

# Outdoor Heritage Fund Grant Application

Name of Organization \* Ransom County Soil Conservation District

Federal Tax ID# \*45-0361109

Contact Person/Title \* Chris Nannenga, Watershed Coordinator

Address \* P.O. Box 431

City \* Lisbon

State \*ND

Zip Code \*58054

E-mail Address \*chris.nannenga@nd.nacdnet.net

Web Site Address (Optional)

Phone \*701-683-4101-EXT3

Fax # (if available)

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\* Ransom County Water Quality Improvement Project**

**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)**

This project has one main objective. The objective of this project is to restore the recreational and aquatic uses of the Sheyenne and Maple River watersheds in Ransom County. This will be accomplished by containing livestock manure runoff from 5 animal feeding operations (AFO's) in Ransom County (see attachment 1). Four of these operations are located within a mile of the Sheyenne River and one is located within a mile of the Maple River.

E. coli, fecal coliform bacteria and nutrients (nitrogen and phosphorous) are the primary cause of recreational and aquatic use impairments in river and streams of North Dakota. The Ransom County Lower Sheyenne River Watershed Assessment Report (NDDH, 2004) identified runoff of manure from animal feeding operations as the main source of recreational use impairment of the Sheyenne River in Ransom County. The Maple River Watershed Assessment Report (NDDH, 2008) identified runoff of manure from animal feeding operations as the main source of recreational use impairment of the Maple River.

The result of this project would be containment of livestock manure from five animal feeding operations in Ransom County and implementation of nutrient management plans for each operation. The nutrient management plans will insure that manure from the systems is applied at agronomic rates. Water quality would be improved within the project area by reducing the amount of E. coli, fecal coliform bacteria and nutrients (nitrogen, phosphorous) entering the Sheyenne River and Maple River Watersheds in Ransom County. The total cost of this project would be \$1,600,000.00. This project would last for the FY2014 and FY 2015 biennium. Approximately, ten producers would be involved in the project along with the North Dakota Department of Health (NDDH) and the North Dakota Natural Resource Conservation Service (NRCS).

**Amount of Grant request \$ 450,000.00**

**Total Project Costs \$ 1,600,000.00**

**Amount of Matching Funds \$ 1,150,000.00**

\$1,150,000.00 cash  
\$ 40,000.00 in-kind

**Source(s) of Matching Funds**

\$ 450,000.00 NRCS EQIP  
\$ 510,000.00 EPA 319 funds  
\$ 150,000.00 producer match  
\$ 40,000.00 Ransom County SCD

**Certifications \***

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

X 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. \***

The Ransom County Soil Conservation District (RCSCD) was formed in 1944. The RCSCD promotes conservation activities within Ransom County. The RCSCD uses all available programs both state and federal to put conservation practices on the ground. The

RCSCD uses their annual and long range plans (see attachment 2) to prioritize what type of conservation practices are needed within the county. Water quality has always been a priority of the RCSCD. Containment of livestock manure runoff has been identified as a major goal for the districts long range plan. The RCSCD has sponsored numerous water quality improvement projects in the past. These projects were focused on implementing best management practices (BMP's) that would improve water quality. The RCSCD currently has an active EPA 319 project.

The RCSCD board consists of five supervisors which are farmers/ranchers from Ransom County. The board supervises two full time employees, a district clerk/technician and a watershed coordinator. The RCSCD board has legal authority to employ personnel and receive and expend funds. The RCSCD board has credible experience in personnel management and conservation leadership. The RCSCD board and employees work closely with the Natural Resource Conservation Service to implement conservation practices in the county.

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

The main goal of this new project is to contain manure runoff from five livestock feeding operations by installing BMP's (dikes, diversions, ponds, fencing, heavy use pads, etc.) within Ransom County. Five feeding operations have been targeted for installation of livestock manure management systems. Nutrient management plans have been developed for these systems including engineering plans (see attachment 3). The installation of these systems will reduce the amount of E. coli, fecal coliform bacteria and nutrients (nitrogen and phosphorous) entering the Sheyenne River and Maple River watersheds in Ransom County. This will improve the beneficial uses of these watersheds and improve water quality in Ransom County thereby meeting Directive B. of the Outdoor Heritage Fund. Implementation of the project would begin in the spring of 2014 and commence in the spring of 2015.

The funding for this project is needed to implement the livestock manure management systems. Current federal programs provide 60% cost share. The average cost of a livestock manure management system is approximately \$ 300,000.00. Producers are unable to cover the 40% out of pocket costs. This project will provide producers with an additional source of cost share (30%) to implement livestock manure management systems. The systems will not be installed without the additional funding this project provides.

**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.\***

The watershed coordinator of the RCSCD will be managing this project with oversight from the RCSCD board. The watershed coordinator has ten years of experience working with producers in Ransom County implementing conservation practices. The watershed coordinator has been involved in the construction of five previous livestock manure management systems in Ransom County. A professional engineer from ND will also provide oversight during construction to make sure that all systems meet NRCS standards and specifications or a state equivalent. All systems installed will be permitted by the NDDH livestock waste program. Producers will be required to sign Operation/Maintenance (O&M) agreements (see attachment 4) to insure that the livestock manure management systems are managed properly. Time tables for construction will be developed with each participating

producer to insure the systems are installed prior to the end of FY 2015. NRCS and the NDDH EPA 319 program have established cost share guidelines for BMP's needed to install a livestock manure management system (see attachment 5). Producers participating in this project will be required to sign a contract with either the NRCS EQIP program or NDDH EPA 319 program. Producers will be required to obtain sealed bids for all BMP's that are installed.

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

The project manager will maintain records of locations, amounts and costs of the applied livestock waste management systems. The project manager will also secure any necessary county/state/federal permits needed to implement the project. All forms needed for reporting, evaluation and expenditures of the OHF Funds will be completed as needed. The Animal Feedlot Runoff Index Worksheet (AFRRIW) will be used to determine the benefits of the completed livestock waste systems. This worksheet takes numerous factors into account to determine the water quality benefits of livestock waste management systems. An example of the AFRRIW is attached in (see attachment 6).

**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.\***

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

Project budget

Project Expense	OHF Request	Ransom County SCD (cash)	Ransom County SCD (in-kind)	Producer Match (cash)	NRCS EQIP Program	EPA 319 Funds	Totals
Livestock Waste Systems(1)	\$450,000.00	\$ 0.00	\$0.00	\$150,000.00	\$450,000.00	\$450,000.00	\$1,500,000.00
Project Administration (2)	\$0.00	\$0.00	\$40,000.00	\$0.00	\$0.00	\$60,000.00	\$100,000.00
<b>Total Project Costs</b>	<b>\$450,000.00</b>	<b>\$0.00</b>	<b>\$40,000.00</b>	<b>\$150,000.00</b>	<b>\$450,000.00</b>	<b>\$510,000.00</b>	<b>\$1,600,000.00</b>

- 1) Includes all costs associated with installation of BMPs (dikes, diversions, ponds, fencing, heavy use pads, etc.) needed to install a livestock waste system.
- 2) Includes all costs associated with administering the project i.e. (salary, fringe, mileage, postage, etc.)

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

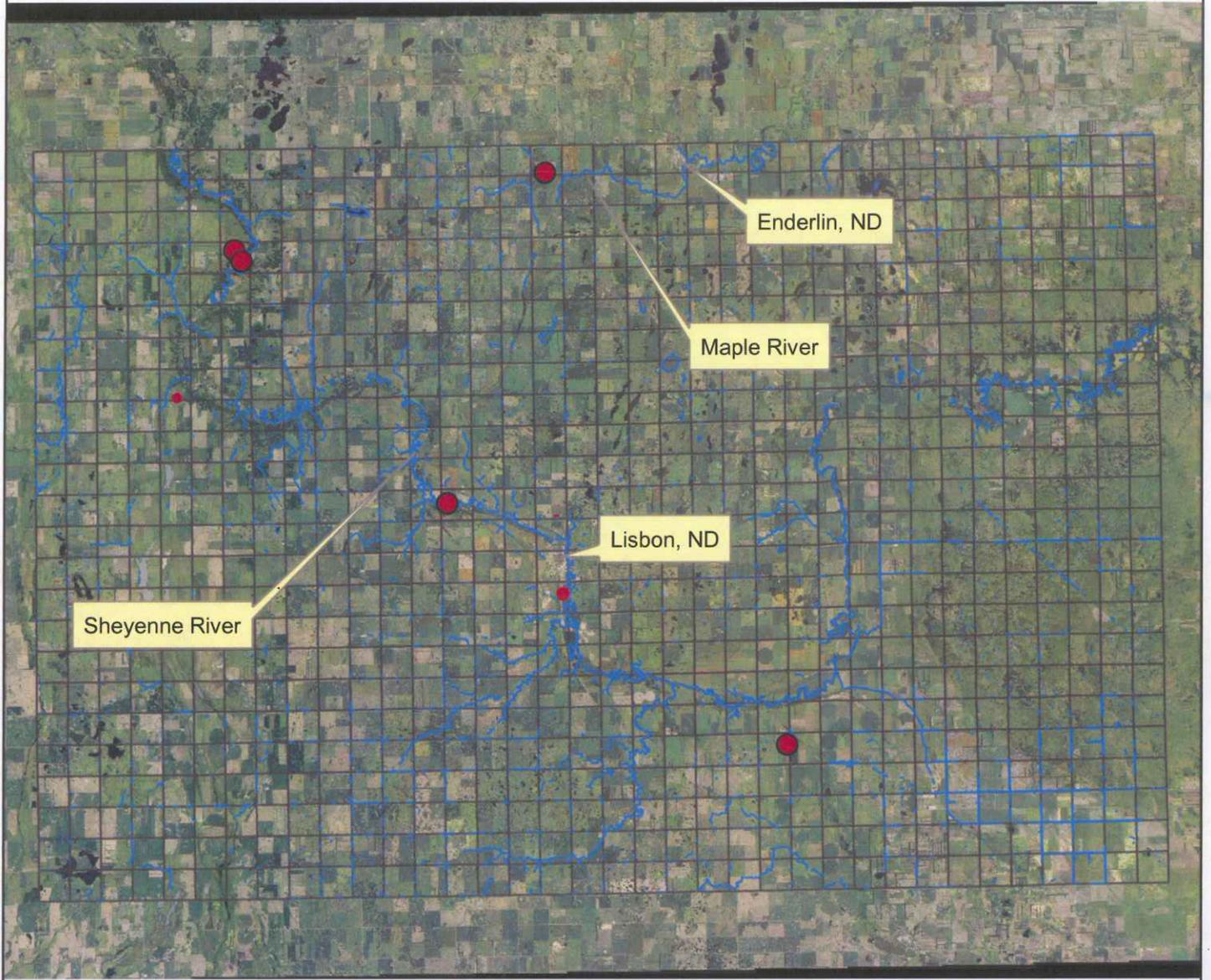
The average life span of a livestock waste management system is 10 years. Once the systems have been installed personnel from the Ransom County SCD and the NDDH will monitor the systems to insure that they are being operated properly. O & M agreements (see attachment 4) with participating producers will insure that the systems are managed properly for the expected life span. No additional funding will be required.

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

The funding requested for this project is for the installation of five livestock waste management systems. There will be fewer systems installed if the project is partially funded.

Ransom County Water Quality Improvement Project

State and County: ND, RANSOM



Legend



AFO's



**Attachment 2**

**RANSOM COUNTY SOIL CONSERVATION DISTRICT**

**LONG RANGE PLAN**

**2013**

**To be reviewed and updated annually.**

Date: January 2013

I. Resource Concern – Soil Erosion

A. Specific Concerns:

1. Wind erosion on sandy soils growing low residue crops.
2. Water erosion on steep sloped soils along Sheyenne and Maple River watersheds.

B. Objective: Reduce Soil Erosion

C. Goals:

1. Reduce soil erosion to T on 50 percent of Ransom County sandy and steeply sloped soils.
2. Install needed conservation practices:
  - a. Sandy Soils: Tree windbreaks, perennial grass seeding, conservation tillage and cover crops.
  - b. Steep Soils: Perennial grass seedings, waterways, filter strips, and riparian buffers along or near rivers and streams
3. Improve cropping systems on land presently incorporating high percentages of low residue crops in cropping sequence.
4. Approve EQIP, 319 and Continuous CRP plans and provide staff, if funding allows, to assist NRCS to accomplish current Farm Bill goals.
5. Promotion of tree windbreak planting program, Red River Riparian project and Living Snowfence Initiative
6. Promotion of wildlife tree plantings
7. Promote conservation tillage i.e. (notill, minimum tillage) in Ransom County on expiring CRP acres.

2. Resource Concern – Water Quality

A. Specific Concerns:

1. Water quality impairments (sediments, nutrients, fecal coliform bacteria, pesticides ) of the Maple, Bear Creek, Wild Rice and Sheyenne River watersheds and their tributaries
2. Nonpoint source pollution on the Maple, Bear Creek, Wild Rice, Sheyenne River and its tributaries from livestock feedlots
3. Ground water contamination
4. Soil Salinity
5. Tile Drainage Impacts

B: Objective: Improve water quality within the Sheyenne, Wild Rice, Maple and Bear Creek Watersheds in Ransom County.

C: Goals:

1. Stabilized highly erodible land along the river watersheds.
  - a. Encourage participation in Continuous CRP, EQIP, and 319 programs.
  - b. Promote conservation tillage i.e. (no-till, minimum till) in Ransom County.
  - c. Promote planned grazing systems on rangeland along the Sheyenne River.
  - d. Promote exclusion fencing on Riparian grazing lands.
  - e. Promote the installation of conservation buffers.
2. Decrease nonpoint source pollution on the Sheyenne River and its tributaries from livestock feedlots.

- a. Inventory and prioritize livestock feedlots.
- b. Design and implement livestock waste systems for 50% of the livestock feedlots.
3. Identify and stabilize critically eroding areas.
  - a. Inventory and prioritize critically eroding areas.
  - b. Stabilize critically eroding areas using BMP's (best management practices).
4. Reduce the potential for groundwater contamination.
  - a. Promote the use of nutrient and pesticide management.
  - b. Promote 590 & 595 in irrigation cropping systems.
5. Identify and stabilize saline areas.
  - a. Promote the use of high-water use crops, such as alfalfa or corn, and/or cover crops.
  - b. Promote permanent vegetation in salt affected areas.
6. Decrease the effects from the increasing amount of land that is being tile drained.
  - a. Promote BMP's on tile drained areas.
  - b. Provide education to producers on tile drainage.

### 3. Resource Concern- Water Management

#### A. Specific Concerns

1. Flooding along the Sheyenne River due to poor channel condition.
2. Cropland flooding resulting in economic losses of crops.

#### B. Objective: Improve water management along the Sheyenne River

#### C. Goals

1. Improve the Sheyenne River channel condition in areas where flooding causes severe economic losses.
2. Promote conversion of existing irrigation to low pressure systems and 449 irrigation water management plans.
3. Promote cover crops to maintain crop productivity.

#### 4. Resource Concern - Social

##### A. Specific concerns:

1. Increase working relations with groups and units of government.
2. Keep public informed on conservation programs.
3. Maintain a successful youth education program.

##### B. Objective: Provide public with information that will maintain strong relations and promote conservation of natural resources.

##### C. Goals:

1. Inform public of resource conservation concerns.
  - a. use news articles, media, and presentations to inform public of conservation programs.
  - b. Conduct locally led conservation process to inform and obtain input from public on resource assessment concerns and goals.
2. Assist units of government when resource problems need to be addressed.
  - a. Meet with County Commissioners and Water Resource Boards to maintain and inform each other of resource activities.
3. Support youth conservation education.
  - a. Maintain and sponsor 7<sup>th</sup> grade conservation tours.
  - b. Sponsor youth conservation camps.
  - c. Sponsor FFA conservation award.

5. Resource Concern – Soil Health

A. Specific Concerns:

1. Soil compaction
2. Excess tillage
3. Limited crop diversity ( ex. corn and beans)
4. low organic matter
5. Salinity

B. Objective: Improve Soil Health

C. Goals:

1. Promote the use of cover crops
2. Promote conservation tillage
3. Promote the use of diverse cropping systems
4. Provide support/assistance to implement USDA programs that enhance soil quality

6. Resource Concern – Wildlife Habitat

A. Specific Concerns:

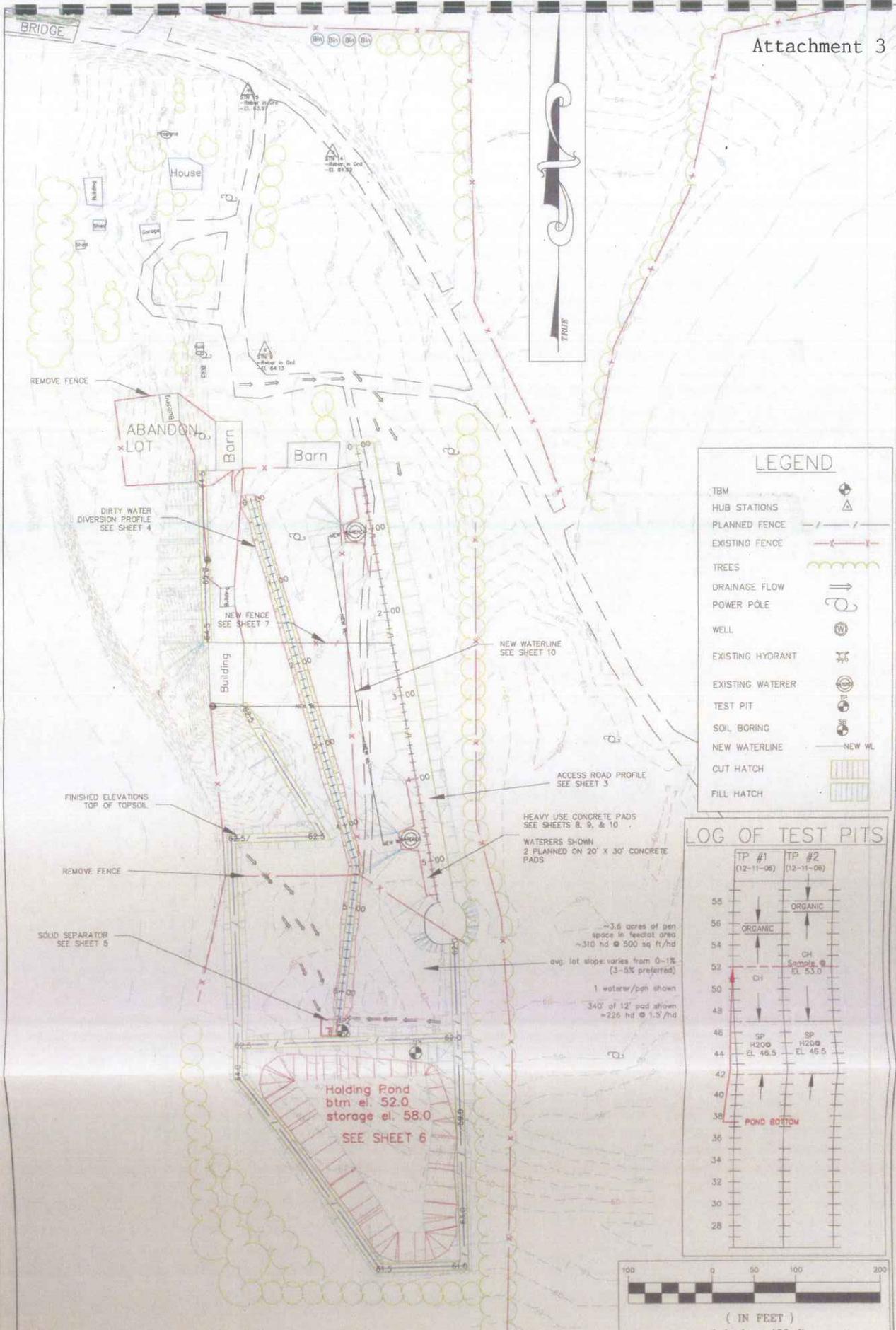
1. Loss of CRP acres
2. Conversion of pasture/rangeland
3. Tree removal

B. Objective: Develop Wildlife Habitat

C. Goals:

1. Promote the CRP program
2. Promote tree plantings that provide wildlife habitat

3. Provide support/assistance to implement USDA programs that develop or enhance wildlife habitat

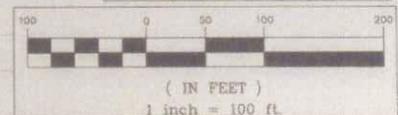


**LEGEND**

- TBM
- HUB STATIONS
- PLANNED FENCE
- EXISTING FENCE
- TREES
- DRAINAGE FLOW
- POWER POLE
- WELL
- EXISTING HYDRANT
- EXISTING WATERER
- TEST PIT
- SOIL BORING
- NEW WATERLINE
- CUT HATCH
- FILL HATCH

**LOG OF TEST PITS**

TP #1 (12-11-06)	TP #2 (12-11-06)
58	ORGANIC
56	ORGANIC
54	CH
52	Sample @ EL 53.0
50	CH
48	
46	SP H2O @ EL 46.5
44	SP H2O @ EL 46.5
42	
40	
38	POND BOTTOM
36	
34	
32	
30	
28	



**K<sub>2</sub>S ENGINEERING INC.**  
 4209 94TH AVE SE  
 FEDERAL HILL, ND 58497  
 Phone 701-489-3322

Sheyenne James RC & D - Ransom CO. 319  
 Ag. Waste System  
 plan view

Date Surveyed 12-06  
 Date Drawn 2-07  
 Designed by bin  
 Drawn by bin  
 Date Checked  
 Checked by jak/skh  
 File: Prelim Ldng  
 Approved By [Signature]  
 Title  
 Date  
 Sheet No. 2 of 10

**OPERATION AND MAINTENANCE PLAN & REQUIREMENTS  
AG WASTE SYSTEM**

*Since it is difficult to design or plan for certain weather trends (e.g. ice flows, flash floods, human and animal activities) and management styles it is necessary to have a plan in place to address these issues.*

*Site and layout was selected by landowner(s). Backfilling of heavy use pads, cleaning out solid separators, and repairing eroded areas and managing water in feed areas, are some items that will require at minimum, annual maintenance.*

*Since the selected site and layout has lot slopes that are less than the recommended 3% - 5%, maintaining lot drainage and transport of solids (erosion) will require, at minimum, annual maintenance.*

*Access roads are designed for low speed (0-5 mph) farm vehicle traffic and are to be maintained to prevent accidents (e.g. sand, salt, and/or plow to remove ice/snow, maintain road as designed to prevent water ponding and muddy conditions).*

1. Accumulated solids shall be removed from settling area(s), dirty water diversions, and feedlot areas a minimum of one time per year; to maintain design volume and minimize transport of solids into containment area/holding pond. It is recommended that feedlot areas are cleaned regularly (weekly) to minimize transport of solids to settling areas and promote good herd health.
2. Screens, piping, and appurtenances in solid separator area(s) shall be inspected after all storm events, and cleaned of any accumulated debris and/or solids to allow for proper drainage and function of settling area. Any damaged or deteriorated components shall be repaired to original condition immediately.
3. The holding pond(s)/containment area(s) is designed to store 365 days' worth of rainfall and runoff from the feedlot areas. This area will have to be pumped annually at a minimum except for; dryer than normal years when the water may evaporate to acceptable depths, or wetter than normal years when the water may need to be pumped more than one-time per year. A marker post/staff gauge will indicate when the holding pond(s)/containment area(s) will need to be pumped down to maintain design capacity. If water levels are within 0.5' of pump-down mark/elevation in the fall (post-harvest) or in the spring (pre-seeding) it would be advised to pump down water and apply runoff water to fields. This will prevent several potential issues of the ponds overflowing (e.g. odors, dikes over-topping and eroding, water backing into pipes and lots).
4. Holding pond(s), containment areas, settling area, and feedlot waste shall be applied as specified in Nutrient Management Plan or Waste Utilization Plan when developed.
5. Earthwork (dikes, berms, ditches, clay liner, etc.) shall be inspected annually for signs of seepage, rodent damage, settlement, misalignment, or erosion. Damaged areas need to be repaired to original design grades and specifications.
5. Vegetation on pond dike shall be clipped annually as a minimum and only when area is **dry and firm**. Regrade, seed and mulch any areas which become damaged immediately.
7. Vegetation in diversion channels or on dikes shall be grazed or clipped ~~annually~~ annually at a minimum and only when area(s) is **dry and firm**. Do not overgraze diversion areas. Planting of row crops will not be permitted within diversion channels. Regrade, seed and mulch any areas which become damaged immediately.

- ~~XXXXXXXXXX~~
8. Removal of accumulated sediment within holding ponds may be necessary over time to maintain design volume, if necessary; care shall be taken to prevent damage to pond design dimensions and clay liner.
  9. Repair any damage to fences, gates, marker posts, and safety signs immediately.
  10. Plant species for reseeding on pond dikes shall be as specified in original design or other approved shallow rooted plant species.
  11. The landowner/producer is responsible for back-up power and water if existing system goes down due to power outage or pump fails, etc.
  12. Inspect concrete work annually for major damage. Repair as needed to maintain original design requirements.
  13. Inspect pipes/catch basins after major storm events and weekly as a minimum for damage and debris. Repair any damage immediately. In no event should pipes/catch basins be entered by the producer(s) or his/her work persons. A professional that is cognizant of safety guidelines for entering wastewater tanks/pipes should be hired to enter or inspect if needed.  
Pipes may experience freezing during temperature fluctuations below and above freezing. Precautions should be taken to keep pipes free-flowing, such as: 1) keeping inlets and outlets free and clean of snow, weeds, grass, manure, and other debris, 2) considering the addition of environmentally friendly melting agents to inlet and outlet areas. Any damaged or deteriorated components shall be repaired to original condition immediately.
  14. Pump life will vary depending on use and proper maintenance. Pumps, pump tank, and appurtenances shall be checked monthly as a minimum for signs of damage, leaks, and proper operation. Any pumps or parts which become damaged or fail shall be repaired to original condition or better. Tank leaks shall be repaired immediately. In no event should pump tank be entered by the producer(s) or his/her work persons. A professional that is cognizant of safety guidelines for entering wastewater tanks/pipes should be hired to enter or inspect if needed.
  15. *Pasture areas or other light-use areas used for occasional feeding should be maintained so that existing vegetation is not greatly disturbed, but if these areas are later found to be contributing nutrients and/or pollutants in excess to local, state or federal tolerances, to the local tributaries or waters of the state, these areas may need to be considered for some type of containment or alternative treatment.*
  16. Ohio State Livestock Management Guide, Bulletin 604-06 is attached additional manure handling and safety information.
  17. Follow manufacturers operation and maintenance guidelines for all manure, feed, animal, ventilation, plumbing, electrical, and water handling/processing equipment. Equipment such as, but not limited to, pumps, augers, conveyors, fans, compressors, pipelines, electrical, and storage tanks to name a few.

#### OPERATION AND MAINTENANCE CONCURRENCE

I have reviewed the above operation and maintenance requirements for the practices installed in this project. The requirements have been fully explained to me. I agree to operate and maintain the best management practices as outlined above.

Landowners'/Producers'  
Signature \_\_\_\_\_

Date \_\_\_\_\_

Ohio Livestock Manure Management Guide  
Bulletin 604-06

### Safety and Manure Handling

Liquid-manure-handling systems can reduce labor requirements in confinement facilities but can introduce hazards due to the toxic effects of manure gases, manure runoff into streams, and offensive odors. Outdoor and open-top manure storage can also be a potential drowning hazard. Under certain conditions, manure gases may be fatal to both humans and livestock. Poor ventilation or ventilation failure in a tightly constructed building can threaten the health and life of animals. To protect humans, manure storage areas should first be ventilated or, where necessary, self-contained breathing equipment should be used when entering manure storage areas. Increased gas levels above manure pits in buildings can also slow the daily gain of animals.

### Dangerous Situations

Dangerous situations resulting from **manure gases** are associated with four main gases that are produced as manure decomposes. These are listed in Table 19 along with some of their characteristics. All of the gases listed in Table 19 are **colorless**.

**Ammonia** ( $\text{NH}_3$ ) is released from fresh manure/urine and during decomposition. Ammonia levels tend to be high in buildings with litter, solid floors, or scrapers because manure spread over the floor increases ammonia release. Heated floors also increase ammonia release. Ammonia is very soluble in water, so liquid-manure systems release less ammonia. High pH levels cause more ammonia to be released into the air.

Concentrations in ventilated hog buildings have been measured as high as 35 ppm (slightly irritating to eyes and nose) and in unventilated buildings at 176 ppm, which produces extreme discomfort. At 100 to 200 ppm, ammonia causes sneezing, salivation, and loss of appetite for hogs. Prolonged exposure may lead to respiratory diseases in people and animals.

**Carbon dioxide** ( $\text{CO}_2$ ) is released through livestock respiration and manure decomposition, and by unvented heaters. Most of the gas in bubbles coming from stored manure or lagoons is  $\text{CO}_2$ . Death of animals in closed confinement buildings following a ventilation-equipment failure (such as that caused by a power failure) is due in part to excessive  $\text{CO}_2$ . Vigorous agitation of stored manure can release a "slug" of  $\text{CO}_2$ .

**Hydrogen sulfide** ( $\text{H}_2\text{S}$ ) is the most toxic gas from liquid manure storage. Dangerous concentrations can be released by agitation of stored liquid manure. Concentrations reaching 200 to 300 ppm have been reported in a building a few minutes after starting to pump out a storage pit and have been as high as 800 ppm during vigorous agitation. Exposure to 200 ppm for 60 minutes will cause headaches and dizziness; 500 ppm for 30 minutes will cause severe headache, nausea, excitement, or insomnia. High concentrations of 800 to 1,000 ppm cause immediate unconsciousness and death through respiratory paralysis unless the victim is moved to fresh air, and artificial respiration is immediately applied. Even the characteristic rotten-egg smell of  $\text{H}_2\text{S}$  does not give adequate warning because the sense of smell is rapidly fatigued by  $\text{H}_2\text{S}$ , and high concentrations do not give proportionately higher odor intensity.

**Methane** (CH<sub>4</sub>) is generated in the decomposition of manure under strict anaerobic (no air) conditions. It is insoluble in water and lighter than air and will accumulate in stagnant air corners in the top of enclosed pits or rooms. CH<sub>4</sub> is not toxic, but high concentrations can produce an asphyxiating atmosphere. Concentration in confinement housing is normally well below the lower end of the 5% to 15% explosive range (Table 19). Explosions attributed to methane have occurred around manure storage pits.

**Table 19.** Characteristics and Effects of Gases Produced in Decomposing Manure.

Gas	Odor	Density	Exposure Limits	Effects
Ammonia (NH <sub>3</sub> )	Pungent	Lighter than air	10 ppm	Irritation to eyes and nose. Asphyxiating at high levels.
Carbon Dioxide (CO <sub>2</sub> )	None	Heavier than air	5,000 ppm	Drowsiness, headache. Can be asphyxiating.
Hydrogen Sulfide (H <sub>2</sub> S)	Rotten-egg smell	Heavier than air	10 ppm	Toxic: Causes headache, dizziness, nausea, unconsciousness, death.
Methane (CH <sub>4</sub> )	None	Lighter than air	1,000 ppm	Headache, asphyxiant, explosive in 5-15% mix with air.

Source: Ohio State University Extension Bulletin 604, 1992 Edition.

### Fatalities

Fatalities may occur when people enter manure-storage structures, including covered manure pits, and are probably due to CO<sub>2</sub> and H<sub>2</sub>S because these gases are heavier than air. Caution should also be taken when agitating manure as the asphyxiating effect of NH<sub>3</sub>, CO<sub>2</sub>, and CH<sub>4</sub> combined with the toxic effect of H<sub>2</sub>S could be fatal.

Another potential risk, especially for children, is drowning in a pit, storage tank, and earthen storage basin or lagoon. Failure and breakage of slats or covers on pits and lack of protective barriers or railings around pit openings during agitation can lead to accidents. Push-off platforms or ramps (piers) can be a site for the tractor scraper and driver to tumble into an open storage structure or lagoon. Crusts on earthen storage basins can be a problem, especially for children, as they may appear capable of supporting one's weight, but they are not.

### Precautions

When designing manure structures and systems, think safety. When operating or managing manure equipment, think safety. Consider the following major safety points when designing and operating manure equipment, structures, or systems:

1. Do not enter a manure pit unless absolutely necessary and then only if:

\*The pit is ventilated beforehand

\*You have supplied air to a mask or a self-contained breathing apparatus.

\*You are wearing a safety harness and attached rope with at least two people standing by who are capable of pulling you out.

2. When agitating a manure storage, always have at least one additional person available who can go for help if you are overcome by gases.
3. Properly designed and operated ventilation systems can reduce the concentration of gases within the animal zone, improving animal performance. Poorly designed or improperly adjusted ventilation air inlets may actually increase gas concentrations at the animal level.
4. When possible, construct lids for manure pits or tanks and keep access covers in place. If an open ground-level pit or tank is necessary, build a fence around it and post with "Keep Out" and "Danger — Manure Storage" signs.
5. Get help before attempting to rescue livestock or people that have fallen into a manure-storage structure.
6. Build railings alongside all walkways or piers of open manure storage structures.
7. Permanent ladders on the outside of above-ground tanks should have entry guards locked in place, or the ladder should be terminated above the reach of individuals.
8. Never leave a ladder standing against an above-ground tank.
9. Construct permanent ladders on the **inside** wall of all pits and tanks, even if covered. Use of noncorrosive material is important.
10. Fence in earthen storage basins and lagoons and erect signs: "Caution — Manure Storage (or Lagoon)." The fence is also needed to keep livestock away from these structures. Additional precautions include a minimum of one lifesaving station equipped with a reaching pole and a ring buoy on a line.
11. All push-off platforms or piers need a barrier strong enough to stop a slow-moving tractor. It should be low enough so that livestock cannot slide underneath.
12. If possible, move animals before agitating manure stored in a pit underneath a building. Otherwise, if the building is mechanically ventilated, turn fans on full capacity when beginning to agitate, even in the winter, or if the building is naturally ventilated, do not agitate unless there is a brisk breeze. Watch animals closely during agitation, and turn off the pump at the first sign of trouble. The critical area of the building is where the pumped manure breaks the liquid surface in the pit.
13. If manure storage is outside the livestock building, provide a water trap or other anti-back flow device to prevent storage gases from entering, especially during agitation.
14. If an animal drops over, do not try to rescue it. You might become a victim of toxic gases. Turn off the pump, and do not enter the building until gases have had a chance to escape.
15. Due to the possibility of explosion and fire, don't smoke, weld, or use an open flame in confined, poorly ventilated areas where methane can accumulate. Electric motors, fixtures, and wiring near manure-storage structures should be kept in good condition.

16. Keep all guards and safety shields in place on pumps, around pump hoppers, on manure spreaders, tank wagons, power units, etc.

Take time now to review your total manure management system from a safety viewpoint. Think through each step of the collection system, storage or treatment units, and the land application phase. Are there dangerous areas in construction or operation? If so, make them safe. It could save your life or the life of a loved one or employee.

### **Emergency Action Plan**

Every livestock farm should have an Emergency Action Plan in place. What is an Emergency Action Plan and why have one? It is a well-thought-out, simple, basic, common-sense plan that will help those involved with an emergency to make the right decisions. A plan is needed:

- \* To meet the requirements of many states for a plan.
- \* To keep humans and livestock safe.
- \* To rectify an emergency situation.
- \* To protect the environment.
- \* To teach family members and employees.
- \* To record for future situations (prevention, law suits, etc.).
- \* To ensure notification of proper authorities.

### **Safety Equipment**

Locate first-aid or rescue equipment near the manure-storage area. Clearly mark a wall closet or box and store the equipment inside it. Make occasional checks to ensure the equipment is in good order and has not been removed. Post the phone number of the local fire department/rescue squad on the wall beside the box and also near the telephone.

Personal protective equipment that includes air packs and face masks, nylon lines with snap buckles, and a parachute-type body harness with "D" rings for attaching lines can be obtained from supply sources of industrial safety and hygiene equipment. Look in the yellow pages under safety, safety equipment, industrial safety and hygiene, or safety supplies. These supply sources can also provide information on monitoring or measuring devices used to test hazardous atmospheres. Be sure to specify the gases you are dealing with when asking for or purchasing equipment.

Familiarize yourself, your workers, and your family with the proper operation of all safety equipment. Local medical (rescue) teams can assist in this education.

### **Immediate First-Aid Procedures**

#### **Victims of Manure-Gas Asphyxiation**

1. Do not attempt to rescue a victim from a hazardous gas situation unless you are protected with a supplied air-breathing apparatus.
2. Have someone telephone for an emergency medical (rescue) squad, informing them there is a "victim of toxic (manure) gas asphyxiation."

3. If the victim is free from the immediate area of danger and there is no personal threat to your life, take the following steps:
  - \* With the victim on his or her back, check for breathing, then give four quick mouth-to-mouth breaths and check for a pulse.
  - \* If there is a pulse, continue mouth-to-mouth breathing every five seconds (12 per minute).
  - \* **If there is no pulse**, start CPR (cardiopulmonary resuscitation) immediately. When the emergency squad arrives, the victim should receive a high concentration of oxygen at the scene and in transport.

If members of your family have not taken CPR and first-aid training, enroll them in a course at your earliest opportunity. Periodic refresher courses in CPR are recommended.

### **Victims of Drowning**

1. Rescue the person from the drowning situation using standard water-rescue technique.
2. If the victim is unconscious or not breathing, use standard CPR procedures. (See No. 3 under Victims of Manure-Gas Asphyxiation.)
3. Have someone telephone for an emergency medical (rescue) squad, informing them there is a victim of drowning.

NORTH DAKOTA  
NONPOINT SOURCE POLLUTION MANAGEMENT  
PROGRAM



COST-SHARE GUIDELINES FOR  
NONPOINT SOURCE POLLUTION CONTROL  
BEST MANAGEMENT PRACTICES

June 2013



NORTH DAKOTA  
DEPARTMENT *Of* HEALTH

## Table of Contents

Introduction.....	1
Approved Agricultural Best Management Practices .....	1
Section 319 BMP Implementation and Cost Share Agreements.....	6
Agricultural BMP Cost-Share Assistance .....	8
Eligible Inkind Match Associated With BMP Implementation .....	10
BMP Operation and Maintenance Conditions.....	11
<hr/>	
NPS Program Cost-Share Policies for the Replacement or Repair of Onsite Sewage Treatment Systems.....	12
NPS Program Cost-Share Policies and Rates for Urban Stormwater Management BMP.....	14
NPS Program Cost Share Policies for Livestock Manure Management Facilities.....	15
NPS Program Cost Share Policies for Multi-Year Easements and Short Term Management Agreements for Riparian Areas.....	26
Approved Methods and Requirements for Procuring Construction Services, Equipment and Supplies.....	30
Appendix A: Contacts for Downloading the NPS Program BMP Tracking Database	
Appendix B: Section 319 Cost Share Agreement Provisions	
Appendix C: Guidelines for Determining Potential Effects to Cultural Resources	
Appendix D: Partial System Manure Management Plan	
Appendix E: Sample Landowner/Contractor Contract	

## **I. INTRODUCTION**

Sediments, nutrients, pesticides, and livestock wastes are the most common NPS pollutants affecting the water quality of many North Dakota waterbodies. These pollutants are generally delivered to waterbodies by way of runoff waters, wind, percolation, or atmospheric deposition. To effectively reduce or eliminate the transport of these pollutants to surface and/or groundwater, various source control measures must be implemented within the watersheds of the impaired waterbodies.

Under the NPS Pollution Management Program, a variety of source control measures have been approved for controlling or preventing urban and rural NPS pollution. These control measures are defined as best management practices (BMP) which are designed to: 1) prevent pollutants from leaving a specific area; 2) reduce/eliminate the introduction of pollutants; 3) protect sensitive areas; or 4) prevent the interaction between precipitation and pollutants. Some common examples of source control BMP utilized by the NPS Program are conservation tillage, grassed waterways, nutrient management, stormwater retention ponds, and livestock manure containment facilities.

Voluntary implementation of the appropriate BMP is best accomplished by providing one-on-one technical assistance and, when necessary, sufficient cost-share assistance to install the BMP. Ultimately, the specific BMP which are actually implemented will be dependent on the: 1) type of NPS pollutants; 2) source and cause of the pollutants; 3) delivery mechanisms being addressed; 4) landowner objectives; and 5) physical/financial limitations associated with the implementation of the practices.

## **II. APPROVED AGRICULTURAL BEST MANAGEMENT PRACTICES**

While many agricultural BMP can be implemented with very little or no expense to the landowner, some practices may require a substantial investment. Because of such instances, the NPS Program will provide cost-share assistance, when necessary, to offset expenses associated with the application of certain BMP. Cost-share assistance will be provided at a sixty percent (60%) federal and forty percent (40%) landowner matching ratio.

Agricultural BMP eligible for cost-share assistance through the North Dakota Nonpoint Source Pollution Management Program (NPS Program) include many of the conservation practices listed in the NRCS electronic Field Office Technical Guide (eFOTG). Table 1 identifies the specific BMP from the eFOTG that are eligible for cost-share assistance through the NPS Program. Several additional BMP, that are not included in the eFOTG, are also eligible for cost share assistance under the NPS Program. These additional BMP are listed in Table 2.

Table I: Approved Best Management Practices from the NRCS eFOTG

NRCS CODE	PRACTICE	LIFESPAN (YEARS)	PLANNING RATE	COST-SHARE PAYMENT
328	Conservation Crop Rotation	--	NCP	NCP
656	Constructed Wetland	10	Engineer Estimate	*
340	Cover Crop (seed costs only)	1	\$20.00/ac.	*
342	Critical Area Planting	10	\$300.00/ac.	*
356	Dike	10	\$1.90/cu yd	*
362	Diversions	10	\$1.90/cuyd	*
382	Fencing (barbed)	10	\$1.35/ft.	\$0.81/ft.
382	Fencing (woven wire)	10	\$1.65/ft.	\$0.99/ft.
382	Fencing (multiple wire electric)	10	\$0.67/ft.	\$0.40/ft.
382	Fencing (single wire electric)	10	\$0.51/ft.	\$0.31/ft.
386	Field Border (seed costs only)	10	\$20.00/ac.	*
393	Filter Strip (planting/establishment only)	10	\$125.00/ac	*
410	Grade Stabilization Structure	10	Engineer Estimate	*
412	Grassed Waterway	10	\$25.00/lnft.	*
422	Hedgerow Planting	10	\$20.00/lnft	*
447	Irrigation System Tailwater Recovery	10	Engineer Estimate	*
472	Access Control/Use Exclusion (Livestock only)	1	\$20.00/acre	\$12.00/acre
634	Manure Transfer	10	Engineer Estimate	*
590	Nutrient Management	1	\$5.00/acre	\$3.00/acre
512	Pasture & Hayland Planting (Forage & Biomass Planting)	5	\$35.00/ac.	*
595	Pest Management	--	NCP	NCP
516	Pipelines	10	\$3.00/ft.	*
378	Pond	10	Engineer Estimate	*

NRCS CODE	PRACTICE	LIFESPAN (YEARS)	PLANNING RATE	COST-SHARE PAYMENT
528A	Prescribed Grazing	3	\$5.00/ac.	\$3.00/ac.
550	Range Planting	10	\$40.00/ac.	*
329A	Residue Management, No Till & Strip Till	--	NCP	NCP
329B	Residue Management, Mulch Till	--	NCP	NCP
329C	Residue Management, Ridge Till	--	NCP	NCP
391	Riparian Forest Buffer	10	\$350.00/ac.	*
390	Riparian Herbaceous Cover	10	\$300.00/ac.	*
558	Roof Runoff Structure	10	Engineer Estimate	*
350	Sediment Basin	10	Engineer Estimate	*
574	Spring Development	10	Engineer Estimate	*
584	Stream Channel Stabilization	10	Engineer Estimate	*
580	Streambank & Shoreline Protection	10	Engineer Estimate	*
587	Structure for Water Control	10	Engineer Estimate	*
600	Terrace	10	Engineer Estimate	*
610	Salinity & Sodic Soil Management (establishing vegetative cover only)	10	\$20.00/ac.	*
614	Trough and Tank (includes frost-free tanks)	10	Local Rate Per Tank	*
601	Vegetative Barrier (establishment only)	10	\$125.00/ac.	*
312	Livestock Manure Management System	10	**	**
635	Waste Water Treatment Strip (establishment only)	10	\$125.00/ac.	*
633	Waste Utilization (cannot exceed 5000 tons; limited to partial manure management systems)	10	\$2.00/ton	\$1.20/ton
638	Water and Sediment Control Basin	10	Engineer Estimate	*

NRCS CODE	PRACTICE	LIFESPAN (YEARS)	PLANNING RATE	COST-SHARE PAYMENT
640	Water Spreading	10	Engineer Estimate	*
642	Well (livestock only)	10	Local Rate per Well	*
351	Well Decommissioning	10	\$900.00 each	*
658	Wetland Creation	10	Engineer Estimate	*
657	Wetland Restoration	10	Engineer Estimate	*
380	Windbreak/Shelterbelt Establishment ***	10	\$22.50/lnft	*
NCP- Non cost-shared practice				
* Section 319 cost-share assistance for these BMP must be based on the actual documented costs. Section 319 assistance cannot exceed 60% of the actual costs.				
** See Section IX for the different practices and cost share assistance policies associated with the installation of the manure management systems.				
*** Limited to windbreaks/shelterbelts for wind protection in agricultural fields and/or adjacent to newly permitted animal feeding operations. A windbreak or shelterbelt established solely for wind protection of a farmstead is not eligible for Section 319 support.				

Table 2: Eligible BMP not included in the NRCS eFOIG

Code	Practice Name -Planning Rate- BMP Lifespan*	Code	Practice -Planning Rate
001	Cultural Resource Review - \$1500/number; Lifespan - 1 yr.	029	Rock Toe or Barb (in-place) - \$75.00/cu.yd
003	Tree Hand Plants (Rooted)- \$2.50/number - (50% materia/150% labor)	030	Root Wads (in-place) - \$500/number
004	Solar Pumps - \$3,100/number	031	Vegetated Gabions - \$76.00/number
005	Pre-Construction Engineering Services - Engineer's Estimate; Lifespan - 1 yr.	032	Weed Control for Established Trees (Chemical) - \$12.00/100fl.
006	Construction Engineering Services - Engineer's Estimate; Lifespan - 1 yr.	033	Site Prep for Trees (Light Mechanical with Chemical) \$52.00/acre; Lifespan - 1 yr.

Code	Practice Name - <i>Planning Rate - BMP Lifespan*</i>	Code	Practice - <i>Planning Rate</i>
007	Post Construction Engineering Services <i>Engineer's Estimate; Lifespan - 1yr.</i>	034	Site Prep for Trees (Heavy Mechanical with Chemical) <i>\$125.00/acre; Lifespan - 1 yr.</i>
020	Tree Machine Planting (Scalp Plant/Site Prep) - <i>\$19.00/hlnft</i>	035	Site Prep for Trees (Light Mechanical) - <i>\$40.00/acre; Lifespan - 1yr.</i>
021	Tree Hand Plants (2 ft. Non-Rooted) - <i>\$2.00/number - (50% material//50% labor)</i>	036	Site Prep for Trees (Heavy Mechanical) - <i>\$115.00/acre; Lifespan - 1yr.</i>
022	Willow Post Planting - <i>\$3.00/number</i>	037	Soil Test (Cropland Nutrient Mgt.) - <i>\$40/sample; Lifespan - 1yr.</i>
023	Willow Fascines, Wattles, or Barbs - <i>\$15.00/ft.</i>	038	Precision Nutrient Management - <i>Rate must be pre-approved by the NPS T: ----- - 1 yr</i>
024	Brush Mattress, Layering, or Packing - <i>\$15.00/ft.</i>	039	GPS Equipment (Demonstration only) - <i>Based on lowest price quote or bid</i>
025	Evergreen Revetment - <i>\$50.00/ft.</i>	056	Alternative Power Source (Livestock Watering Only) - <i>Lowest price quote</i>
026	Timber Stand Improvement (Scarification) - <i>\$200/ac.</i>	057	Exclusion Fencing for Riparian Area Management - <i>\$1,351/ft.</i>
027	Direct Seeding of Trees - <i>\$520/ac.</i>	058	Riparian Easement on Cropland - <i>Non- irrigated Cropland CRP Soil Rental Rates</i>
028	Streambank Reshaping - <i>\$15.00/cu.yd.</i>	059	Riparian Easement on Pasture/Range - <i>Marginal Pasture/and CRP Soil Rental Rates</i>
060	Weed Control for Established Trees (Full Weed Barrier) - <i>\$48.50/100.ft.</i>	061	Weed Control for Established Trees (4x4 Weed Barrier Sq.) - <i>\$2.80/number</i>
062	Tree Tube Shelter (3 ft.) - <i>\$4.30/number</i>	063	Tree Thinning (Riparian areas only) - <i>\$82.50/acre</i>
064	Selective Debris Removal (Site-specific approval required) - <i>\$500/site</i>	065	Rural Water Hookup (hookup costs minus the sign-up fee) - <i>\$1,300/hookup</i>

Code	Practice Name - <i>Planning Rate - BMP Lifespan*</i>	Code	Practice - <i>Planning Rate</i>
066	Portable Windbreak ** (limited to two foot per animal) - \$45.00/ft.	067	Electric Fence Energizer *** - \$400/number
068	Irrigation System (Site-specific approval required) - <i>Cost share is limited****</i>		

\* Unless otherwise indicated, for operation and maintenance purposes, the expected lifespan for the BMP listed in the table is 10 years.

\*\*Section 319 support is limited to portable windbreaks needed for partial manure management systems. The two foot/animal limit applies to windbreak panels that will be set in an 'L' shape or roughly perpendicular to one another. Straight line portable windbreaks must be limited to one foot/animal.

\*\*\* Section 319 cost share assistance for an electric fence energizer is only allowable if it is needed for new cross fencing scheduled under a prescribed grazing system. Cost sharing an energizer as a stand-alone practice is not allowable.

\*\*\*\*Section 319 cost share assistance is limited to irrigation systems installed specifically for the management of runoff water collected in containment ponds associated with a permitted livestock manure management system. Section 319 cost share assistance must be based on actual costs not to exceed \$15,000/system.

The planning rates listed for the BMP in Tables 1 and 2 should be used to develop the producer contracts obligating Section 319 funding for scheduled BMP. However, if the local rates for a practice are known, the project sponsors can use the local rates to develop the producer contract. Regardless of which planning rates are used, the planning rates are only for planning purposes and must not be used to determine the amount of actual Section 319 cost share assistance. Section 319 cost share assistance must be based on the actual documented costs or the cost share payment amount listed in Table 1. Total Section 319 assistance cannot exceed 60% of the documented actual costs. The balance of costs (i.e., 40%) will be the responsibility of the local sponsors and/or cooperating landowner or producer.

The NPS Program also supports other practices that are not listed in Tables 1 and Table 2. These additional BMP are listed in Sections VII, VIII, IX, and X. The North Dakota Forest Service (NDFS) has also developed Forestry BMP Guidelines for the state. The NDFS guidelines should be used to help determine the appropriate practices to prescribe under resource management plans involving forestry management. The web address for the NDFS guidelines is:  
[http://www.ndsu.edu/fileadmin/ndfs/BMP\\_2010\\_FINAL\\_DOC\\_11\\_12\\_10.pdf](http://www.ndsu.edu/fileadmin/ndfs/BMP_2010_FINAL_DOC_11_12_10.pdf).

### III. SECTION 319 BMP IMPLEMENTATION AND COST SHARE AGREEMENTS

Local Section 319 project staff will be responsible for the development of the appropriate producer agreements scheduling BMP implementation and cost share assistance. All information, (e.g., completion dates, amounts, costs, etc.) pertaining to the planned BMP must be included in the producer's Section 319 Conservation Plan of Operation (CPO) and the associated CPO Comments Form. The CPO and Comments Form, in conjunction with the Section 319 Cost Share Agreement

## \*North Dakota Animal Feedlot Runoff Risk Index Worksheet

Landowner:	Archie Wolf	Weather Station:	Mott
Location:	Hettinger Co.	HUC:	10130202
Planner:		Precipitation:	16.55
Date:	December 7, 2011		

Lot Description:				
Planning Scenario:	Before	After	Before	After
Lot Size (Sq. Ft.):	148104	148104		
Surface Type:	Dirt	Dirt		
Animal Type:	Beef (Feeder)	Beef (Feeder)		
No. of Animals:	600	600		
Avg. Weight:	900	900		
Days Confined:	180	180		
Sq.Ft./Animal:	246.8	246.8		
Feedlot Features				
Runoff Containment	40	0		
Distance to Water	2	2		
% Slope	1.5	1.5		
Vegetation	1	1		
Clean H <sub>2</sub> O Diversion	4	0		
Index and Risk Level				
Index:	48.5	4.5		
Risk Level:	Medium	Very Low		
Manure Management and Conservation Practices				
Haul/Scrape Frequency	Annually	Annually		
Practices to be implemented				
Loading Calculations				
Fresh Manure (tons)	2,863	2,863		
Total N Available (lbs)	16,573	16,573		
Total P Available (lbs)	7,964	7,964		
Total BOD <sub>5</sub> Available (lbs)	72,706	72,706		
Precipitation Factor	0.24	0.83		
Lot Surface Factor	0.90	0.90		
Risk Factor	0.40	0.00		
Total N Loading (lbs)	4,990	0		
Total P Loading (lbs)	2,398	0		
Total BOD <sub>5</sub> Loading (lbs)	21,390	0		

\*Modified from Utah to fit North Dakota. Individual high risk features should be evaluated and conservation practices applied where possible. All runoff from a 25-year, 24-hour storm event must be contained on the lot.

## Practices that might be implemented:

Move Lot	Install Dike	Install Filter Strip
Regrade Lot	Install Diversion	Roof Runoff System
Build Storage	Increase Sq.Ft./Animal	Change Hauling Frequency
Increase Storage		

Figure 6: Example of Animal Feedlot Runoff Risk Index Worksheet (AFRRIW)