Project Summary Sheet

Cottonwood Creek Watershed

Lead Project Sponsor - LaMoure County Soil Conservation District
211 South Main, P.O. Box 278
LaMoure N.D. 58458

Contact Person: Bob Flath
Title: Program Coordinator
E-mail: Robert.flath@nd.nacdnet.net
Phone: 701-883-5344
Cell: 701-320-0194

State Contact Person: Greg Sandness
(701)328-5232
E-mail: gsandnes@nd.gov

State: North Dakota
Watershed: Cottonwood Creek
HUC: 10160003-070

Project Type	Waterbody Type	NPS Category
Watershed	Lake – Stream	Agriculture

Major Goals:

The primary goal of this project is to reduce the nutrient load being delivered to Lake LaMoure to reduce the frequency and extent of Harmful Algal Blooms (HABs) and restore the recreational uses of the lake.

Project Description:

LaMoure County SCD will develop and utilize the Prioritize, Target, and Measure Application (PTMApp) to identify the magnitude and spatial distribution of potential pollution sources across the landscape. More specifically, PTMApp will be used to identify how various parts of the watershed contribute sediment, total phosphorous, and total nitrogen loads to Lake LaMoure. This information can then be used to identify the highest priority areas for nutrient and sediment loading and also used to determine the measurable water quality benefits for implementing specific practices. Specific practices to implement are then based on their probable benefits at the location of the practice. Outputs from PTMApp can show areas that provide the most bang for your buck and can help target practice locations to provide the most cost-effective ways to create measurable progress. Once possible BMP locations are identified they must be evaluated for their combined effectiveness. PTMApp can generate data to provide feasible locations for implementing practices that will provide measurable water quality improvements for priority resources. By running various scenarios in PTMApp managers can analyze various practices and estimate the largest load reductions for specific areas within the watershed. This makes it possible to implement the best possible practices in the most effective areas. PTMApp is currently under development and is scheduled to be completed for the Cottonwood Creek Watershed in April 2017.

The LaMoure County SCD also plans to develop an annual plan of operation for the hypolimnetic drawdown system to deal with in-lake nutrient concerns. ND Game and Fish will also be approached to consider possible tactics that can be implemented to control nutrient resuspension in the lake caused by the out of control carp population.

FY17 SECTION 319 FUNDS REQUESTED: $250,200
Match: $168,050
Other State and Federal: $48,000
Total Costs: $466,250
319 Funded Full Time Personnel: 0.5 FTE

2.0 Statement of Need:

2.1 Although nutrient impacts to Lake LaMoure were addressed through a previous watershed project, there are renewed needs to follow-up with additional nutrient management practices to address post-project changes in cropland management in the watershed. These follow-up efforts will build on previous nutrient reduction accomplishments to address the recent occurrences of harmful algal blooms (HAB) in Lake LaMoure. A copy of the final report from the previous project can be obtained from the ND Dept. of Health.

Most recently Lake LaMoure proved to be a source of great public scrutiny this past summer. High levels of algal born Cyanotoxin had the public very concerned and the local health department on high alert. Warnings were put in place so the public would be aware of the issue and utilize the lake accordingly. ND Dept. of Health guidelines require a warning when levels exceed 10 ug/l. Several samples exceeded this and in one case the level exceeded 1,000 ug/l. See table 1 for specific sample results. Nutrients originating within the watershed are without a doubt contributing to the extensive algal blooms.

Cyanotoxin levels at Lake LaMoure summer of 2016

Date		Site Description	Result	Unit
7/11/2016	Lake Lamoure	Boat Ramp	0.172	ug/L
7/11/2016	Lake Lamoure	Swimming Beach	3.095	ug/L
7/20/2016	Lake Lamoure	Boat Ramp	10.755	ug/L
7/20/2016	Lake Lamoure	Swimming Beach	0.594	ug/L
7/26/2016	Lake Lamoure	Boat Ramp	31.109	ug/L
7/26/2016	Lake Lamoure	Swimming Beach	38.017	ug/L
8/2/2016	Lake Lamoure	Boat Ramp	22.981	ug/L
8/2/2016	Lake Lamoure	Swimming Beach	1.953	ug/L
8/9/2016	Lake Lamoure	Boat Ramp	87.663	ug/L
8/9/2016	Lake Lamoure	Swimming Beach	41.159	ug/L
8/23/2016	Lake Lamoure	Boat Ramp	12.090	ug/L
8/23/2016	Lake Lamoure	Swimming Beach	4.210	ug/L
8/29/2016	Lake Lamoure	Swimming Beach	4.430	ug/L
8/29/2016	Lake Lamoure	Boat Ramp	1314.290	ug/L

Table 1. Cyanotoxin levels

In lake concerns are also on the rise with a strong carp population making their presence known. Resuspension of nutrients within Lake LaMoure is an issue at this time. LaMoure County Soil Conservation District staff plan to partner with the local Lake Association and the ND Game and Fish to pursue alternatives to control the population of carp in the lake.

The high value of crops over the past 10 to 15 years has been the cause of increased interest in crop production. This has led to several thousand acres of CRP, pasture/rangeland, and marginal riparian areas being converted back to farmland that is highly susceptible to erosion. In many cases it is also in very close proximity to Cottonwood Creek. One example can be seen in figure 1.

This is why LaMoure County and the LaMoure County Soil Conservation District have both recently contributed substantial funds in excess of $15,000 to the development of the PTMApp. Through the use of this application practices can be placed in specific high impact areas. The days of multi-million dollar federal programs like CRP are a thing of the past. A new avenue must be pursued to spend the dollars that are available in the most practical way possible. When completed, PTMApp will give us this luxury.

A portion of the abilities that PTMApp brings to the table is already available to us in the form of mapping what is called the Stream Power Index (SPI). During the interim this mapping gives us the ability to identify high risk areas in the watershed by delineating areas that are highly susceptible to erosion. The priorities identified by the SPI mapping tool were further prioritized by using AnnAGNPS mapping to identify the SPI priority areas within the priority areas delineated with the Annualized Agricultural Nonpoint Source Pollution (AnnAGNPS) model (Figure 6). These AnnAGNPS/SPI priorities will be the primary focus of project until PTMApp is fully developed. Simple ground truthing can give project staff the ability to approach producers that can make big differences in the watershed with smaller contributions. Figures 2 and 3 show a small example of how this mapping looks up close. It is the belief of the managers in LaMoure County that this data can be used to more effectively convince producers that a practice is of great benefit not only to them but Lake LaMoure and the natural resources.

Figure 1. Waterway erosion on a tributary of Cottonwood Creek.

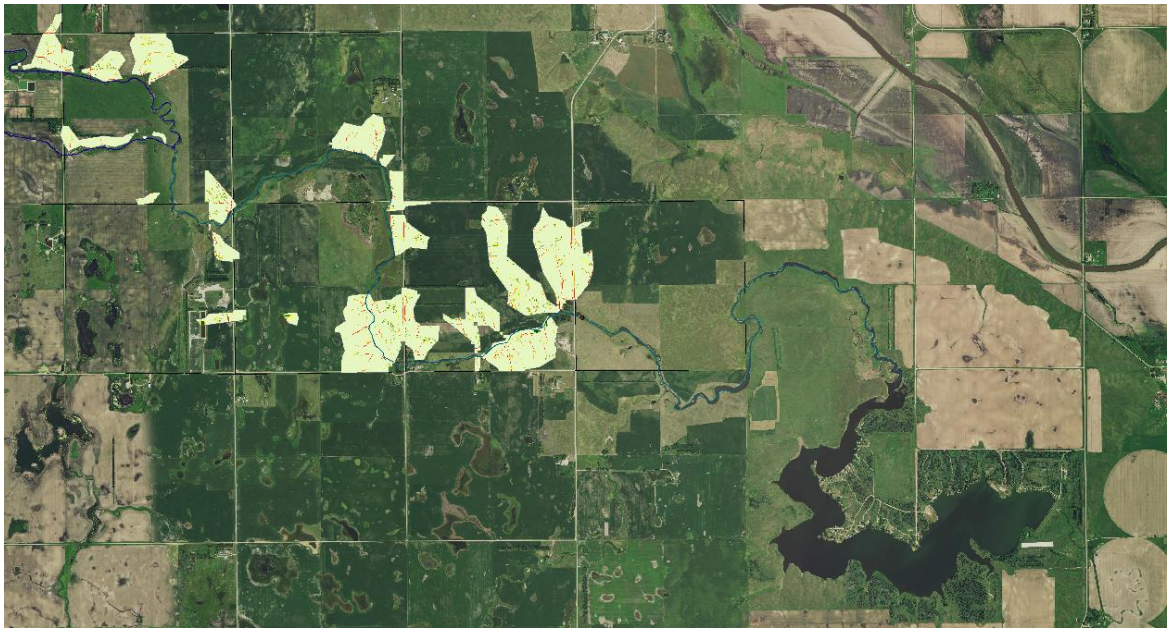


Figure 2. Stream Power Index priority sites located within priority areas delineated with the AnnAGNPS model

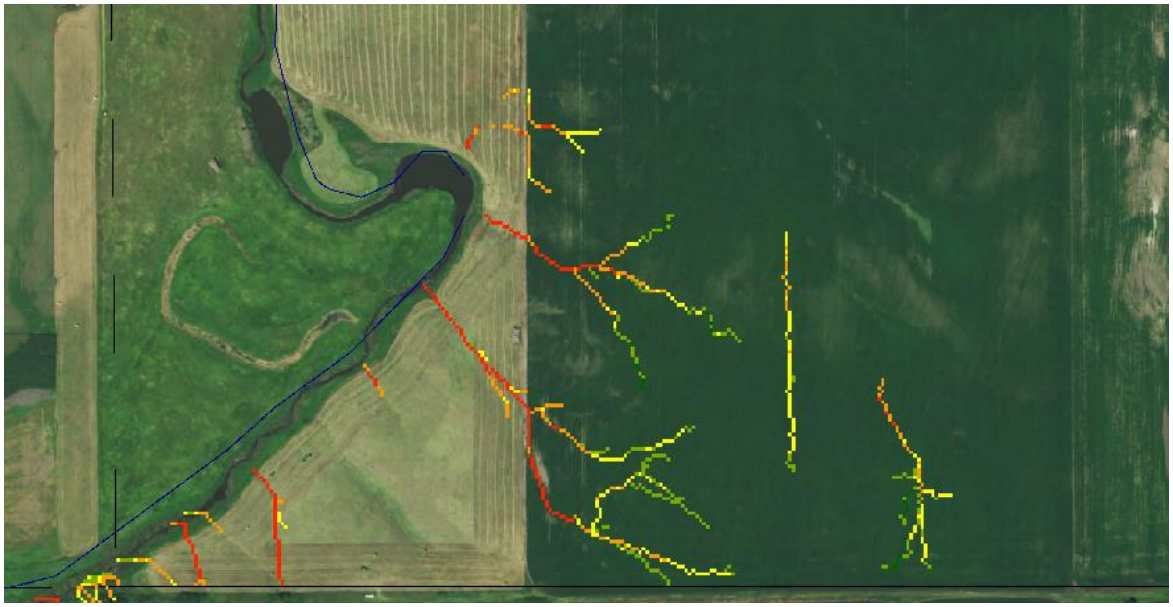


Figure 3. Stream Power Index highlights areas of especially erosive soils and contour.

2.2 Lake LaMoure is a reservoir located on the Cottonwood Creek, south of the city of LaMoure in LaMoure County, North Dakota. It has an earthen dam with a concrete outlet, emergency spillway, and hypolimnetic drawdown system. The reservoir was created in 1973. It has a surface area of 495 acres, a maximum depth of 36.5 feet, and a volume of 7,755 acre feet at full pool. Lake LaMoure was created primarily for water-based recreation in an area of the state with few natural lakes. Cottonwood Creek, an intermittent stream is the primary tributary to Lake LaMoure.

2.3

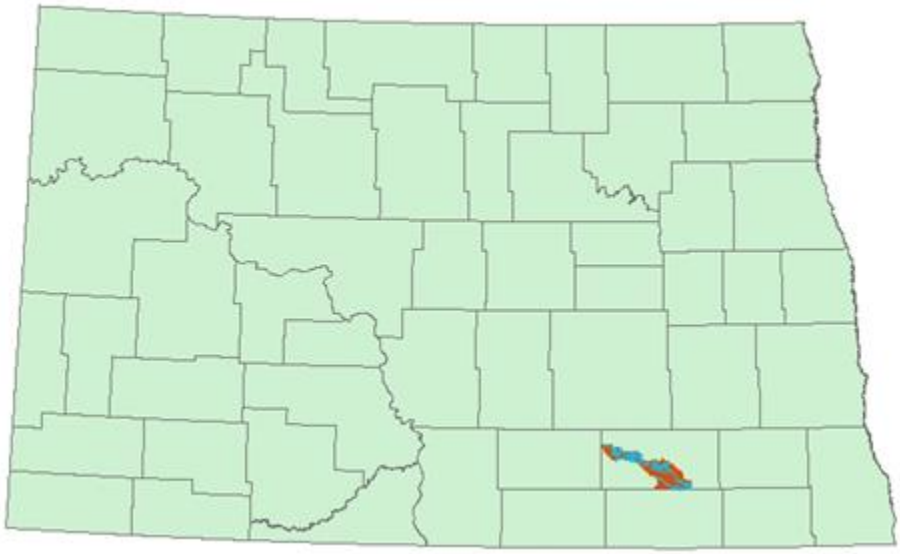


Figure 4: Map of Cottonwood Creek watershed in the State of North Dakota

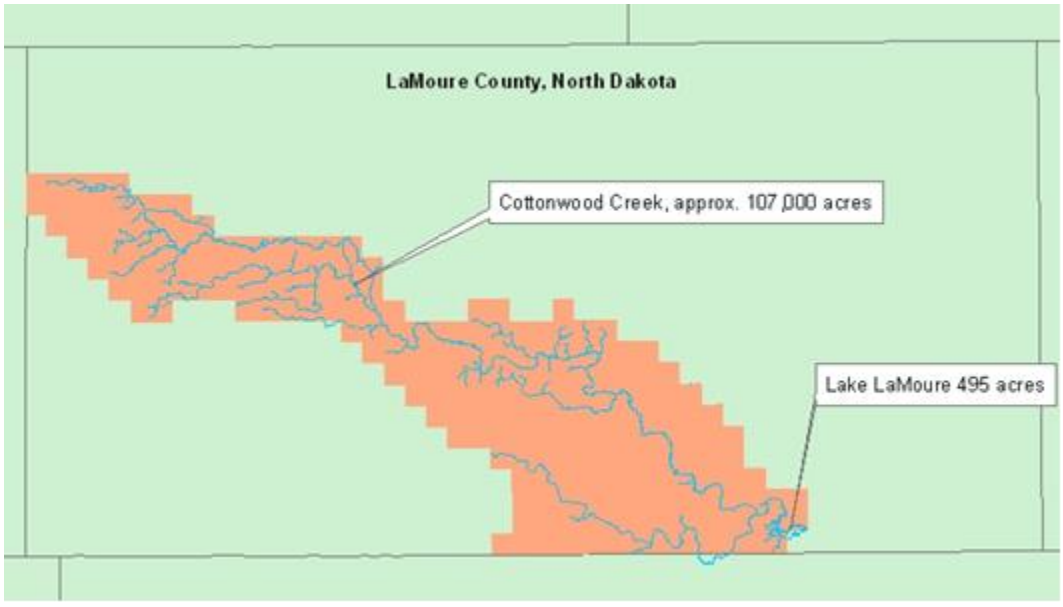


Figure 5: Map of Cottonwood Creek Watershed and Lake LaMoure in LaMoure County

2.4 The entire watershed for Lake LaMoure covers approximately 107,000 acres which is characterized by highly fertile uplands, primarily used for rowcrop, small grain and livestock production. The predominate soils in the watershed are Barnes-Svea loam. These soils are formed on slopes of 3 to 6 percent and are deep, medium textured, well to moderately well drained, very fertile, and possess high moisture holding capabilities. Typically, Barnes/Svea loams are resistant to wind erosion but moderately susceptible to water erosion.
In addition to the agricultural lands, other potential sources of pollution in the watershed include seasonal camping facilities adjacent to the lake, wastewater treatment systems for the city of Jud and the Fairview Colony, and construction activities within close proximity of Cottonwood Creek.
One hundred percent of Lake LaMoure is publicly owned. Public facilities around the lake are excellent and include a boat ramp, parking, toilets, swimming beach, picnic grounds, playground, and public camping areas. In addition, approximately 50 seasonal camping sites are maintained and utilized extensively by local citizens. Access to the lake is excellent by county and state roads.

2.5 Nutrients and sediments, originating on agricultural lands, have been identified as the primary NPS pollutants impacting water quality in Lake LaMoure and threatening the long-term recreational and aquatic life uses of the lake and its tributaries. The nutrient cycle within Lake LaMoure though already stressed from highly concentrated inflow is further hindered by the disruption of internal cycling. An out of control carp population is cause for resuspension of nutrients within the water column making for a double impact to the lake. To reduce the cumulative effects of these pollutants, LaMoure Co. SCD will provide technical assistance for farm unit conservation planning to address sediment and nutrient loads originating in the AnnAGNPS/SPI priority areas (Figure 6) or priority areas to be identified with PTMApp. The SCD will also work with the ND Game and Fish Department to address some form of control over the carp population. Expanding their educational program to place more emphasis on cropland nutrient management and soil erosion will also be a priority. Through these efforts the project sponsors plan to 1) Improve the water quality that is delivered to Lake LaMoure by reducing NPS pollutants. 2) Document improvements as BMP's are installed by implementing the changes in PTMApp which will provide measurable data to track the project effectiveness. 3) Increase public awareness of the impacts of and solutions to NPS pollution. Funds provided through various USDA programs and the Section 319 program will be utilized to support the implementation of BMP's and scheduled I/E activities.

3.0 Project description

3.1 Goals for the project

The primary goal of this project is to decrease the nutrient load being delivered to Lake LaMoure to reduce the frequency and extent of HABs and restore the recreational uses of the lake. This will be accomplished through the following objectives and tasks.

3.2 Tasks

Objective (1):

Achieve and maintain an in-lake trophic status of mesotrophic by reducing the external and internal nutrient loadings to the lake.

Task 1: Employ a Resource Conservationist to Contact landowners/operators to assist in conservation plan development and implementation.

Product: 0.5 FTE Watershed Conservationist

Cost: $153,200

Task 2: Provide technical and financial assistance to landowners/operators in the AnnAGNPS/SPI priority areas to implement best management practices that prevent or minimize the transport of nutrients (N&P) and sediments from cropland and grazing land.

Product: Develop 20 contracts consisting of approximately 30 acres of highly erodible drainage through the 319 program during the project period. Practices ranging from the most involved like Stream Channel Stabilization or as simple as a grassed waterway, use exclusion, or nutrient management. Also assist in directing producers to the proper programs needed to serve their needs like EQIP, CRP, or existing OHF programs (Pheasants Forever, Delta Waterfowl, Fish and Wildlife, Game and Fish etc.)

Total Cost: $250,000

Task 3: Conduct follow up contacts to assist with conservation plan updates and monitor O&M of Section 319 cost shared practices.

Product: Database of BMP's applied.

Cost: Included in Task 1 cost.

Objective (2):

Reduce the availability of internally stored nutrients in Lake LaMoure.

Task 4: Coordinate with the ND Game & Fish Dept. to develop an annual plan of operation for the hypolimnetic drawdown system. Through careful evaluation of lake stratification by measurement of temperature and Dissolved Oxygen profiles within the lake staff will operate the hypolimnetic drawdown system and develop a plan for future users.

Product: Annual schedule/procedure for the operation of the hypolimnetic drawdown system.

Cost: $750

Objective (3):

Further define land use priorities in Lake LaMoure watershed and also establish future watershed management priorities in Dickey and LaMoure counties.

Task 5: Coordinate with the International Water Institute to complete development of PTMApp and recieve training on its use.

Product: Functioning PTMApp Planning tool for the entire James River Basin in ND, including portions in Dickey and LaMoure Counties.

Costs: $3,600

Task 6: Develop PTMApp maps and data to allow for the development of possible projects (if needed) within Bear Creek, Bonehill Creek, and Maple River Watersheds.

Product: Maps and Data to support any needs within these watersheds

Costs: Included in Task 1 costs.

Task 7: Utilize PTMApp to update current priority maps for Cottonwood Creek watershed to better define critical areas for nutrient and sediment load reduction.

Product: Priority area maps showing specific fields that are potentially the primary sources of nutrients and/or sediments being delivered to Lake LaMoure.

Costs: Included in the Task 1 costs.

Task 8: Assist Dickey and LaMoure SCDs with the development of a multi-year strategy that is based on PTMApp outputs and priority maps

Product: County-wide priority schedule for directing future watershed projects.

Costs: Included in Task 1 costs.

Objective (4):

Increase the public's understanding of the impacts of and solutions to NPS pollution.

Task 9: Organize and conduct I/E events focusing on NPS pollution control within agricultural areas and coordinate them with ongoing state/federally sponsored I/E programs.
Product: 4 workshops, 4 tours/demonstrations and 5 informational meetings.

Cost: $1,800

Task 10: Prepare newsletter articles, and work with local media to promote the project and disseminate information on water quality and NPS pollution control.

Product: Minimum of 5 newsletter articles and 5 news releases.

Cost: $900

Task 11: Complete semi-annual, annual and final project reports to update the GRTS. These will be provided to NDDH, EPA, and all sponsors and interested individuals.

Product: Annual and 1 final report.

Cost: Included in Task 1.

3.3 See attached Milestone Table

3.4 Permits: All necessary permits will be acquired.

These may include CWA Section 404 permits. Project sponsors will work with NDDH to determine if National Pollution Elimination System permits are needed.

3.5 Appropriateness of the lead sponsor

LaMoure County Soil Conservation District (LCSCD) will be the lead sponsor. LaMoure County SCD has sponsored several other 319 projects. The LCSCD's annual and long range plans help to prioritize and guide the field service of staff. The LCSCD has legal authorization to employ personnel and receive and expend federal, state, and local funds. They have a track record for personnel management and addressing conservation issues for their constituency.

4.0 Coordinating Plan

4.1 Cooperating organizations, roles, arguments

1. LaMoure County SCD - The LCSCD will be the signer of the Section 319 contract and be the lead agency responsible for administration. They will provide office space, clerical assistance, access to equipment, and supplies as well as annual financial support. The LCSCD board will oversee implementation of the scheduled project activities, and provide for staff time if feasible. The LCSCD will also be the primary supervisors of the watershed conservationist and all Section 319 funded activities.
2. The 319 BMP Team will assist in the completion of engineering for projects within the watershed.
3. Natural Resources Conservation Service (NRCS) - The NRCS will provide day to day assistance in conservation planning, plan writing, contract writing, and technical assistance for construction and installation of planned BMP's approved through any USDA program ie, EQIP, CSP, CRP, etc. Standards and Specifications for approved BMP's will be provided by local NRCS personnel from the NRCS Technical Guide.
4. North Dakota State Department of Health (NDDH) - The NDDH will oversee 319 funding. It will provide the sponsor over sight to ensure proper management and expenditure of Section 319 funds. They will assist NRCS and LCSCD personnel in the review of O&M requirements for section 319 cost shared

BMP's. The NDDH will also develop the Quality Assurance Project Plan (QAPP) for the project and provide analytical support for the water quality samples collected under the QAPP.

5. Farm Services Agency (FSA) - Programs available through FSA will be pursued for cost share assistance.
6. North Dakota Extension Service (EXT) - Local personnel and educational materials will be utilized to compliment the projects I / E activities. This will include such things as specific BMP publications and assistance with workshops and field tours. The specific role of EXT will be dependent on the type of I / E activity being implemented and availability of staff and materials.
7. North Dakota Game and Fish Department - (NDGFD) -NDGFD will support the Lake LaMoure Watershed Project by providing technical assistance to oversee lake management.
8. LaMoure Recreation Board - The LaMoure Recreation Board supports this project and will assist with in-lake issues.

5. 0 EVALUATION AND MONITORING PLAN

-The NDDH will develop the QAPP for the project after it is fully approved.

6. 0 BUDGET

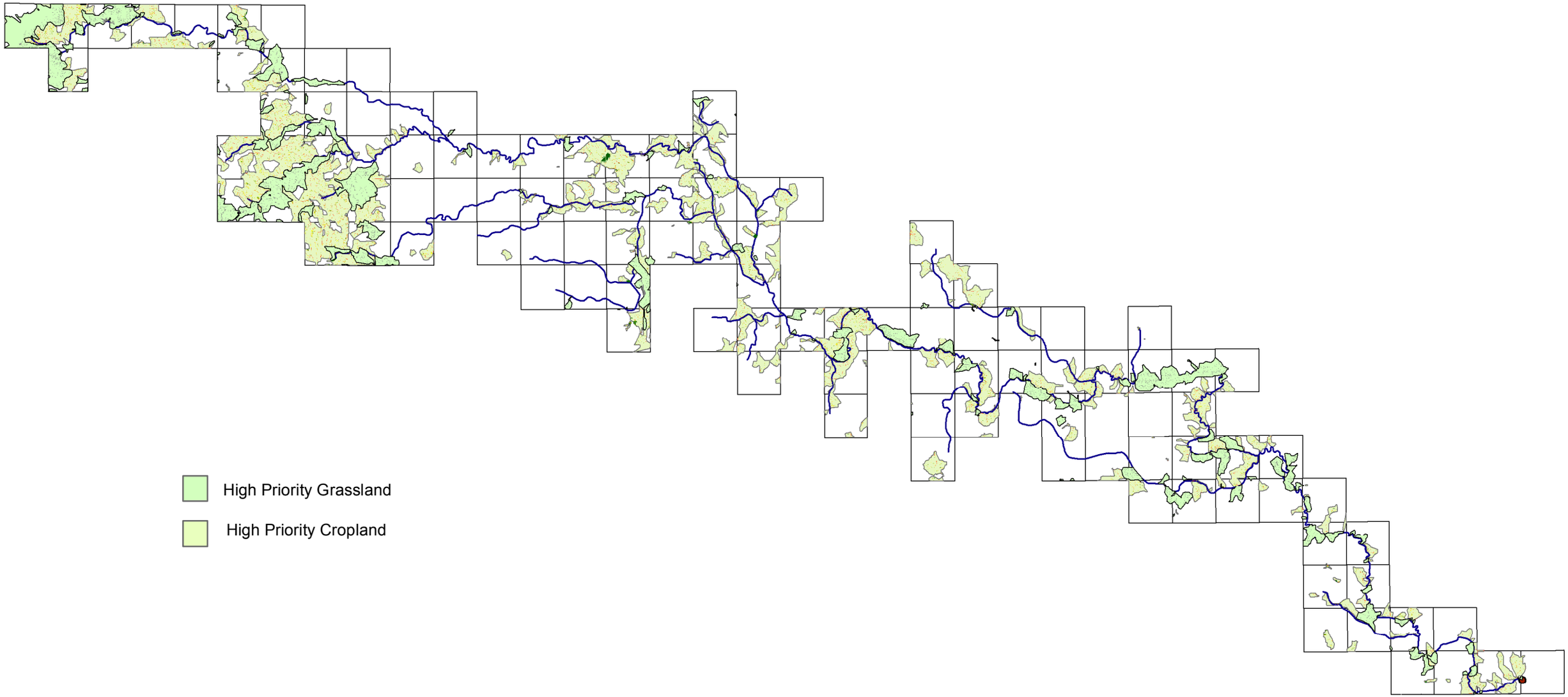
6.1 Budget Table
6.2 Funding Budget

7.0 Public Involvement

-The Lake LaMoure association has agreed to assist with in-lake issues. The Lake association represents more than 200 individuals utilizing 80 camping spots around the lake. They will be involved with hypolimnetic operation and possible carp reduction efforts.

-Several Producers within the watershed have shown interest or are currently pursuing practices that would benefit Lake LaMoure. Interest in programs that retire unproductive acres like alkali or drainage areas could be of major benefit to Lake LaMoure. A pilot project being conducted through Pheasants Forever is already working with two producers in the Cottonwood Creek Watershed through the use of a precision Ag computer model that determines unproductive acres on their farm. Cost share dollars will be the limiting factor to the program's success. 319 funds from this proposal would provide practice cost share to producers utilizing the Pheasants Forever project.

Figure 6: Stream Power Index (SPI) High Priority areas within Cottonwood Creek Watershed



3.3

Milestone Table for Cottonwood Creek Watershed

	Task/Responsible Organizations	Output	Qty.	Year 1 2017		Year 2 2018		Year 3 2019		Year 4 2020		Year 5 2021	
Objective 1													
Task 1	Employ Resourse Conservationist	Conservationist	1	x									
Task 2	Assist in plan development	Long term plans	20		x	xxx	xxx	xxx	xxx	xxx	xxx		
Task 3	Follow-up contacts to assist with plan updates	Database of BMPs applied	1							xxx	xxx	xxx	xxx
Objective 2													
Task 4	Develop plan for hypolimnetic drawdown system	Reduce nutrient concentration	1		xxx	xxx	xxx						
Objective 3													
Task 5	Coordinate PTMApp completion with International Water Institute	Develop functioning PTMApp Tool	1		xxx	xxx	xxx						
Task 6	Develop PTMApp maps and data for neighboring watersheds	Maps and Data to support needs in watersheds	4		xxx	xxx	xxx	xxx	xxx				
Task 7	Update Cottonwood Creek maps	Maps showing high potential nutrient sources	1		xxx	xxx	xxx	xxx	xxx				
Task 8	Develop maps for Dickey and LaMoure SCD's	Develop county wide priority schedule for future projects	1		xxx	xxx	xxx	xxx	xxx				
Objective 4													
Task 9	Organize & conduct I / E events	Workshops, tours & info. Mtgs.	13		xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx
Task 10	Promotion of project	Newsletter articles & mailings	10		xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx
Task 11	Complete reports	annual/final reports	5				x		x		x		x

6.1 BUDGET TABLE FOR COTTONWOOD CREEK WATERSHED PROJECT

	2017	2018	2019	2020	2021	Total Cost
FY 2017 EPA 319 Funds	42840	51960	51960	51720	51720	
Subtotal	42840	51960	51960	51720	51720	250200
Other Federal Funds						
1) NDDH (TA)	1000	1000	1000	1000	1000	
2) NRCS (TA)	1000	1000	1000	1000	1000	
3) NRCS (EQIP)	0	2000	2000	2000	2000	
4) FSA (CRP)	5000	5000	5000	5000	5000	
Subtotal	7000	9000	9000	9000	9000	43000
State / Local Match						
1) Game & Fish Dept. (TA)	1000	1000	1000	1000	1000	
2) LaMoure Co. SCD (TA & FA)	8560	14640	14640	14480	14480	
4) LaMoure Recreation Board (TA)	250	250	250	250	250	
5) Landowners (TA & FA)	20000	20000	20000	20000	20000	
Subtotal	29810	35890	35890	35730	35730	173050
Total Budget	79650	96850	96850	96450	96450	466250

FA: Financial Assistance
TA: Technical Assistance
NRCS: Natural Resources Conservation Service
NDDH: North Dakota Department of Health
FSA: Farm Services agency

6.2

Cottonwood Creek Watershed Project Budget

	2017	2018	2019	2020	2021	**Total Cost**	**Local Cash**	**Other State/ Fed Funds**	**FY 2017 Section 319 Funding**
Personnel/Support									
1) Salary + SS + Unemployment	15,600	31,200	31,200	31,200	31,200	140,400	56,160		84,240
2) Travel	500	1,000	1,000	1,000	1,000	4,500	1,800		2,700
3) Boat rental	100	250	250	100	100	800	320		480
4) Computer/Associated Software	2,500	1,000	1,000	1,000	1,000	6,500	2,600		3,900
5) Temperature/DO meter	1,000	0	0	0	0	1,000	400		600
Subtotal	19,700	33,450	33,450	33,300	33,300	153,200	61,280		91,920
Objective 1: Conservation Planning									
1) BMP	50,000	50,000	50,000	50,000	50,000	250,000	100,000		150,000
2) NDDH (TA)	1,000	1,000	1,000	1,000	1,000	5,000		5,000	
3) NRCS (EQIP)		2,000	2,000	2,000	2,000	8,000		8,000	
3) NRCS (TA)	1,000	1,000	1,000	1,000	1,000	5,000		5,000	
4) FSA (CRP)	5,000	5,000	5,000	5,000	5,000	25,000		25,000	
Subtotal	57,000	59,000	59,000	59,000	59,000	293,000	100,000	43,000	150,000
Objective 2:Reduce internally stored nutrients									
1) Procedure for hypolimnetic drawdown	250	250	250	0	0	750	300		450
2) Game and Fish (TA)	1,000	1,000	1,000	1,000	1,000	5,000		5,000	
3) Lake LaMoure Recreation Board (TA)	250	250	250	250	250	1,250	1,250		
Subtotal	1,500	1,500	1,500	1,250	1,250	7,000	1,550	5,000	450
Objective 3: Reduce nitrate and phosphorous concentrations									
1) Develop mapping	400	800	800	800	800	3,600	1,440		2,160
Subtotal	400	800	800	800	800	3,600	1,440		2,160
Objective 4: I/E Programs									
1) Workshops, tours. & meetings	200	400	400	400	400	1,800	720		1,080
2) Newsletters, articles, direct mailings	100	200	200	200	200	900	360		540
Subtotal	300	600	600	600	600	2,700	1,080		1,620
Administrative									
1) Secretary	250	500	500	500	500	2,250	900		1,350
2) Sponsor meeting	500	1,000	1,000	1,000	1,000	4,500	1,800		2,700
Subtotal	750	1,500	1,500	1,500	1,500	6,750	2,700		4,050
Total	79,650	96,850	96,850	96,450	96,450	466,250	168,050	48,000	250,200
Federal Funds Required									250,200