focal areas identified by ABC and our partners to represent priority areas for conservation implementation for curlews. Finally, we present recommended best management practices (and standards) to implement at rangewide, ecoregional and focal area scales, in order to achieve conservation objectives for the Long-billed Curlew across its breeding range.

Agriculture

Though they clearly prefer grasslands for nesting, Long-billed Curlews have been documented using a wide variety of agricultural habitats during the breeding season, seemingly preferring those that mimic the structure of native grasslands or which provide an abundance of invertebrate prey. Both native and non-native pastures, dry or irrigated, are used for nesting, particularly where fields have not been leveled for planting (some micro-topography seems

necessary to facilitate awareness of approaching predators). Hay meadows are often used for feeding, but less so for nesting, although in certain portions of their range hay meadows seem to be the preferred habitat (R. Cavallaro, pers. comm.). Cropland, fallow and stubble are used rarely for nesting and variably for feeding, based on food resources available. Flood (or sub-) irrigated fields can provide favored feeding opportunities for adults and newly hatched broods; center-pivot and other overhead irrigation systems are not as likely to provide the saturated soils and food biomass that such sites provide. |

Grassland

Curlews nest in a wide variety of native and non-native grassland habitats, from the shortgrass prairies of the southern Great Plains, to the mixed grass prairies of the glaciated northern prairies, to stands of invasive cheatgrass throughout the Great Basin. Historically, Long-billed Curlews responded to the grassland habitat conditions provided under grazing by bison, prairie dogs and other ground squirrels, and relatively frequent fire. Because of their preference for relatively short (10-30 cm or less) and relatively sparse grass for nesting, they will often nest on sites grazed by livestock. While this means that they can be compatible with working rangelands, the timing and intensity of grazing can affect both overall habitat suitability and nest success. Within the low, sparse relatively level grasslands they prefer, curlews often select sites for nesting that are slightly taller vegetation, with more cover, and slightly elevated with respect to the surrounding area.

Shrub-steppe

Throughout much of the Great Basin, Northern Rockies and northwestern portions of the Northern Great Plains, curlews nest in shrub-steppe habitats, generally on sites with low shrub densities, a dominance of grass in the understory, and an open ground component. In many places they are using shrub-steppe areas cleared of shrubs for the purpose of improving livestock grazing. Throughout the Great Basin in particular, they occur in some of their highest densities in former shrub-steppe stands now dominated by cheatgrass. Ironically, in some areas efforts to eradicate the latter and restore the former may be to the detriment of curlew populations. Indeed, perhaps one of the only fortuitous aspects of the difficulty in slowing the spread of cheatgrass is that it does provide habitat for curlews.

Wetlands

Though they are highly reliant on wetlands during migration periods and during winter throughout much of their range, studies have varied widely on the importance of wetland habitats to Long-billed Curlews during the breeding season. Only one study (Faanes and Lingle 1995) indicated that curlews nested in higher densities in wet meadow than in upland prairie.

Several authors have suggested that preferred nesting habitats must be within 1-3km of wetlands, and yet in many parts of the breeding range the only wetlands are ephemeral (e.g. playas), and the birds are apparently well adapted to cope with drier periods. Still, we can generally assume that the highest quality nesting landscapes do include wetland elements.

For each of the following summary tables, the following terminology has been used. "Idle" is used as a modifier (e.g., idle tallgrass) denotes undisturbed or unmanaged (e.g., not burned, mowed, or grazed) areas. "Idle" by itself denotes unmanaged areas in which the plant species were not mentioned. Examples of "idle" habitats include weedy or fallow areas (e.g., old fields), fencerows, grassed waterways, terraces, ditches, and road rights-of-way. "Tame" denotes introduced plant species (e.g., smooth brome, crested wheatgrass) that are not native to North American prairies. "Hayland" refers to any habitat that was mowed, regardless of whether the resulting cut vegetation was removed. "Burned" includes habitats that were burned intentionally or accidentally or those burned by natural forces (e.g., lightning). In situations where there are two or more descriptors (e.g., idle tame hayland), the first descriptor modifies the following descriptors. For example, idle tame hayland is habitat that is usually mowed annually but happened to be undisturbed during the year of the study:

Habitat Relationships: Great Basin (BCR 9)

Author(s)	Location(s)	Habitat(s) Studied*
Sugden 1933	Utah	Pasture, wetland
Species-specific Habitat Characteristics: Preferred flat, open country of alkali flats and wetlands around the Great Salt Lake		
Author(s)	Location(s)	Habitat(s) Studied*
Forsythe 1972	Utah	Shrubsteppe, shrubsteppe pasture
Species-specific Habitat Characteristics: Nests were found in irrigated and non-irrigated grass pastures and salt flats; nests were built in bunchgrasses , clumps of sedges (<i>Carex</i> spp.), and stands of inland saltgrass (<i>Distichlis spicata</i>), or saltwort (<i>Salicornia rubra</i>).		
Author(s)	Location(s)	Habitat(s) Studied*
Allen 1980	Washington	Cropland, shrubsteppe
Species-specific Habitat Characteristics: Preferred to forage in dune and ridge areas where topographic and vegetational diversity were high; most nests were on relatively flat ground ; of 59 nests, 5% were >100 cm from an object, 37% were 30-100 cm from an object, 31% were <30 cm from an object, and 27% abutted an object (e.g., big sagebrush [<i>Artemisia tridentata</i>] limbs, rocks, dirt mounds, horse manure, metal cans, bunchgrasses); preferred to nest (71% of 21 nests) in areas dominated by downy brome (<i>Bromus tectorum</i>) and Sandberg's bluegrass (<i>Poa sandbergii</i>) rather than in areas dominated by downy brome alone (29% of nests); did not nest in stands of downy brome containing substantial amounts of tumbling mustard (<i>Sisymbrium altissimum</i>), nor in areas dominated by wheatgrasses (<i>Agropyron</i> spp.); mean vegetation values at nest sites in		

downy brome/Sandberg's bluegrass were **<10 cm** downy brome height, **20 cm Sandberg's bluegrass** height, 6.7% coverage of live downy brome, 65% coverage of dead downy brome, 17% coverage of live Sandberg's bluegrass, and 4.6% coverage of dead Sandberg's bluegrass; mean coverage values at nest sites in areas dominated by downy brome were 14% coverage of live downy brome and 92% coverage of dead downy brome.

Author(s)	Location(s)	Habitat(s) Studied*
Pampush 1980, Pampush and Anthony 1993	Oregon	Cropland, idle, idle shortgrass, idle tame, shortgrass/tame pasture, shrubsteppe, tame hayland

Highest mean densities of nests occurred in areas of downy brome with patches of Sandberg's bluegrass intermixed; avoided areas of antelope bitterbrush (*Purshia tridentata*) and areas with dense forbs; nest density was negatively correlated with vegetation height and vertical density; **foraged in fallow fields and alfalfa (*Medicago sativa*) as long as vegetation was <30 cm tall**; compared to non-nest areas, nest areas were associated with **shorter vegetation** (24 cm vs. 29 cm at non-nest areas), grass with less variation in height, total vegetation with less variation in height, grass with higher vertical density (0.8 contacts vs. 0.2 contacts/5 cm height increment) in the 25-50 cm height increment, and shrubs with lower total vertical density (0.02 contacts vs. 0.05 contacts/5 cm height increment).

Author(s)	Location(s)	Habitat(s) Studied*
Bicak et al. 1982	Idaho	Shortgrass/tame pasture, tame pasture

Species-specific Habitat Characteristics: Used areas of short, recently grazed vegetation; curlew density was positively correlated with size of management unit, annual total animal unit months, and area of vegetation <10 cm tall; areas grazed by sheep alone or by sheep and cattle had more area of short grass (32% of area sampled was <10 cm tall) and higher densities of curlews than did areas grazed by cattle alone (19% of area sampled was <10 cm tall); **did not use areas that had not been grazed for >1 yr.**

Author(s)	Location(s)	Habitat(s) Studied*
Redmond 1986	Idaho	Cropland, shortgrass Pasture

Species-specific Habitat Characteristics: Nested in **shortgrass pasture**; foraged in shortgrass pasture when vegetation was sparse (3.6 to 9.7 cm tall) but **traveled up to 10 km** from nesting sites to forage in agricultural areas when vegetation was dense (12 to 15.7 cm tall with areas 40 cm tall) due to abundant precipitation.

Author(s)	Location(s)	Habitat(s) Studied*
Paton and Dalton 1994	Utah	Shrub-steppe pasture, wetland

Species-specific Habitat Characteristics: Habitat patches containing nests had shorter vegetation (mean of 5.6 cm) than random habitat patches (mean of 9.0 cm), and **more bare ground 6-15 m from the nest** (mean of 34-36%) than random patches (mean of 38-39%); at nest sites, vegetation <3 m from the nest was taller (mean of 6.5 cm) than vegetation 6-15 m from the nest (mean of 4.9-5.5 cm) and there was **less bare ground <3 m from the nest** (mean of 18%) than >6 m from

the nest (mean of 28-39%).		
Author(s)	Location(s)	Habitat(s) Studied*
Blake (2013)	se Washington, ne Oregon	Shrub-steppe, grassland, agriculture
<p>Species-specific Habitat Characteristics: Nested primarily in grasslands with no shrub cover, grasslands with moderate shrub cover less extensively, and agriculture occasionally. Broods required structure, and used short grassland with moderate shrub cover (5-30%) more than grasslands with no shrubs, across all study areas. Alfalfa, barley and wheat were all used for nesting, and tilling before mid-June was detrimental to survival.</p>		

Habitat Relationships: Northern Rockies (BCR 10)

Author(s)	Location(s)	Habitat(s) Studied*
Bent 1962	Rangewide	Idle mixed-grass, idle shortgrass, mixed grass pasture, shortgrass pasture
<p>Species-specific Habitat Characteristics: Required large, open prairie expanses; nested on grazed rangeland and in damp, grassy hollows or slopes near bodies of water.</p>		
Author(s)	Location(s)	Habitat(s) Studied*
Cochran and Anderson 1987	Wyoming	Shortgrass hayland, shortgrass pasture, tame hayland, tame pasture, woodland
<p>Species-specific Habitat Characteristics: Preferred irrigated native hayland and pasture over tame hayland and pasture; nested in pastures and hayfields that had lower mean percent grass cover (20 vs. 32%), higher mean percent forb cover (16 vs. 3.5%), and were drier (45 vs. 3% of random locations characterized as 'dry') than unused pastures and hayfields; within pastures and hayfields containing nests, nest sites had less bare ground and higher percent cover of grasses (values not given) than random sites; preferred to nest on hummocks >2.5 cm above the immediate surroundings; percent coverages in native hayland and pasture were 24% grass, 24% sedge (<i>Carex</i>), 23% bare ground, 9.9% rush (<i>Juncus</i>), 7.8% forbs, and 0.8% moss (Latin name not given).</p>		

Habitat Relationships: Potholes and Prairies (BCR 11)

Author(s)	Location(s)	Habitat(s) Studied*
Timken 1969	South Dakota	Pasture
<p>Species-specific Habitat Characteristics: Curlews were noted in idle pasture and in cattle pasture, but not in sheep pasture.</p>		
Author(s)	Location(s)	Habitat(s) Studied*
Owens and Myres 1973	Alberta	Cropland, idle mixed-grass, mixed grass hayland, mixed-grass pasture

Species-specific Habitat Characteristics: Were more common in areas of mixed-grass than in cultivated areas.		
Author(s)	Location(s)	Habitat(s) Studied*
Stewart 1975	North Dakota	Idle shortgrass, mixed-grass pasture
Species-specific Habitat Characteristics: Used shortgrass prairie and mixed-grass pasture; some areas of shortgrass prairie that were used had prickly pear cactus (<i>Opuntia</i>) and an open shrub layer composed of big sagebrush and silver sagebrush (<i>Artemisia cana</i>); preferred gently rolling terrain with gravelly soils.		
Author(s)	Location(s)	Habitat(s) Studied*
Prescott et al. 1993	Alberta	Mixed-grass pasture, tame pasture, wetland, wetland (restored)
Species-specific Habitat Characteristics: Were present only in continuously but lightly grazed mixed-grass pasture; absent from early summer-grazed mixed-grass pasture, spring grazed tame pasture, and deferred-grazed (grazed after 15 July) mixed-grass pasture.		
Author(s)	Location(s)	Habitat(s) Studied*
Prescott 1997	Alberta	Cropland, hayland, idle, idle mixed-grass pasture, shrubland, tame pasture, woodland
Species-specific Habitat Characteristics: Occurred (in decreasing order of abundance) in mixed-grass, mixed-grass within sandhills areas, planted cropland, and hayfields; were absent from fallow cropland, stubble fields, riparian areas, upland shrubland, and upland areas of deciduous trees.		
Author(s)	Location(s)	Habitat(s) Studied*
McMaster and Davis 1998	Alberta, Manitoba, Sask.	Cropland, Permanent Cover Program (PCP; idle tame, tame hayland, tame pasture)
Species-specific Habitat Characteristics: Present in both cropland and PCP grassland; PCP cover included combinations of wheatgrasses, brome (<i>Bromus</i> spp.), and alfalfa (<i>Medicago</i> spp.).		
Author(s)	Location(s)	Habitat(s) Studied*
Gratto-Trevor 1999	Alberta	Shortgrass pasture, wetland
Species-specific Habitat Characteristics: Were more common on dry transects (a dry transect was defined as intersecting wetlands along <5% of its length) than on wet transects.		

Habitat Relationships: Northern Great Plains (BCR 17)

Author(s)	Location(s)	Habitat(s) Studied*
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Johnsgard 1979, 1980	CO, KS, NE, NM, ND, OK, SD, TX	Cropland, idle mixed-grass, idle shortgrass, idle tallgrass, mixed-grass pasture, tallgrass pasture, tame hayland, wet meadow
Species-specific Habitat Characteristics: Nested on shortgrass plains on gently rolling terrain or on upland prairie slopes; in the sandhill grasslands region, close proximity to wet meadows was important in nest-site selection ; nests frequently were placed next to cowpies; used wet meadows as foraging areas.		
Author(s)	Location(s)	Habitat(s) Studied*
Kantrud and Kologiski 1982	CO, MT, NE, ND, SD, WY	Mixed-grass pasture, shortgrass pasture, shrubsteppe
Species-specific Habitat Characteristics: Preferred lightly grazed areas with aridic ustoll and aridic borollic soils , and heavily grazed areas with typic ustoll soils; plants that were more common than average within nesting habitat included clubmoss (<i>Selaginella densa</i>), blue grama , fringed sagewort (<i>Artemisia frigida</i>), and golden aster (<i>Chrysopsis villosa</i>); other common plants within breeding habitat included bluebunch wheatgrass (<i>Pseudoroegneria spicata</i>), prairie sandreed (<i>Calamovilfa longifolia</i>), and Idaho fescue (<i>Festuca idahoensis</i>).		

Habitat Relationships: Playa Lakes and Southern Great Plains (BCRs 18, 19):

Author(s)	Location(s)	Habitat(s) Studied*
Graul 1971	Colorado	Shortgrass
Species-specific Habitat Characteristics: Nested in shortgrass prairie at the edge of a valley and near a hill; nest was lined with buffalo grass (<i>Buchloe</i> sp.) and lichen (<i>Parmelia molliuscula</i>); vegetation surrounding the nest was buffalo grass, blue grama (<i>Bouteloua gracilis</i>), and plains prickly pear (<i>Opuntia polyacantha</i>).		
Author(s)	Location(s)	Habitat(s) Studied*
Cole and Sharpe 1976	Nebraska	Idle, pasture
Species-specific Habitat Characteristics: Were present on areas that were grazed, and absent from idle areas .		
Author(s)	Location(s)	Habitat(s) Studied*
Bicak 1977	Nebraska	Mixed-grass hayland, mixed-grass pasture
Species-specific Habitat Characteristics: Areas used by curlews had 75% of total vertical vegetation density <10 cm high , compared to 63% in non-use areas; proximity of nest sites to foraging meadows was more important in nest site selection than vegetation characteristics.		

Author(s)	Location(s)	Habitat(s) Studied*
McCallum et al. 1977	Colorado	Idle, mixed-grass, shortgrass
<p>Species-specific Habitat Characteristics: Preferred to nest in shortgrass prairie; occasionally nested in fallow fields; 41% of 63 curlew observations were <91 m from water and 68% were <403 m from water; avoided tall (measurements not provided) vegetation.</p>		
Author(s)	Location(s)	Habitat(s) Studied*
King 1978	Colorado, Texas	Cropland, idle mixed-grass pasture, sand-sage grassland, shortgrass pasture
<p>Species-specific Habitat Characteristics: Six of seven nests were in areas dominated by buffalo grass (<i>Buchloe dactyloides</i>) and blue grama; one nest was in an area dominated by sand dropseed (<i>Sporobolus cryptandrus</i>); six of seven nests were within 20 cm of a cowpie; mean vegetation height at nests was 11 cm; mean vegetation cover at nests was 72%; at 3 m from nests, mean vegetation height was 20.6 cm; did not use areas dominated by sand sagebrush (<i>Artemisia filifolia</i>) for nesting or foraging; 39% of curlew observations occurred within 400 m of standing water (irrigation, stockponds); used shortgrass, mixed-grass, and weedy areas in slightly greater proportions (75% of 354 observations) than their availability (67% of the landscape); use of areas with high structural diversity increased following hatching of eggs.</p>		
Author(s)	Location(s)	Habitat(s) Studied*
Johnsgard 1979, 1980	CO, KS, NE, NM, ND, OK, SD, TX	Cropland, idle mixed-grass, idle shortgrass, idle tallgrass, mixed-grass pasture, tallgrass pasture, tame hayland, wet meadow
<p>Species-specific Habitat Characteristics: Nested on shortgrass plains on gently rolling terrain or on upland prairie slopes; in the sandhill grasslands region, close proximity to wet meadows was important in nest-site selection; nests frequently were placed next to cowpies; used wet meadows as foraging areas</p>		
Author(s)	Location(s)	Habitat(s) Studied*
Shackford 1987	Oklahoma	Colonies of burrowing mammals, cropland, idle, shortgrass pasture
<p>Species-specific Habitat Characteristics: Used native pastures near cultivated fields (mostly planted to wheat); areas that were used had clay loam soils on 0-1% slopes; curlews with young foraged in prairie dog (<i>Cynomys</i>) colonies.</p>		
Author(s)	Location(s)	Habitat(s) Studied*
Shackford 1994	Oklahoma	Cropland, shortgrass, tame
<p>Species-specific Habitat Characteristics: Curlews were observed in cropland, in shortgrass prairie, and in tame grassland; two nests were found in cultivated fields.</p>		

Author(s)	Location(s)	Habitat(s) Studied*
Faanes and Lingle 1995	Nebraska	Idle mixed-grass, idle shortgrass, Idle tallgrass, wet meadow
Species-specific Habitat Characteristics: Nested at higher densities in wet meadow than in upland prairie.		

Section II - Threats and Opportunities

Historical declines in Long-billed Curlew populations were in part due to unrestricted hunting, but habitat changes due to conversion, fragmentation and management have been a primary driver of population declines since the initial push west by pioneers. The conversion of native prairie to cropland which began then continues today. With it now are changes due to urbanization, energy exploration and development, livestock grazing, and changes in fire regimes. All can result in the loss of suitable breeding habitats, and some are irrevocable. But each type of threat may present an opportunity to implement strategic conservation for curlews.

Habitat Conversion. Perhaps the single biggest opportunity to stem the tide of continued Long-billed Curlew population declines is to prevent the further plowing of native prairie wherever it occurs within the species' range. There have been Farm Bill programs designed specifically for this purpose (e.g. Sodbuster, Grassland Reserve Program). Furthermore, the Conservation Reserve Program has been instrumental in returning tilled lands to permanent grass cover. Often these were planted with crested wheat or other grass mixes that typically have too robust a growth habit to be used by curlews. Program adjustments that encourage the use of native grasses interseeded with legumes and other forbs, or even burning, mowing, light disking or controlled grazing could benefit curlews and other grassland species reliant on shorter and more heterogeneous habitat structure (as cited by Playa Lakes JV Implementation Plan for Nebraska BCR 18). These landowner incentive programs have been effective for many grassland species, but their continued funding is in question, and indeed many CRP acreages are coming out of enrollment. It will be important to find new, innovative ways to provide incentives to continue such work.

Perhaps the single biggest opportunity to stem the tide of continued Long-billed Curlew population declines is to prevent the further plowing of native prairie wherever it occurs within the species' range.

Land Protection Needs

The protection of currently occupied Long-billed Curlew habitats, particularly large blocks of native grassland, is perhaps the most pressing conservation need for the species. Little has been done previously to delineate those areas most in need of protection. There are many government and non-government programs and organizations that focus on long-term stewardship agreements, conservation easements, or even acquisition of important habitat blocks. These tools can prevent habitat conversion, and with guidance, could be focused on the largest and highest quality blocks of occupied curlew habitat. Tools to identify those blocks, and to verify their use by curlews, can include the identification of focal areas, analysis of stewardship, and the incorporation of citizen science (including landowners and managers themselves) to identify occupied areas.

Fragmentation. In addition to habitat conversion, some curlew breeding habitats may become unsuitable as roads, other right-of-ways, buildings or energy exploration and development (e.g. drilling pads, wind turbines) reduce the size of habitat patches below the threshold at which curlews will use them. While more work needs to be done to describe these threshold levels, our efforts to identify key areas will help us work with land managers to reduce the threat of fragmentation. Work in Idaho indicated a minimum patch size of about 120 acres (Redmond et al. 1981). The revision of land use plans by federal agencies, notably the Bureau of Land Management, should provide opportunities to directly incorporate recommendations for curlew management in key areas.

Land Management Recommendations

Preferred management prescriptions will preserve or create large blocks of low-structure grassland (for nesting) mixed with or in proximity to wetlands or moister meadow habitats (for feeding and brood-rearing). Grazing should be managed to provide cover levels compatible with the needs of curlews; grazing systems (particularly late summer, fall or winter) that leave grass 10-30 cm in height have the best potential for use by curlews. Where nesting curlews are present, disturbance (e.g. mowing, fire, grazing, spraying, road-building, ORV use) should be avoided during the nesting season (15 Mar – 15 Jul, varying regionally).

Management recommendations and their rationale were compiled by Dechant et al. (1999), who cited the specific studies supporting their recommendations. We summarize those again here, and provide bulleted management recommendations on pages 25 and 26 of this document.

The foremost recommendation is to prevent conversion of upland prairie to cropland (Faanes and Lingle 1995). Breeding habitat should be protected from detrimental human activities, such

as vehicular use, and shooting (Sugden 1933, Redmond and Jenni 1986). In Saskatchewan, abandonment of breeding sites by Long-billed Curlews was attributed to researcher disturbance (Maher 1973, 1974). Habitat areas need to be >3 times as large as a Long-billed Curlew territory, which averages about 14 ha (35 ac), in order for curlews to use them, providing an unoccupied buffer strip 300-500 m wide around the edge of suitable habitat (Redmond et al. 1981).

Tall, dense residual vegetation should be removed before the pre-laying period (March to April) so that adults do not have to leave their territories to forage (Redmond 1986; R. L. Redmond, University of Montana, Missoula, Montana, pers. Comm.). Removal of residual vegetation is especially important after years of above-normal precipitation. Haying and grazing can be used to provide the short vegetation and reduced vertical plant density preferred by nesting curlews, but should be timed so that short vegetation is available early in the season (Cochran and Anderson 1987). In southwestern Idaho, curlews avoided areas that had not been grazed within the past year (Bicak et al. 1982), but the timing and intensity of grazing necessary to provide needed habitat structure needs to be adjusted based on local environmental factors (rainfall, soil productivity; Bicak et al. 1982, Cochran and Anderson 1987, Bock et al. 1993). Grazing during the incubation period should be avoided; in Wyoming, nests in areas that were grazed during incubation had lower hatching success rates than nests in other areas (Cochran and Anderson 1987).

Burning can be used with caution where fire will improve habitat by reducing shrub coverage and increasing habitat openness (Redmond and Jenni 1986, Pampush and Anthony 1993). During the breeding season following a fall range fire in western Idaho, the estimated curlew breeding density increased 30% (Redmond and Jenni 1986).

Curlews often place their nests adjacent to cowpies, and in westcentral Wyoming it was therefore suggested that hayfields should not be dragged to break them down (Cochran and Anderson 1987). However, in Idaho, curlews did not show a preference for nesting near cowpies (Redmond and Jenni 1986), suggested that dragging may be acceptable in some areas where it meets other management objectives.

Section III - Focal Area Identification

ABC and our partners have identified primary (continental) and secondary (regional) focal areas within the breeding range of the curlew in the U.S. and Canada, meant to represent those areas where the best remaining habitat, densest populations and/or known conservation opportunities come together. We initiated this effort using the HABPOPS database built for the IWJV, which identified and mapped current estimated carrying capacity of the landscape within BCRs 9, 10 and 16, within the IWJV boundary (Fig. 3).

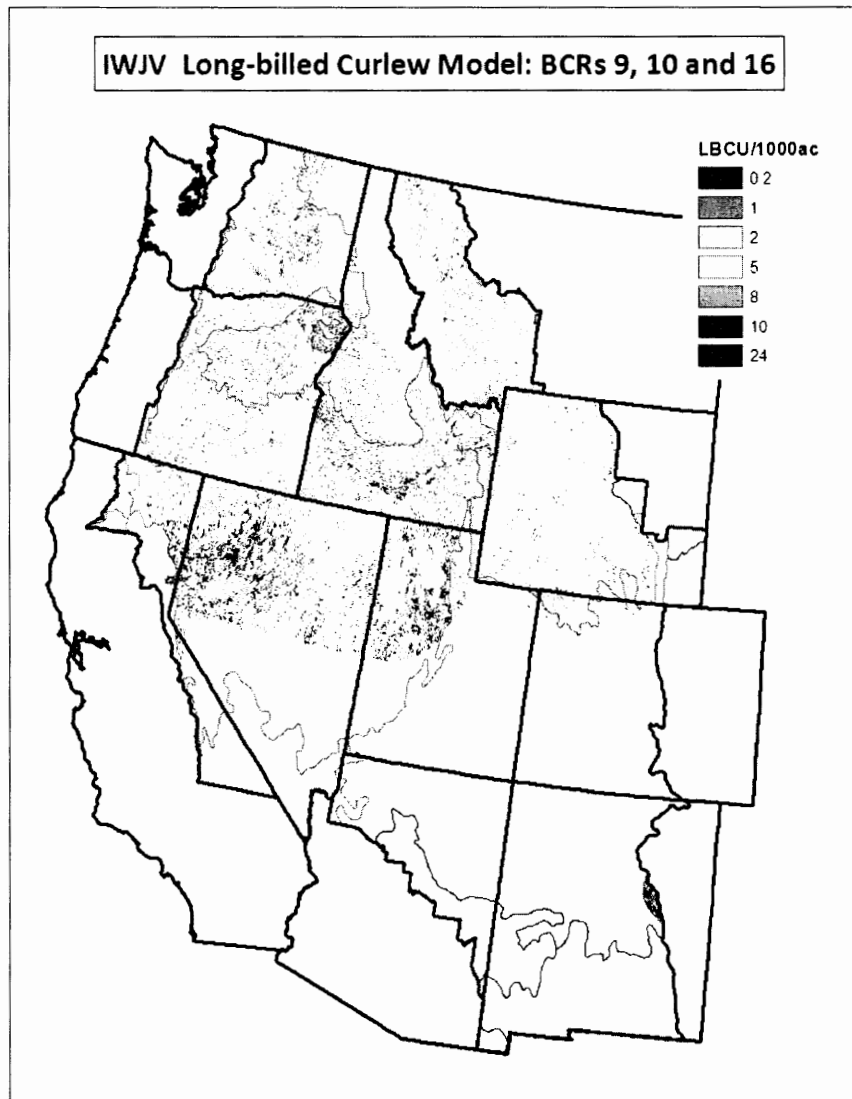


Figure 3. Long-billed Curlew habitat model, BCRs 9, 10 and 16 in the IWJV. Colors correspond to an index of the current estimated carrying capacity (estimated % occupancy) x (density) for the mapped vegetative associations in our HABPOPS model.

Figure 3 shows our current estimate of the carrying capacity of the vegetative associations in the Long-billed Curlew portion of our HABPOPS model, identifying those landscapes where we currently estimate carrying capacity to be the greatest. Areas toward the red end of the spectrum represent places where we have the most opportunity to protect existing populations; those at the green end of the spectrum represent areas where restoration and enhancement are most needed to increase carrying capacity.

Following the initial identification of “hotspots” using the HABPOPS model, we utilized the mapped results of relative abundance and trend as indicated by BBS data from 2001 through 2007 (Figures 1 and 2) to identify those areas where relative abundance was high, but populations trends were downward (Figure 4). These areas logically represent places where conservation action is most needed. We compared the resulting overlap in these data sets (BBS and HABPOPS) to develop a set of preliminary focal areas.

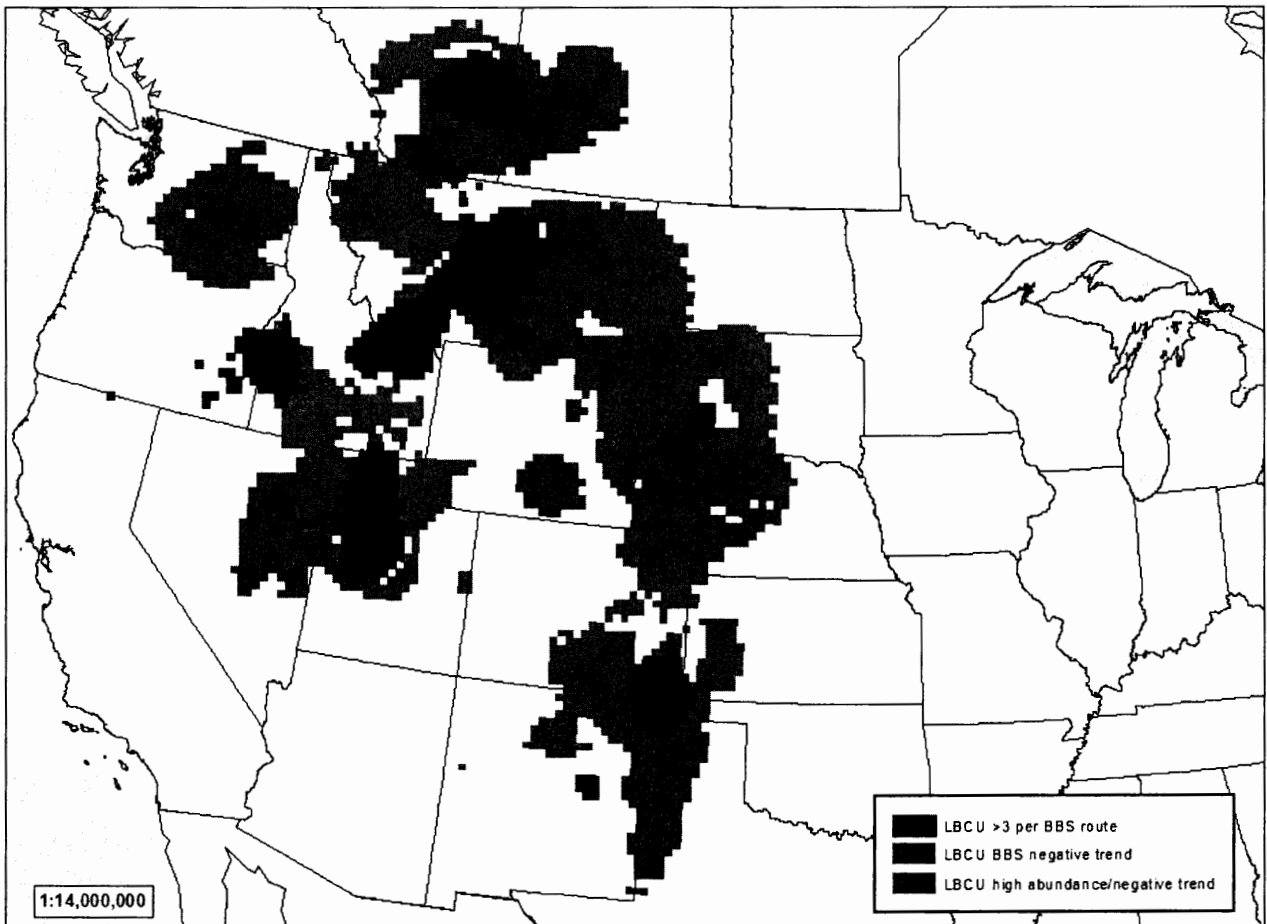


Figure 4. Relative abundance (>3 birds per route) and population trend (negative) from BBS data for the Long-billed Curlew, 2001-2007 (USGS data).

We selected 12 (Draft) continental or “primary” focal areas for Long-billed Curlew conservation (Figure 5). During the identification of these 12 draft primary focal areas, we also worked with partners on the state committees of the IWJV, and with partners in the Northern Great Plains and Playa Lakes JVs, to identify regional “secondary” focal areas which represent population hotspots or high local interest in conservation. For example, additional focal areas in Montana were selected using the outputs of a predictive model developed by the Montana Natural Heritage Program and the Prairie Potholes Joint Venture. These regional focal areas are displayed in the figures associated with the Recommended Management Actions and Guidelines sections which follow.

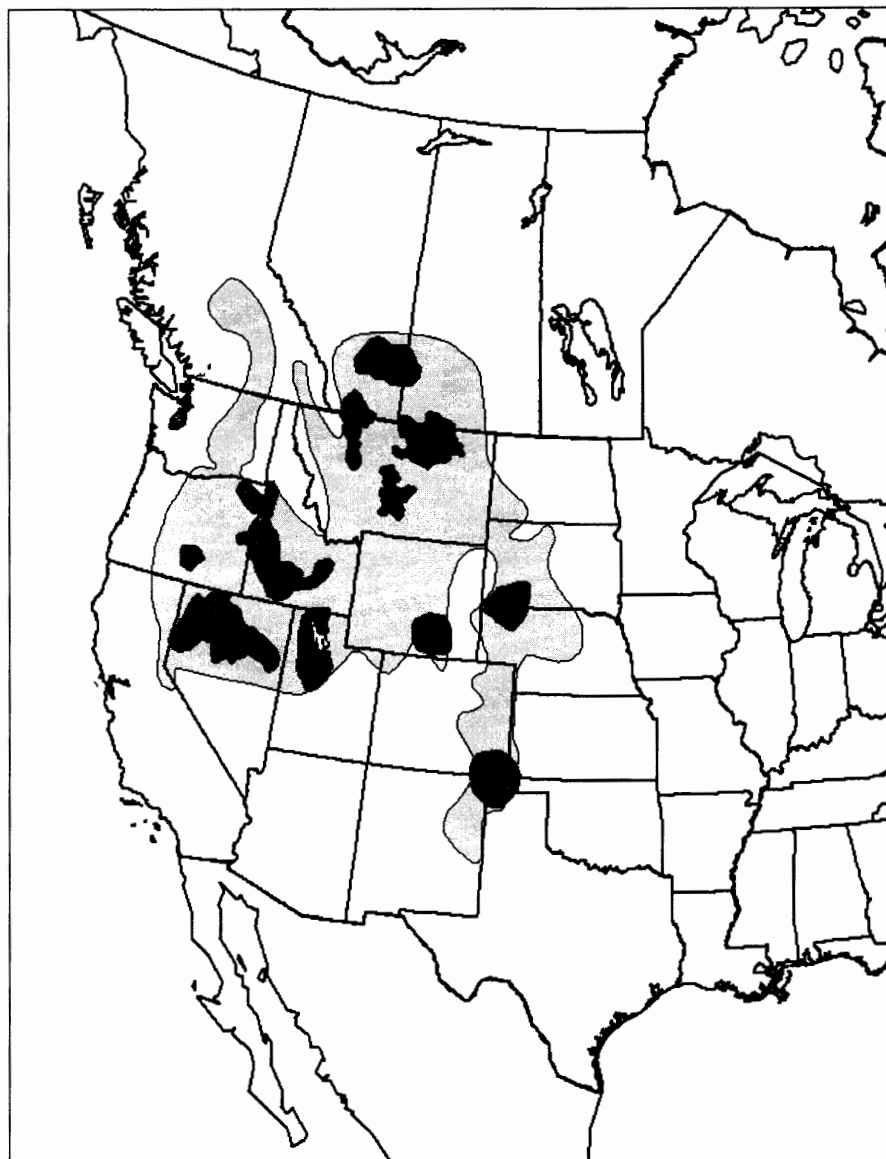


Figure 5. Primary (continental) focal areas (in blue) for Long-billed Curlew breeding habitat conservation, overlaid on the current breeding range of the species (in green).

Selection of these primary and secondary focal areas does not imply that management recommendations should not be implemented wherever breeding curlews occur. Indeed, ABC is working with regional partners (especially the Joint Ventures) to ensure that all interested parties will incorporate these guidelines into their management systems. But we do feel that these focal areas will help catalyze action, and that tracking successes within them through a registry of sites will further help to delineate partner opportunities and responsibilities. We are setting up such a registry as part of the focal area designation process. The registry will include (at a minimum) summaries of the known and estimated habitat acreage and population of curlews for each area, and will identify currently protected lands, private and public ownership, and project tracking, along with information on the conservation partners and other stakeholders.

Section IV – Best Management Practices

The following set of recommended management actions and guidelines should be implemented wherever practicable within the breeding range of the Long-billed Curlew in North America. They are adapted from Dechant et al (1999) and Cannings (1999), and are meant to also benefit other grassland species associated with native grassland habitats. In every case, these guidelines will be most effective if implemented on landscapes already known to be inhabited by breeding curlews; ideally implementation should be accompanied by local surveys to verify important nesting or brood rearing areas. The timing of breeding, appropriate stocking rates, seed mixes and opportunities will vary regionally, as well as by site. We present these as overall guidance to land managers across the range of the species, but urge local partner cooperation and consultation during their implementation. This will help ensure that local expertise and other site management objectives are taken into account.

Manage Grazing Appropriately

- Remove tall, dense residual vegetation before the spring arrival/pre-laying period (graze in fall/winter). Target date: 15 March (adjusted regionally/locally)
- Adjust timing and intensity of grazing to leave grass cover 10-30 cm tall by the time of nest initiation. Target date: 15 April (adjusted regionally/locally).
- Retain 5% of grasses and forbs in taller condition (30-40 cm) for broods.
- Avoid grazing during the incubation and nestling period, to avoid potential for trampling. Target dates: 15 April – 15 July (adjusted regionally/locally)
- Do not drag hayfields to break up cowpies.

Halt Habitat Conversion

- Prevent conversion of grassland or shrub-steppe, particularly in landscapes with wetland elements.
- Maintain or manage for grassland block sizes of >120 acres.
- Manage the forest fringe to minimize/reverse forest encroachment using slashing or other suitable method.

Emphasize Native Grasses and Forbs

- Burn areas only where and when fire intensity will reduce shrub coverage and increase habitat openness without reducing the diversity of native grass and forbs.
- Avoid seeding with non-natives (e.g. crested wheatgrass).
- Use locally-appropriate native bunchgrass/forb seed mixes for restoration and revegetation efforts.
- Where necessary, manage taller non-native grass cover with grazing, mowing or fire to maintain low profile vegetation prior to the nesting season.

Avoid Disturbance during Sensitive Periods

- Protect breeding habitat of curlews from detrimental human activities, such as vehicular use, construction activities, and shooting.
- Do not construct additional roads in occupied curlew habitat unless there is no other practicable option. Limit road use during the breeding season (March 15-July 15).

Adjust Certain Agricultural Practices

- Reduce pesticide use on grasslands, especially near water, to maintain both terrestrial and aquatic invertebrates as a food sources.
- Avoid widespread pesticide applications aimed at controlling grasshoppers.
- Reduce herbicide use to maintain nesting, loafing, and brood-rearing cover.
- Postpone tilling until at least mid-June in those agricultural habitats used for nesting.
- Whenever possible and practicable, favor flood-irrigation of hay meadows over sprinkler systems.

Recommended Management Actions and Guidelines by Ecoregion

Here we present some additional guidelines and actions specific to individual BCRs across the species' range. Each is accompanied by a map of the draft focal areas for that BCR. Typical spring arrival, nest initiation and fledging dates (Fellows and Jones 2009) are provided by state and province within each BCR. The quantity and quality of data identifying these seasonal benchmarks for implementing best management practices vary widely. For this reason, local data should be used whenever possible to adjust application of management actions (e.g. grazing, ORV restrictions) to match local breeding phenology.

Great Basin (BCR 9):

Identify partner organizations and individuals in primary focal areas in Idaho, Nevada, Oregon and Utah. Set up registry for each focal area to track opportunity and success. Refine and/or add secondary focal areas with local partners on a state by state basis (e.g. Boardman grasslands in Oregon, Hanford in Washington, Steptoe Valley in Nevada). Verify curlew occupancy through field surveys with agency, NGO or citizen scientists (e.g. eBird). Conservation in this region will be complicated by the high densities of curlews that can be found in some invasive cheatgrass stands. In addition to implementing the general guidelines above, strive to:

- Emphasize protection and enhancement of level or moderately level stands Sandberg's bluegrass, as a component of the vegetation, and where possible use this or shorter native grasses in seed mixes for restoration areas, avoiding *Agropyron* spp;
- Manage for preseason grass heights of 6-10 cm and bare ground cover of 35%;
- Maintain fallow and hayfields at heights of <30cm with mowing as needed to provide better foraging habitat during the nesting and brood-rearing period;
- Consider using sheep if necessary to meet grass height and bare ground objectives.

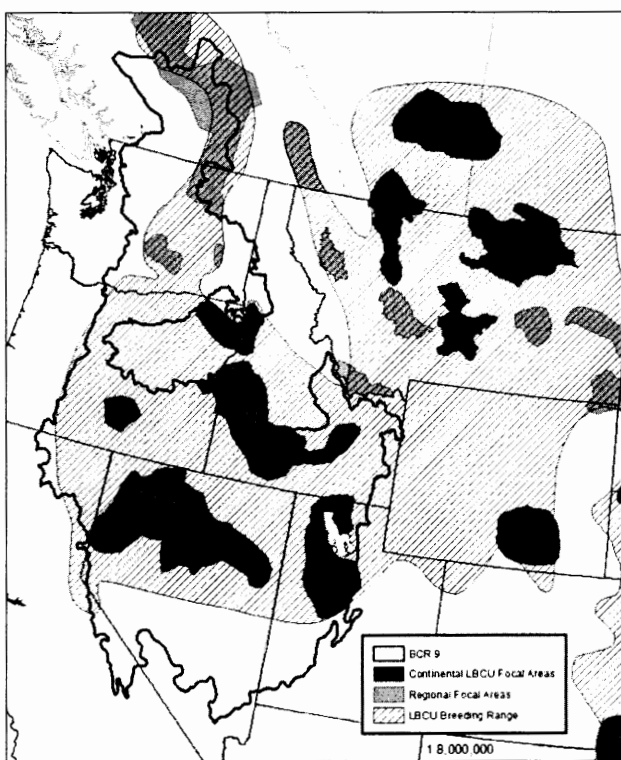


Figure 6. Great Basin BCR (BCR 9), with primary (blue) and secondary (gray) focal areas for Long-billed Curlew Conservation.

Northern Rockies (BCR 10):

Identify partner organizations and individuals in primary focal areas in British Columbia, Idaho, Montana, Oregon and Utah. Set up registry for each focal area to track opportunity and success. Refine and/or add secondary focal areas with local partners on a state by state basis (e.g. sw Wyoming). Verify curlew occupancy through field surveys with agency, NGO or citizen scientists (e.g. eBird). In addition to implementing the general best management practices, strive to:

- Manage irrigated and non-irrigated pastures and hayfields for 25 % grass cover;
- Identify the largest intact grassland stands in Intermountain valleys and take immediate steps to identify the best approaches to long-term protection.

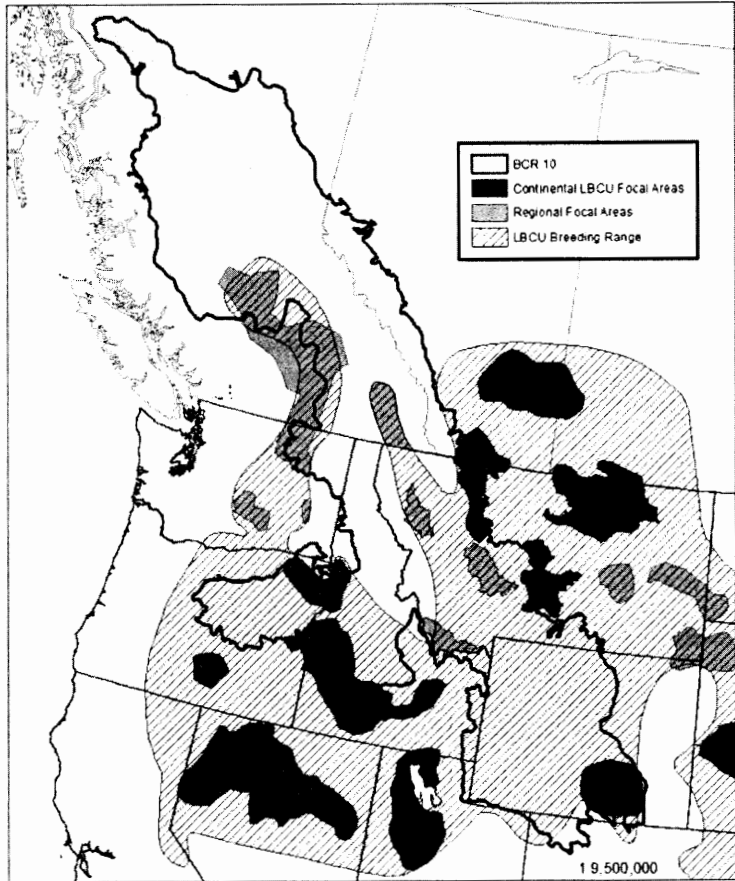


Figure 7. Northern Rockies BCR (BCR 10), with primary (blue) and secondary (gray) focal areas for Long-billed Curlew

Table 2. Approximate dates of spring arrival, nest initiation, and fledging for Long-billed Curlews, by state and province, BCR 10. Adapted from the compilation by Fellows and Jones (2009).

State/Province	Spring Arrival	Nest Initiation	Fledging
Colorado	1 April	15 April	15 July
Idaho	1 April	15 April	15 July
Montana	15 April	1 May	15 July
Oregon	15 March	15 April	15 July
Utah	15 March	10 May	10 August
Washington	10 March	1 April	30 June
Wyoming	15 April	5 May	5 July
Alberta	20 April	1 May	1 July
British Columbia	20 March	10 April	10 July

Potholes and Prairies (BCR 11):

Identify partner organizations and individuals in primary focal areas in Alberta, Montana, and Saskatchewan. Set up registry for each focal area to track opportunity and success. Refine and/or add secondary focal areas with local partners (e.g. southern Saskatchewan). Verify curlew occupancy through field surveys with agency, NGO or citizen scientists (e.g. eBird). In addition to implementing the general best management practices, strive to:

- Emphasize protection of sites with sandy soils and flat to rolling terrain;
- Avoid grazing in spring or late summer in mixed-grass pasture;
- Identify and protect habitat blocks of >120 ac and within ¼ mi of wetlands

Figure 8. Potholes and Prairies BCR (BCR 11), with primary (blue) and secondary (gray) focal areas for Long-billed Curlew Conservation.

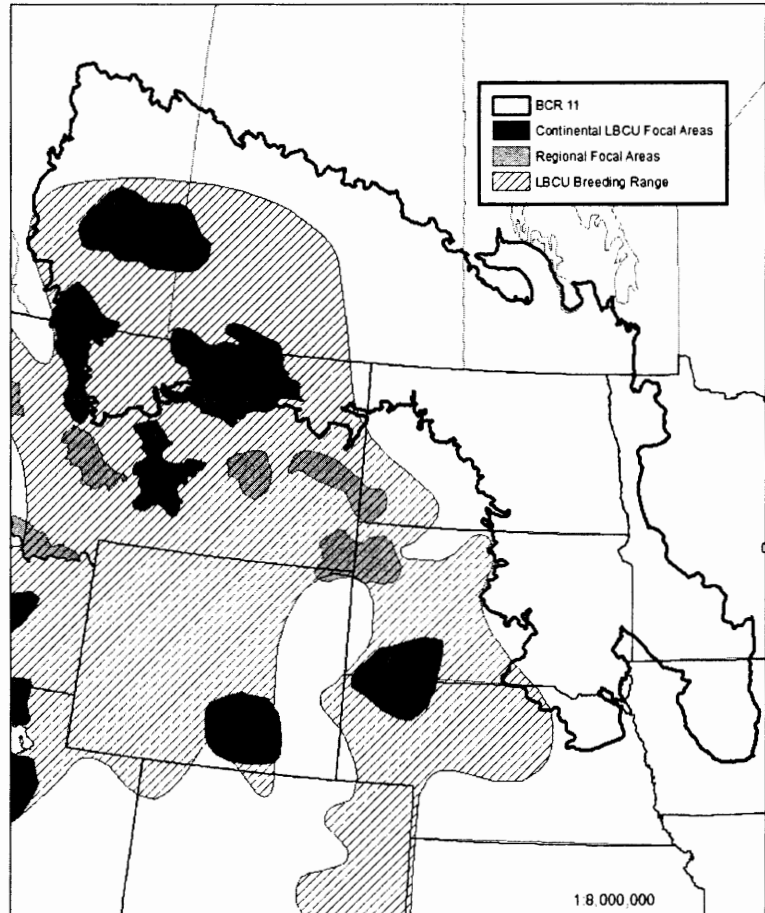


Table 3. Approximate dates of spring arrival, nest initiation, and fledgling for Long-billed Curlews, by state and province, BCR 11. Adapted from the compilation by Fellows and Jones (2009).

State/Province	Spring Arrival	Nest Initiation	Fledging
Montana	15 April	1 May	15 July
Nebraska	20 March	10 April	15 June
South Dakota	20 March	1 May	15 July
Alberta	20 April	1 May	1 July
British Columbia	20 March	10 April	10 July
Saskatchewan	15 April	5 May	5 July

Northern Great Plains (BCR 17):

Identify partner organizations and individuals in primary (continental) and secondary (regional) focal areas in Montana, Nebraska, North and South Dakota and Wyoming. Set up registry for each focal area to track opportunity and success. Refine and/or add secondary focal areas with local partners on a state by state basis. Verify curlew occupancy through field surveys with agency, NGO or citizen scientists (e.g. eBird). In addition to implementing the general best management practices, strive to:

- Manage for or emphasize sites dominated by bluebunch wheatgrass, prairie sandreed, and Idaho fescue.
- Identify and protect habitat blocks of >120 ac and within ¼ mi of wetlands.

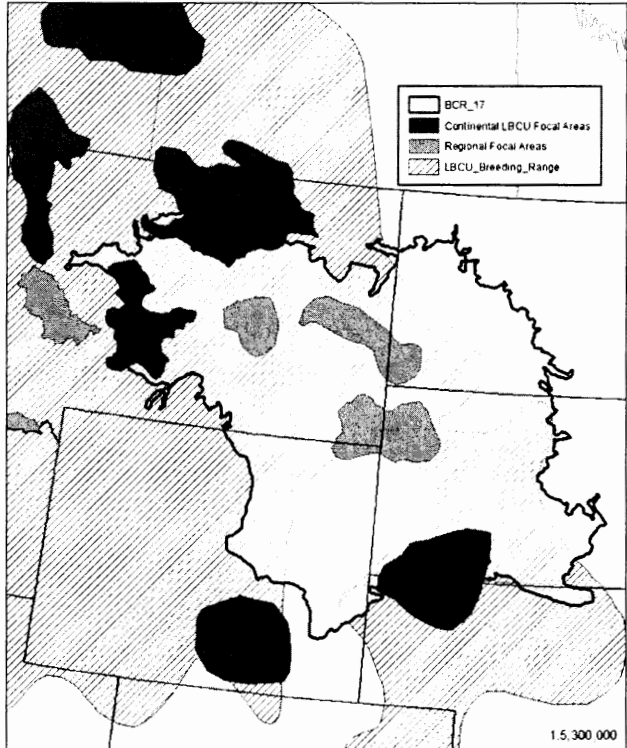


Figure 8. Northern Great Plains BCR (BCR 17), with continental and regional focal areas for Long-billed Curlew Conservation.

ABC received a grant in 2013 for an 18-mo effort to deliver Long-billed conservation in a 32-county area in MT, ND and SD. Using funding from the National Fish and Wildlife Foundation and the Northern Great Plains Joint Venture, we established a Conservation Specialist position, housed in the NRCS Field Office in Hettinger, ND, to deliver outreach and implementation. Targets are to engage with 300 landowners and deliver 6,250 ac of conservation action using NRCS conservation practices.

Table 4. Approximate dates of spring arrival, nest initiation, and fledging for Long-billed Curlews, by state, BCR 17. Adapted from the compilation by Fellows and Jones (2009).

State/Province	Spring Arrival	Nest Initiation	Fledging
Montana	15 April	1 May	15 July
Nebraska	20 March	10 April	15 June
North Dakota	20 March	20 April	15 July
South Dakota	20 March	1 May	15 July
Wyoming	15 April	5 May	5 July

Southern Great Plains (BCR 18, 19):

The Playa Lakes Joint Venture has prepared implementation plans for those portions of each state within BCR 18 (<http://www.pljv.org/partners/planning>). They include specific acreage and population goals for the species, based on a model in which one curlew is supported by 1,650 ac of shortgrass, of which no more than 220 are shrubland or woodland and no more than 51 ac of roads, within 1 mi of a wetland. While those plans acknowledged that more information is needed to improve their models, they called for the management of nearly 5 million acres of shortgrass prairie, and 1.15 million acres of mixed grass prairie, with a mix of short (e.g. 10 cm) and taller (i.e. 30-40 cm) grasses, few shrubs and in large blocks. They also recommend establishing nearly 80,000 more acres of prairie dog colonies, and maintain an additional 10,000 playas within the BCR.

These objectives are further broken down by state within the BCR (Table 5), and exceed the areas included in our proposed primary focal areas.

The PLJV Implementation Plans recommend using managed grazing to create/enhance large blocks of shortgrass with heterogeneity and few shrubs near water sources. We recommend identifying those specific land parcels within our BCR 18 focal areas where progress toward these objectives can be made, and working with the Playa Lakes and Rainwater Basin JVs to implement necessary management and track successes within each focal area.

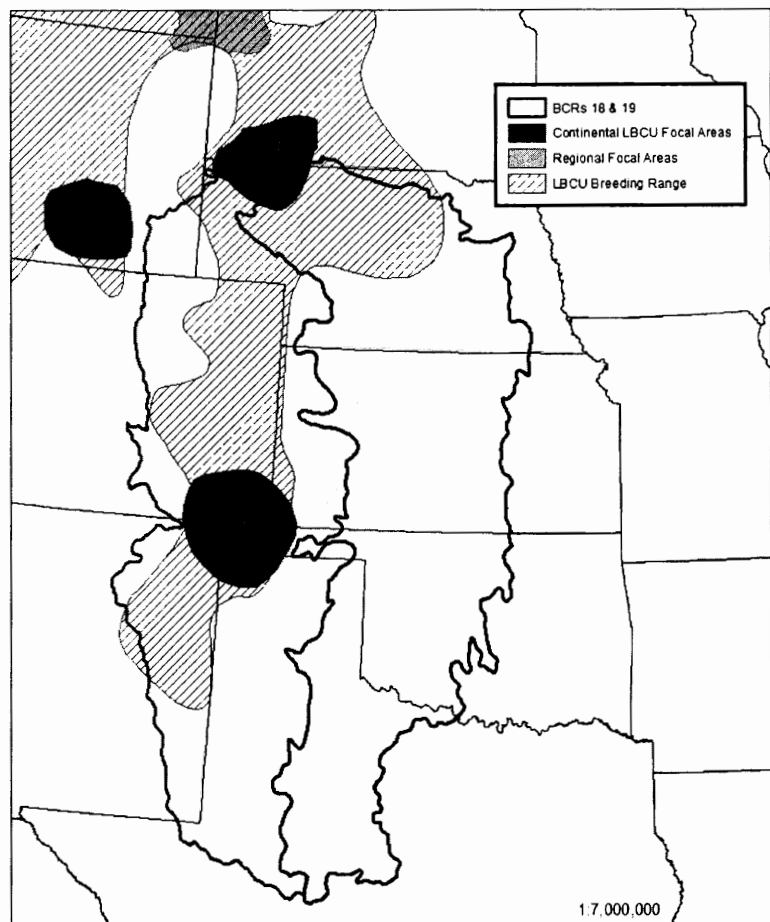


Figure 9. Southern Great Plains BCRs (18 and 19), with continental and regional focal areas for Long-billed Curlew Conservation.

Table 5. Playa Lakes Joint Venture habitat objectives for Long-billed Curlew Conservation in BCR 18.

State	Acres
CO	4.48 million ac shortgrass with few shrubs
KS	Convert 124,000 ac of agricultural land to shortgrass prairie
	Manage 214,621 ac of shortgrass in large blocks
NE	Manage 1,147,285 ac of mixed grass prairie for few shrubs
	Manage 436,307 ac of shortgrass
	Manage in large blocks (current estimates 600,472 ac mixed and 150,165 short in large blocks.
	Configure prairie dogs to make large blocks
NM	Manage 1,113,203 additional ac of shortgrass in blocks
OK	Add 38,671 ac of prairie dogs, primarily in Cimmaron County
	Manage 302,863 ac of prairie in large blocks
TX	2,267,171 shortgrass needed in large blocks

Table 6. Approximate dates of spring arrival, nest initiation, and fledging for Long-billed Curlews, by state, BCRs 18 and 19. Adapted from the compilation by Fellows and Jones (2009).

State/Province	Spring Arrival	Nest Initiation	Fledging
Colorado	1 April	15 April	15 July
Kansas	15 March	1 April	1 July
Nebraska	20 March	10 April	15 June
New Mexico	10 March	15 April	15 July
Oklahoma	15 March	1 May	1 July
Texas	10 March	15 April	20 June

Conclusions

Effective conservation of the declining Long-billed Curlew will require concerted efforts of agencies, NGOs, landowners and citizen scientists to ensure that important breeding sites and habitats are identified and managed to meet the habitat needs of the species. We have identified 12 primary (continental) focal areas for curlew conservation throughout their breeding range in North America. These were selected based on the modeling efforts, BBS relative abundance and trend mapping, and peer review. The identification of these areas was meant to reinforce, rather than replace the efforts of local and regional partnerships to account for and meet the needs of grassland nesting birds. The largest blocks of suitable/occupied curlew habitat within these focal areas should be targeted for long-term protection through fee-title purchase, conservation easement or management agreements. Those already in public ownership or stewardship need to be managed to provide the habitat conditions required by curlews.

Though they are highly reliant on native rangeland habitats, Long-billed Curlews also use multiple habitats on working lands, from pastures and hay meadows to certain cropland types. Land management prescriptions should account for meeting the needs of nesting curlews by providing a heterogeneous mixture of grass cover <30 cm tall, bare ground, and native forbs, particularly in proximity to seasonally flooded meadows or wetlands. Cost-share and landowner incentive programs (e.g. NRCS conservation practices under EQIP and WHIP) should be used to encourage management toward these objectives. Land management plans of the BLM and other land management agencies should account for and incorporate these recommendations in their alternatives for public land management direction. We will establish and maintain registries for each Long-billed Curlew focal area to identify opportunities and track conservation accomplishments

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