1.0 Project Summary Sheet

Title: Cropland Planning for Water Quality Improvement

Project Period: 2013

Project Sponsor

South Dakota State University
Primary Contact: Christopher Hay
Assistant Professor / Extension Water Management Engineer
christopher.hay@sdstate.edu
Agricultural and Biosystems Engineering
Box 2120
Brookings, SD 57007-1496
605-688-5610

Project Funding

NPS Funds Requested $23,897 + Match (cash/in-kind) $16,021 + Other Federal Funds $0 =

Total Project Cost $39,918

Project Type

Planning/Assessment

Project Location

Watershed(s): Statewide

Counties: Statewide

303(d) Listed Stream: Statewide

Project Location: Statewide

HUC(s): Statewide

NPS Pollution Source categories to be addressed			
100%	Agriculture	0%	Silviculture
0%	AFOs	0%	Hydrologic Modification
0%	Urban Runoff	0%	Construction
0%	Resource Extraction	0%	Other

NPS Functional Category			
	BMP Implementation		Technical Assistance
	Information and Education	X	Planning
	Watershed Assessment		Groundwater
	Water Quality Monitoring		Other

NPS Pollutants to be Addressed			
X	Excess Nitrogen	X	Pesticides
X	Excess Phosphorous		Oil and Grease
X	Sedimentation		Temperature
X	Pathogens/Bacteria		pH
	Metals		Other
	Low Dissolved Oxygen		Other

Project Goals: Our *long-term goal* is to reduce sediment, nutrient, and pesticide loading of South Dakota waters by fostering the adoption of conservation best management practices (BMPs) on croplands. The *goal of this proposal*, which is the next step toward our long-term goal, is to conduct the planning and assessment necessary to develop a Cropland Coalition designed to promote voluntary adoption of BMPs through technical assistance and information and education. The attainment of this goal will result in a partnership of organizations and individuals working collaboratively for the health of South Dakota's cropland and water resources for sustained, profitable agricultural production and environmental quality.

Project Description: The Cropland Planning for Water Quality Improvement project is a 1-year planning project that is expected to lead to a future comprehensive implementation and information and education project designed for water quality improvement of surface waters impacted by croplands in South Dakota. This project will organize a coalition of cooperating organizations with common interests in increasing voluntary conservation practices on croplands, conduct planning and assessment activities for a larger implementation project, and conduct a series of information and education events.

2.0 Statement of Need

2.1 Demonstrated Water Quality Need

Cropland is a key component of South Dakota's economy. There are over 13 million acres of cropland in South Dakota with a production value in 2011 of $7.8 billion (2011 USDA NASS State Agriculture Overview). Corn, soybean, and wheat are the primary field crops in South Dakota, but there are several other crops that are also produced. The majority of cropland in South Dakota is located east of the Missouri River; however, there are also significant areas of crop production in western South Dakota. As with any other land use, runoff from croplands can contribute to loading of nonpoint source (NPS) pollutants to surface waters. Because of the importance and extent of cropland in South Dakota and its contribution to surface water impairments, there is a need for a comprehensive project to foster the voluntary adoption of BMPs on croplands, and this planning project is the first step to address that need.

The 2012 Integrated Report for Surface Water Quality indicates that 65% of the stream miles (4181 miles) in South Dakota do not support one or more of their designated uses. The previous (2010) report identifies cropland as the probable source of impairment for 729 stream miles, with irrigated crop production identified as the probable source for an additional 97 miles. The primary causes of impairment are from high levels of total suspended solids (TSS), *E. coli*, and fecal coliform bacteria. Elevated levels of TSS and bacteria are generally associated with storm events. There are 92 stream segments requiring Total Maximum Daily Loads (TMDLs).

Additionally, 34% of the assessed lake and reservoir acreage (41,423 acres) are considered impaired. The primary NPS pollutants leading to the impairment of lakes and streams are sediment and nutrients. There are 63 lakes that require TMDLs.

The 2012 Integrated Report for Surface Water Quality recognizes that while education has been effective in prompting many landowners to voluntarily adopt BMPs, the technical and financial assistance that is currently available is not sufficient. The report also notes that many of the solutions to NPS problems involve land management changes that will improve the productivity and sustainability of those lands. The cropland coalition formed as part of this planning process will seek to fill this need by developing a framework to provide accelerated technical assistance for producers to implement practices that improve their long-term productivity and profitability in addition to protecting the health of South Dakota's waters.

2.2 Waterbody Information

The proposed project will be statewide, and thus, will involve multiple waterbodies. We will rely on baseline data and information from DENR for water quality. Data and information from DENR on

probable sources of NPS pollutants will be used to develop a priority ranking for targeting of future implementation activities. To the extent that additional data is needed for planning and assessment for targeting of future implementation activities, commonly used, well-documented federal geospatial databases (e.g. SSURGO, Cropland Data Layer) will be used.

2.3 Project Map

The surface water resources of South Dakota and the status of those waterbodies are shown in Figure 1.

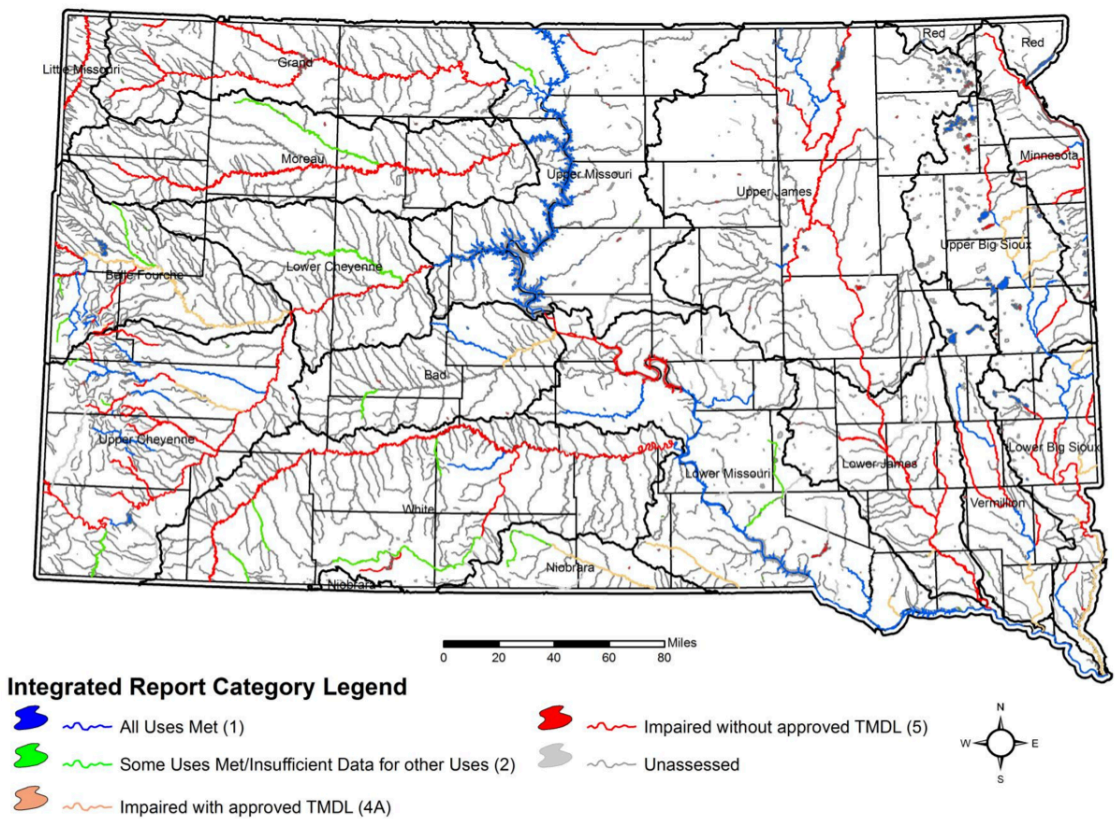

Figure 1. Surface water resources of South Dakota and their TMDL status (2012 Integrated Report for Surface Water Quality).

2.4 General Watershed Information

South Dakota can be divided into 14 major river basins. All but two of these river basins are part of the Missouri River drainage. Only a small portion of the Red River basin in northeastern South Dakota does not contribute to the larger Mississippi River drainage. Eastern South Dakota generally has greater precipitation and lower topography than the western part of the state. Western South Dakota is part of the Great Plains with a semi-arid climate and more rugged topography. The

landscape of eastern South Dakota was heavily influenced by glacial activity and is a younger landscape with a less well-defined drainage network. Another product of the glacial activity in eastern South Dakota is a large number of glacial lakes and prairie pothole wetlands.

3.0 Project Description

The Cropland Planning for Water Quality Improvement project is a 1-year planning project that is expected to lead to a future comprehensive implementation and information and education project designed for water quality improvement of surface water impacted by croplands in South Dakota. This project will organize a coalition of cooperating organizations with common interests in increasing voluntary conservation practices on croplands; conduct planning and assessment activities for a larger implementation project; and conduct information and education events to increase knowledge of cropland conservation practices, technologies and incentives available for their adoption, and develop support for an implementation project.

3.1 Project Outcomes

There are three expected outcomes for the proposed project:

Outcome 1: Develop a coalition of cooperating organizations and individuals, tentatively titled the Cropland Coalition, with common interests in fostering the voluntary adoption of cropland BMPs for water quality improvement and sustained, profitable agricultural production.

The purposes of a cropland coalition will be to encourage and provide technical assistance for the adoption of conservation practices on cropland. These practices will largely be based on practices included in the USDA NRCS Environmental Quality Incentive Program (EQIP), including, but limited to, grassed waterways, vegetated buffers, conservation crop rotations, cover crops, nutrient management, residue and tillage management, and terraces. One of the goals of the cropland coalition will be to develop a comprehensive planning, assessment, and implementation project to increase the adoption of these practices by South Dakota crop producers. The adoption of these practices will result in reductions in sediment, nutrient, and pesticide loadings to South Dakota surface waters. For cropland producers who include manure applications in their operations, these same practices will also have the effect of reduced bacteria loadings. Another key function of the cropland coalition will be information and education activities to better inform producers and the public on the role of cropland conservation practices on sustaining agricultural productivity and environmental quality. The cropland coalition will foster the development of learning communities of interested producers in key crop producing areas of the state to develop locally based, adaptive BMPs for water quality improvement and long-term productivity and profitability. The success of these learning communities will build momentum for adoption of these practices by other producers.

Outcome 2: Priority cropland areas for targeting of future cropland BMP activities.

A GIS-based approach will be used to prioritize cropland areas based on their potential for erosion and sediment and nutrient loading to South Dakota surface waters. This ranking system will be used to target implementation activities of future projects to maximize achievable impacts with available inputs.

Outcome 3: A series of information and education events.

A series of three information and education meetings will be held. Two meetings will be held in eastern locations (e.g. Aberdeen, Mitchell, Sioux Falls) and one will be held in a more central location (e.g. Pierre). The goals of these meetings will be to share the vision of the vision of the cropland coalition with a broader audience, inform producers and other stakeholders of the benefits of cropland conservation practices for long-term agricultural productivity and environmental quality, promote interest in future implementation projects, and identify potential producer cooperators.

Outcome 4: Reporting.

A semi-annual, annual, and final report will be prepared and submitted to meet reporting rquirements.

3.2 Outcomes, Targets, and Tasks

Outcome 1: Develop a coalition of cooperating organizations and individuals, tentatively titled the Cropland Coalition, with common interests in fostering the voluntary adoption of cropland BMPs for water quality improvement and sustained, profitable agricultural production.

Task 1: Cropland Coalition planning. The sponsor and cooperating organizations will work to identify and partner with organizations and individuals interested in forming a cropland coalition. In particular, we will seek to partner with NRCS, SDACD, and DENR to complement and build on the existing activities of these organizations. A series of planning meetings will be held to identify mutual goals, a shared vision for achieving those goals, proposed activities for future implementation projects of the coalition, an appropriate framework for carrying out the activities of the coalition, and potential funding mechanisms for the coalition's activities.

Output: A new cropland coalition.

Outcome 2: Priority cropland areas for targeting of future cropland BMP implementation activities.

Task 2: Assess, adapt, and supplement existing data for priority ranking cropland areas. An assessment of existing data and information will be made, in consultation with SD DENR, on probable sources of NPS pollution in cropland areas. To the extent necessary, these data will be adapted and

supplemented with additional data necessary for developing a priority ranking of cropland areas and incorporated into a GIS.

Output: A GIS-based system for identifying priority cropland areas for targeting of future implementation activities.

Task 3: Apply GIS-based system for ranking of priority cropland areas. The GIS system will be applied to cropland in the state of South Dakota to identify priority cropland areas for targeting of future BMP implementation activities.

Output: A geospatial dataset of South Dakota cropland ranked by potential for sediment and nutrient loadings.

Outcome 3: A series of information and education events.

Task 4: Event organization and execution.

A series of three meetings will be organized to share the vision of the cropland coalition, inform producers and other stakeholders of the benefits of cropland conservation practices for long-term agricultural productivity and environmental quality, promote interest in future implementation projects, and identify potential producer cooperators. SDSU Extension will organize the meetings with assistance by the cooperating organizations. We will seek to incorporate the programming into successful, existing crop-related Extension meetings to maximize the audience reached. Included in these events will be a needs assessment of the information and technical assistance needs of crop producers for cropland BMPs and an evaluation of the educational activities.

Output: A more informed group of producers and stakeholders and an assessment of their information and technical assistance needs.

Costs:	Federal (319) Funds:	$13,200
	Non-Federal Match:	$0
	Total Cost:	$13,200

Outcome 4: Reporting.

Task 5: Write semi-annual, annual, and final reports to fulfill reporting requirements.

Output: Semi-annual, annual, and final reports.

3.3 Milestone Table

See Attachment 1.

3.4 Project Management and Tracking

South Dakota State University is a land-grant university, whose mission includes service to the state and public through SDSU Extension. Additionally, the Water Resources Institute at SDSU provides service on water related issues. Primary faculty and staff from SDSU that will be involved in this project are Dr. Chris Hay, Agricultural and Biosystems Engineering; Dr. Jeppe Kjaersgaard, South Dakota Water Resources Institute; Dr. Gregg Carlson, Plant Sciences; and Kurt Reitsma and Larry Wagner, Field Specialists with SDSU Extension. The primary faculty and staff have extensive experience and technical expertise in agriculture and water quality issues. Additionally, they work closely with crop commodity organizations and other conservation stakeholders. Therefore, the project sponsors are well qualified to management this planning project. The end goal of this planning project will be the creation of a new coalition to take over the sponsorship and management of future related projects.

3.5 Permits

Since implementation activities are not a part of this proposal, no permits will be required.

4.0 Coordination Plan

4.1 Cooperating Organizations

South Dakota State University and SDSU Extension will be the project sponsor for this initial planning phase to provide leadership and technical assistance for developing a Cropland Coalition. The South Dakota Corn Growers Association, South Dakota Soybean Association, and South Dakota Wheat Commission will be partnering organizations. They will work with and advise the project sponsors in the development of a broad coalition to address conservation practices on cropland for water quality improvement.

4.2 Local Support for the Project

The project has local support as indicated by the support of individual producers from the cooperating commodity organizations who have indicated that water and environmental quality are important issues for their organizations.

4.3 Duplicate Effort

Although several organizations are involved in BMPs for cropland, there is currently no broad-based coalition addressing conservation practices specifically for croplands in South Dakota. As part of the planning efforts, the sponsor and cooperating organizations will coordinate with other organizations

with interests in improving voluntary adoption of conservation practices on croplands to develop a coalition that will minimize duplication of effort and maximize impact.

4.4 Assumption of the Responsibilities of Other Entities

As part of the planning efforts, the sponsor and cooperating organizations will seek to leverage relevant existing state and federal programs to add to those efforts and not assume the responsibilities of those agencies.

5.0 Evaluation and Monitoring Plan

5.1 Monitoring Strategy

A water quality monitoring plan is not proposed for this project. However, there will be monitoring of project activities and periodic evaluations to ensure that milestones and project outcomes are being met. The planning activities for this project will rely on existing data, but, as part of that planning, water quality evaluation and monitoring needs for future activities may be identified.

5.2 Sampling and Analysis Plan

Since a water quality monitoring plan is not proposed for this project, a sampling and analysis plan is not applicable.

5.3 Quality Assurance Project Plan

Since a water quality monitoring plan is not proposed for this project, a Quality Assurance Project Plan is not applicable.

5.4 Data Collection, Management, and Analysis

SDSU will be responsible for collecting, managing and analyzing data used in the project. For this planning project, the data will consist of publicly available state and federal water quality, soils, and land use / land cover, and other applicable geospatial datasets.

5.5 Models

A GIS-based land targeting system will be developed using existing data for targeting high priority areas. DENR will be consulted about data availability any other potentially appropriate modeling efforts.

5.6 Operation and Maintenance

The current proposed project will not involve BMP implementation.

6.0 Information and Education

A series of three information and education meetings will be held. Two meetings will be held in eastern locations (e.g. Aberdeen, Mitchell, Sioux Falls) and one will be held in a more central location (e.g. Pierre). The goals of these meetings will be to inform producers and other stakeholders of the benefits of cropland conservation practices for long-term agricultural productivity and environmental quality, promote interest in future implementation projects, and identify potential producer cooperators. SDSU Extension will organize the meetings with assistance by the cooperating organizations. We will seek to incorporate the programming into successful, existing crop-related Extension meetings to maximize the audience reached. Included in these events will be a needs assessment of the information and technical assistance needs of crop producers for cropland BMPs and an evaluation of the educational activities. The output of these events will be a more informed group of producers and stakeholders and an assessment of their information and technical assistance needs to inform future implementation and education activities.

7.0 Budget and Budget Justification

See Attachment 2.

8.0 Attachments

Attachment 1

Milestone Table

Project Name: Cropland Planning for Water Quality Improvement
Date: July 1, 2013 to June 30, 2014

Task	Group	Quantity	2013		2014	
			Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun
Outcome 1: Develop Cropland Coalition						
Task 1: Cropland Coalition Planning						
Product 1: Cropland Coalition	1,2	1		1		
Outcome 2: Priority Cropland Areas						
Task 2: Data Assesment						
Product 2: GIS Priority System	1			1		
Task 3: GIS Application						
Product 3: Geospatial Dataset	1					1
Outcome 3: Information and Education						
Task 4: Meeting Organization and Execution						
Product 4: Educational Meetings	1,2	3			3	
Outcome 4: Reporting						
Task 5: Semi-annual, annual, and final reports						
Product 5: Reports	1					
Semi-annual report				1		
Annual report						1
Final report						1

Groups:
1 - Project staff (SDSU)
2- Cooperating organizations (SDCGA, SDSA, SDWC)

Attachment 2

Budget

Project Name: Cropland Planning for Water Quality Improvement
Date: July 1, 2013 to June 30, 2014

ITEM	Year 1 2013-2014	Total	319-EPA	State SDSU
Personnel				
Project Coordinator/Project Staff	16,021	16,021		16,021
(Benefits included)				
Undergraduate Student Labor	2,122	2,122	2,122	
(Benefits included)				
Travel				
Vehicle Mileage (7500 mi. x $0.37 per mile)	2,775	2,775	2,775	
Meals	720	720	720	
Outcome 1: Develop Cropland Coalition				
Task 1: Cropland Coalition Planning				
Product 1: Cropland Coalition				
Costs are in Personnel and Travel				
Outcome 2: Priority Cropland Areas				
Task 2: Data Assesment				
Product 2: GIS Priority System				
Costs are in Personnel and Travel				
Task 3: GIS Application				
Product 3: Geospatial Dataset				
Costs are in Personnel and Travel				
Outcome 3: Information and Education				
Task 4: Meeting Organization and Execution				
Product 4: Educational Meetings				
3 Meetings @ $4,400 each	13,200	13,200	13,200	
Outcome 4: Reporting				
Task 5: Semi-annual, annual, and final reports				
Product 5: Reports				
Costs are in Personnel				
Indirect Costs				
F&A (27%)	5,080	5,080	5,080	
Total Project Costs	39,918	39,918	23,897	16,021
Match				
Ineligible match				
Match: Project Totals for Match	16,021	16,021		16,021
Match Percentages	40%	40%		40%

South Dakota
Corn Growers Association
4712 S. Technopolis Drive
Sioux Falls, SD 57106

October 1, 2012

Chris Hay
Assistant Professor/Extension Water Management Engineer
Agricultural and Biosystems Engineering
South Dakota State University

Dear Chris,

The South Dakota Corn Growers Association (SDCGA) submits this letter in support of the "Cropland Planning for Water Quality Improvement project.

The SDCGA will provide project guidance and assistance. Our organization will work with South Dakota State University and SDSU Extension to develop a coalition of cooperating organizations that share common interests in expanding conservation practices on cropland.

Water quality issues have never been more important than they are now. We believe this planning project is a key step in protecting South Dakota waters. It will also raise awareness of conservation technology and incentives.

It is important for both urban and rural groups to do all they can to protect our water, and the SDCGA supports this project.

Sincerely,

Lisa Richardson
SDCGA executive director

SOUTH DAKOTA
SOYBEAN
RESEARCH & PROMOTION COUNCIL

Oct 1, 2012

Christopher H. Hay
Agricultural and Biosystems Engineering
South Dakota State University
Box 2120
Brookings, SD 57007-1496

To Whom It May Concern:

The South Dakota Soybean Research & Promotion Council supports the proposal titled "Cropland Planning for Water Quality Improvement" and encourages its funding. We will participate in the planning activities to develop a coalition to foster best management practices for water quality and sustained, profitable agricultural production, and we will provide guidance and assistance to the project coordinators toward successful outcomes for this project. Water quality is an issue that is important to everyone, including soybean growers, and this project and future endeavors will impact land and water management across the state to the benefit of growers and the public. Therefore, we are willing to cooperate on this project.

Sincerely,

Jeremy Freking, SDSRPC Executive Director

South Dakota Soybean Research and Promotion Council
5000 South Broadband Lane, Suite 100
Sioux Falls, SD 57108

SOUTH DAKOTA
WHEAT COMMISSION

September 28, 2012

Christopher H. Hay
Agricultural and Biosystems Engineering
South Dakota State University
Box 2120
Brookings, SD 57007-1496

Dear Chris,

On behalf of the South Dakota Wheat Commission, I submit this letter of support for the "Cropland Planning for Water Quality Improvement" project.

Agriculture is now more than ever a knowledge-driven industry. Advances in genetics, in field crop technology, in pest protection and in soil health - advances at all stages of the production chain are driven largely by information and new technologies.

South Dakota Wheat Commission will participate in discussions to develop the future watershed planning, implementation, and educational projects and activities as this project moves forward. We will actively provide guidance and assistance to the project coordinators to ensure that technical and financial assistance opportunities and information on best management practices for water quality and sustained, profitable agricultural production are disseminated to producers.

The South Dakota Wheat Commission supports the proposed grant proposal and strongly encourages funding. This proposal will bring researchers and students together with the state's major commodity groups that are governed and represent producers making for a system-wide focus on water quality. Working together to establish shared goals and interest will broaden partnerships.

Needless to say, water quality is important to issue for both rural and urban communities. The outcomes from this grant would benefit many growers and impact land usage over a wide range of land. We are willing to collaborate with the objectives stated in this proposal.

Sincerely,

Randy L. Englund

Randy L. Englund, Executive Director
South Dakota Wheat Commission