1.0 PROJECT PROPOSAL SUMMARY SHEET

Project title: **Menoken Farm Soil Foodweb Project II**

Lead project sponsor: Burleigh County Soil Conservation District

Contact persons:

Project director: Susan Davis, Executive Director
Dakota Prairies RC&D Council
919 S. Seventh St., Suite 310, Bismarck, ND 58504
701-226-8409 or dakotaprairiesrcd@gmail.com

Other contacts: Cindy Makedonski, District Clerk
Burleigh County Soil Conservation District
701-250-4518, ext. 3, or lucinda.makedonski@nd.nacdnet.net

State: North Dakota
Hydrologic unit code: Statewide
High priority watershed: N/A
Project type: Information and education
Waterbody types: Other – crosscuts all categories
NPS category: Other – crosscuts all categories; emphasizes nutrient management
Project location: Burleigh County, North Dakota

Summarization of major goal: Increase agricultural producers and landowner's ability to improve water use efficiency and quality through soil health improvement.

Project description: Menoken Farm is an educational site consisting of 150 acres of cropland owned and operated by Burleigh County Soil Conservation District (SCD). We will inform and educate the public on improvements to soil health, resulting in restored water and nutrient cycles. This will benefit both cropping and grazing systems and ultimately water use efficiency and quality. Since Burleigh County SCD purchased the 150 acres of cropland in 2009, the site has been set up with 10 fields, each 12 acres in size, which mimics native rangeland with crop diversity, cover crops, livestock integration and a continuous live root. The management of these fields encourage soil biology, native pollinators, beneficial insects, wildlife, maximum sunlight harvest and livestock integration. The original landscape between present day Pierre, S.D., and Bismarck, as described in the *Journals of Lewis and Clark,* consisted of high plant diversity and large numbers of animals. Our present landscape consists of plant monocultures and few, if any, animals. Knowing the original landscape and our present landscape, will help us paint the landscape for the future.

FY2015 Section 319 funds requested:	$ 155,000
Match:	$ 103,335
Other federal funds:	$ 0
Total project cost:	$ 258,335

319 funded personnel: .5 or less

2.0 STATEMENT OF NEED

2.1 Water quality priorities

The Menoken Farm Soil Foodweb Project II is a continuation of the Menoken Farm Soil Foodweb project. The primary target audience will consist of farmers, ranchers, landlords, educators, ag lenders, foresters, wildlife conservationists and gardeners. Cover crops will act as the bridge to connect the cropping and grazing systems. This, in turn, will allow us to also introduce livestock to the program. *(See past accomplishments in Attachment A)*

There is a need to provide education on strategies for bringing those more fragile lands back into production while maintaining or improving soil health and water quality. Extremes in temperature, rainfall and snowfall, chemical or biological use of inputs; crop diversity; livestock integration; and management perspectives all impact soil health and water quality.

A majority of crop producers typically apply recommended amounts of fertilizer and herbicide to their crops to improve yield and profitability. These are inputs with the potential for nonpoint source (NPS) contamination. Most of these same producers are not aware of new innovative management strategies showing them how to reduce these inputs and still harvest an abundant crop. There is a need for continuing education to keep abreast of these new practices, including using cover crops to provide more ground cover and to cycle nutrients, especially those nutrients that have leeched into deeper soil depths beyond the reach of typical crop roots.

Education is also needed on managing crops to influence the soil C/N ratio, which in turn has an impact on ground cover residue and soil erosion. Producers have not been exposed to new concepts of how to capture more rainfall and sunlight, resulting in more carbon to build healthier soil. We can teach them practices that can lead to the following seven benefits:

1. A sizeable reduction in the amount of fertilizer and herbicide used
2. Improved water infiltration and holding capacity
3. Improvements in organic matter and soil health
4. Reduced operating expenses
5. Increased biomass material for groundcover
6. Additional sources of livestock feed
7. Improved water quality

These benefits are consistent with the intended results for many of the practices promoted and supported by the ND NPS Pollution Management Plan.

The Burleigh County SCD team identified a number of resource concerns in this county. They are soil surface armor, crop diversity, infiltration, nutrient cycle, water cycle, soil aggregates, soil organic matter and pollinators. As a result of these resource concerns, Burleigh County SCD developed the Menoken Farm site. This educational site consisting of 150 acres of cropland owned and operated by Burleigh County SCD. *(See Attachment B for a map of the farm site)*

The purpose is to restore the health of our soils and move production agriculture toward sustainability by reducing/eliminating fungicides, insecticides, GMOs and commercial fertilizer, while minimizing herbicides, soil disturbance and fossil fuel impacts.

3.0 PROJECT DESCRIPTION

3.1 Goal

The primary goal of this project is to increase agricultural producers and landowners ability to improve water use efficiency through soil health improvement. This will be accomplished by designing and implementing high plant diversity cropping systems and high stock density grazing systems with long recovery periods. We will then use cover crops as the bridge to connect the cropping and grazing systems together, allowing livestock integration to occur. *(See Attachment C, "The Menoken Farm")*

The resource improvements on the Farm, which will also benefit off site water quality, will be monitored and shared as part of the overall natural resources educational program. Outreach will consist of hosting groups and entities, speaking requests, articles and multiple videos. The area of impact will include local, regional, national and international.

3.2 Objectives and tasks

Objective 1: *Deliver a cropping and grazing plan.* The Burleigh County SCD team will annually provide one part-time employee for technical assistance, day-to-day practice and system implementation to manage and maintain a Menoken Farm cropping and grazing plan. The cropping plan addresses such things as crop diversity, cover crops, compost and the two gardens. The grazing plan addresses such things as cover crops, animals and rotational grazing.

Task 1: *Seeding and maintaining fields and gardens.* After seeding, the Burleigh County SCD team will manage all herbicides, spraying, harvesting and trucking. This task will also include annual crop rotation and cover crop management.

Product: A detailed work plan that is carried out for seeding, annual crop rotation, managing herbicides, spraying, harvesting and trucking.
Estimated cost: $54,000 from 319 grant and $36,000 match

Task 2: *Manage and maintain compost materials.* The Burleigh County SCD team will perform all composting duties, such as adding new materials, aerating the pile, curing the compost and distributing the final compost to fields and the garden.

Product: Successful management and maintenance of compost materials.
Estimated cost: $7,000 from 319 grant and $4,667 match

Task 3: *Install pipeline, water tanks and fencing for cattle.* With cattle added as a new element, we will need to bring good quality drinking water to the animals and also provide fencing so we can manage their movement.

Product: Completed pipeline, tank and fencing for the care and handling of animals. The fencing will include a 3,400-foot woven fence in field 1 and a 1,200-foot woven fence in the small pasture.
Estimated cost: $9,000 from 319 grant and $6,000 match

Task 4: *Care and handling of animals.* The plan of work for the farm will include proper watering and feeding of the animals.

Product: Proper care, management and maintenance of purchased animals.
Estimated cost: $1,000 from 319 grant and $667 match

Task 5: *Maintain and manage high tunnel garden and Hunger Free Garden:* The Burleigh County SCD will annually provide management and maintenance for the high tunnel garden, along with the outside Hunger Free Garden. All produce will be donated to the Bismarck/Mandan food pantries. High tunnel-related work includes installing and maintaining a 30-by-80-foot shade panel; a 36-inch exhaust fan; a thermostatically controlled curtain; and a high tunnel cover. Raised beds will also be built and maintained.

Product: Installed exhaust fan, shade, raised beds, high tunnel cover and a thermostatically controlled curtain in the high tunnel greenhouse.
Estimated cost: $2,087 from 319 grant and $1,392 match

Task 6: *Staff time necessary to design and implement all project components.*

Product: Employ a part-time person at Menoken Farm, along with support from Burleigh County SCD staff and NRCS staff to complete projects.
Estimated cost: $34,272 from 319 grant and $22,848 match

Objective 2: *Gather and compile monitoring information.* We will gather and analyze pertinent monitoring information, which will speak directly to NPS pollution and water quality. The Haney Test and the PLFA will be used to perform a total of approximately 60 soil tests.

Task 7: *Annually monitor impacts from all 10 Menoken Farm fields.* Approximately 60 soil samples will be taken and analyzed over the three-year period of this project.

Product: Approximately 60 completed and analyzed soil samples. Analyze water soluble organic nitrogen, phosphorus and carbon.
Estimated cost: $7,206 from 319 grant and $4,804 match

Objective 3: *Provide information, education and demonstration activities.* The Burleigh County SCD will provide education and demonstration activities for specific groups, such as farmers, ranchers, gardeners, small landowners, agriculture lenders, educators, wildlife groups, forestry groups and landlords. All of these events will be held at the Menoken Farm site east of Bismarck so participants can tour the fields, view the gardens and compost pile, and take part in the on-site demonstration tools.

Task 8: *Conduct education and demonstration events.* One major workshops/tours will be held each year, for a total of three major events. The first year will be geared toward agriculture lenders and landlords, the second year will target educators and small landowners and the third year will focus on wildlife and forestry groups. Double ring infiltration, rainfall simulator, slake, infiltration, crop and grass root boxes and tabletop runoff demonstrations will be conducted.

Product: A total of three major education and demonstration events that provide education and training on the management of systems and technology that can be implemented to improve soil health, plant and animal bio-diversity, and other practices that ultimately protect and improve water quality.

Estimated cost: $9,000 from 319 grant and $6,000 match

Task 9: *Arrange and host 12 summer tours.* We will plan and carry out four summer tours per year at the Menoken Farm site. These workshops/tours are primarily for farmers and ranchers and include all the demonstrations listed in Task 7. These tours will include a grazing component, which is the bridge that cropping and grazing create so livestock can be added.

Product: A total of 12 completed summer tours.
Estimated cost: $7,200 from 319 grant and $4,800 match

Task 10: *Produce eight educational videos.* We will work with a local video company to shoot film and then edit and produce 5-minute teaching videos that will be posted on YouTube and the Web sites of Burleigh County SCD, Menoken Farm, Dakota Prairies RC&D, the North Dakota Department of Agriculture/Division of Water Quality, NRCS and others.

Product: Eight professionally-produced short videos posted on YouTube and Web sites.
Estimated cost: $3,255 from 319 grant and $2,170 match

Task 11: *Produce one main brochure, three newsletters and maintain Menoken Farm Web site.* We will write copy for a Menoken Farm informational brochure, which we will then have designed and printed by a local print shop for distribution throughout North Dakota. Recipients of the newsletter are the primary target audience. We have found that many North Dakotans are still unfamiliar with the Menoken Farm education site and what they can see and learn on-site about soil health and water quality issues. One newsletter per year will be written and published to highlight the monitoring impacts. The Menoken Farm Web site, www.bcscd.com, will be updated regularly and the videos and other resulting products from this project will be posted on the site.

Product: A dynamic Web site for Menoken Farm along with a completed, informational brochure for Menoken Farm and newsletters to reach our target audience
Estimated cost: $6,763 from 319 grant and $4,509 match

3.3 Project schedule

We propose a project work plan that includes three overall objectives. *(See Attachment D, Milestone Table)*

3.4 Appropriate entity

Burleigh County SCD has been in operation for more than 35 years. It is considered a leader in its field and is one of the first organizations in North Dakota to embrace new and innovative ideas to test in its area. Burleigh County SCD employs four full-time and one part-time employee and has technical assistance on this project from three NRCS employees. The SCD

has a proven history of projects, knowledgeable employees and detailed tracking of data and outcomes of its projects.

3.5 Plan for proper operation and maintenance

The Burleigh County SCD has ongoing discussion on this project at monthly board meetings. At these meetings the project and expenses are discussed and approved by the board. At the end of each year the project staff has planning sessions for additions/changes for the farm for the coming season. The plan is presented to the board for approval and is put in its annual work plan, which is the SCD's primary work document.

4.0 COORDINATION PLAN

4.1 Lead project sponsor and cooperating organizations

The Burleigh County SCD will implement all activities of the project and will have the primary responsibility for project planning, contracting, coordination, implementation, financial assistance and timely submission of project payment applications to Dakota Prairies Resource Conservation & Development (RC&D), which will serve as fiscal agent for the project.

Dakota Prairies RC&D

Dakota Prairies Resource RC&D will partner with Burleigh County SCD, per agreement, to assist in outreach and fiscal management of the project. Dakota Prairies RC&D will provide staff time equivalent of one part-time employee for management, oversight, administrative support and technical assistance for delivery and implementation of the Menoken Farm Soil Foodweb Project II. A memorandum of agreement will be signed with Dakota Prairies RC&D to carry out the activities of this project.

- Provide program coordination
- Monitor progress of the tasks for reporting purposes
- Provide technical assistance as necessary
- Review completed project activities and related invoices
- Record and distribute relevant project data
- Submit vouchers for reimbursement and payments
- Maintain financial transactions and reports for program
- Create and submit annual and final reports

Dakota Prairies RC&D has implemented 319 Programs for information and education for more than 17 years. Dakota Prairies RC&D currently works closely with soil conservation districts (SCDs), water resource districts (WRDs) and county commissions within its constituency areas. Dakota Prairies RC&D Council is a non-profit entity with IRS 501(c)3 designation, and has a proven history of fiscal responsibility and grant administration. Dakota Prairies RC&D contracts with Susan Davis for its executive director services. Davis, who has 13 years of grants administration experience, will be responsible for overall oversight and administration of this project. Davis has a master's degree in management from the University of Mary, Bismarck.

USDA Natural Resources Conservation Service (NRCS)

Technical assistance will also be provided by NRCS staff in planning and implementing workshops and educational activities.

USDA Agriculture Research Service
Personnel from the USDA-ARS Northern Great Plains Lab will provide technical assistance and instruction for project workshops, tours, demonstrations, watershed management training sessions and submission of newsletter insert articles. These activities will be conducted in accordance with the agency's mission.

South Dakota State University
Dwayne Beck will provide technical assistance for project workshops, tours, demonstrations, and watershed management training sessions. These activities will be conducted in accordance with the university's mission.

North Dakota Department of Health
Personnel will oversee 319 funding and assist with planning and implementation of educational events when possible.

4.2 Local support for the project

There is support for the project by USDA-ARS, Dakota Prairies RC&D, and the North Dakota USDA-NRCS. Letters of support are on file in the Burleigh County Soil Conservation District office.

4.3 Coordination with other education programs

Burleigh County SCD will coordinate with the active watershed projects, as needed, to assist in their educational events. The outcomes and data will be shared with other organizations and agencies. Information will be exchanged in tours, workshops and by personal contact.

4.4 Similar activities in project area

To our knowledge there is not another program in the State that measures the biological outcomes and demonstrates the "whole" concept of restoring soil health on field scale. By mimicking native rangeland with crop diversity and introducing the Soil Foodweb to half of each field the concept is understood by what the farmer/rancher (client) can achieve through these methods on their farms.

5.0 Evaluation and monitoring plan

5.1 Plans for evaluating project goals, objectives and tasks

An outcome evaluation will be conducted throughout the project period, as activities are completed, to determine the effectiveness of the project and to determine that the project objectives are being met. The evaluation will also be used as an internal tool to determine if the educational activities being implemented through this project are effective in increasing public awareness on water quality issues. NRCS soils data report will be run in May 2015 and again in May 2018. The report will include bulk density, soil organic matter (SOM) at various depths, pH, carbon, EC, etc., allowing a comparison of results.

The following evaluation measures will be conducted for the products outlined in this proposal:

a) Personnel and support: Hours spent on each activity will be documented and actual costs for training and utilities will be tracked with receipts.
b) Deliver a cropping and grazing plan: Burleigh County SCD will record this information on the Project Outcome section of the reimbursement for each activity to indicate the one-on-one contact.
c) Gather and compile monitoring information: Each field is divided into two halves, with Soil Foodweb applied to only one of the halves. Ward Laboratory of Kearney, Neb., will test each half annually and compare the soil biology results. In addition, grain yields will be documented annually and also compared.
d) Provide education and demonstration activities: The number of tours and workshops implemented, the date held and the number of people in attendance will be recorded for each event. Exit surveys will be completed for all workshops.

The information obtained from the evaluation measures will be compiled by Burleigh County SCD and submitted to Dakota Prairies RC&D for reporting to the North Dakota State Health Department in annual and final reports.

5.2-5.4 Demonstration project monitoring
Non applicable.

5.5 How and when data will be stored, managed and reported
We will compile all information obtained and both keep on file at the offices of Burleigh County SCD and Dakota Prairies RC&D Council and submit it to the North Dakota Department of Health/Division of Water Quality in annual reports and the final report. This information will include the number of individuals reached and the number of organizations and counties represented throughout the project period.

5.6 Any models used
Non applicable.

5.7. Long-term funding plans for the operation and maintenance of activities
Burleigh County Soil Conservation District general operating budget and the North Dakota Outdoor Heritage Fund grants.

BUDGET TABLE FOR MENOKEN FARM SOIL FOODWEB PROJECT II

Part 1 – Funding Sources	**2015/16**	**2016/17**	**2017/18**	**TOTAL**
EPA SECTION 319 FUNDS				
1) FY2015 Section 319 Funds	$53,309	$50,653	$51,038	$155,000
Subtotals	**$53,309**	**$50,653**	**$51,038**	**$155,000**
STATE/LOCAL MATCH				
1) Burleigh County SCD	$35,540	$33,769	$34,026	**$103,335**
Subtotals	**$35,540**	**$33,769**	**$34,026**	**$103,335**
TOTAL BUDGET	**$88,849**	**$84,422**	**$85,064**	**$258,335**

FA: Financial assistance

TA: Technical assistance

SCD: Soil Conservation District General Operating Budget

WCD: Water Conservation District

RC&D: Resource Conservation & Development

Section 319/Non/federal Budget	2015/16	2016/17	2017/18	Total Costs	Cash Match	In-kind Match	319 Funds
PERSONNEL/SUPPORT							
1) Salary (Menoken Farm part-time employee)	18,480	19,040	19,600	57,120	22,848	0	34,272
2) Grants administration	5,166	5,167	5,167	15,500	$0	6,200	9,300
3) Utilities (electricity, water, phone)*	2,732	2,732	2,731	8,195	3,278	0	4,917
Subtotals	**$26,378**	**$26,939**	**$27,498**	**$80,815**	**$26,126**	**$6,200**	**$48,489**
OBJECTIVE 1: Deliver a cropping and grazing plan							
1) Seeding & maintaining fields & garden**	30,000	30,000	30,000	90,000	18,000	18,000	54,000
2) Manage & maintain compost materials	3,889	3,889	3,889	11,667	2,333	2,334	7,000
3) Install pipeline, water tanks & fencing	5,000	5,000	5,000	15,000	3,000	3,000	9,000
4) Care & handling of animals	556	$556	555	1,667	0	667	1,000
5) Maintain & manage high tunnel garden	2,395	$500	584	3,479	0	1,392	2,087
Subtotals	**$41,840**	**$39,945**	**$40,028**	**$121,813**	**$23,333**	**$25,393**	**$73,087**
OBJECTIVE 2: Gather and compile monitoring information							
1) Monitor impacts from all 10 Menoken Farm fields	4,003	4,003	4,004	12,010	4,804	0	7,206
Subtotals	**$4,003**	**$4,003**	**$4,004**	**$12,010**	**$4,804**	**$0**	**$7,206**
OBJECTIVE 3: Provide information, education and demonstration activities							
1) Conduct education & demonstration events	5,000	5,000	5,000	15,000	3,000	3,000	9,000
2) Arrange and host 12 summer tour ***	4,000	4,000	4,000	12,000	2,000	2,800	7,200
3) Produce 8 educational videos	1,356	2,035	2,034	5,425	2,170	0	3,255
4) Produce 1 brochure, 1 newsletter & maintain Web site	6,272	2,500	2,500	11,272	4,509	0	6,763
Subtotals	**$16,628**	**$13,535**	**$13,534**	**$43,697**	**$11,679**	**$5,800**	**$26,218**
TOTAL 319/Non-Federal Budget	**$88,849**	**$84,422**	**$85,064**	**$258,335**	**$65,942**	**$37,393**	**$155,000**

**Utilities for the farm/building pro-rated 50%*

***Seed, spraying, trucking & harvesting costs*

****Printing, lunch, staff time, newsletters*

ATTACHMENT A

Past Accomplishments

PAST ACCOMPLISHMENTS

Menoken Farm Soil Foodweb
Information & Education Program

Burleigh County Soil Conservation District is in its third and final year of its Menoken Farm Soil Foodweb Project.

Accomplishments to date (May 1, 2012 to Sept. 30, 2014) under this program are as follows:

Program coordination and administration services

Dakota Prairies RC&D Council provided management and oversight of this grant. The Burleigh County Soil Conservation District has ongoing discussions on Menoken Farm projects at monthly SCD board meetings. At these meetings the project and expenses are discussed and approved by the board. At the end of each year the project staff has planning sessions for additions/changes for the farm for the coming season. The plan is presented to the board for approval and is put in its annual work plan, which is the SCD's primary work document.

Outreach information

The Burleigh County SCD has completed outreach of approximately 11 newsletters to promote soil health and sustainability, cropping and grassland management. Events, articles and videos are posted on our Web site as events occur.

Workshops and field events

The educational events to date are as follows:

2013 soil health workshop

Held Jan. 8, 2013, this "Advancing Soil Health" was held in Bismarck. Guest speaker was Davis Brandt of Brandt Farms of Carroll, Ohio, who talked about "Building Better Soils." Other speakers included Paul Brown, Joshua Dukart, Jay Fuhrer and Jonathan Lundgren.

- *Media and printed resources:* 1.3 newsletters, two displays and 68 radio ads were developed for this event, for a total distribution of 681.
- *Workshops, tours and trainings:* The workshop drew 424 participants of which 100 were students and three were instructors.

2014 soil health workshop

This one-day workshop Jan. 23, 2014, taught about building healthy soils and improving nutrient efficiency to producers, college students and agency personnel. The theme was "Finding Our Path" and the event was held in Bismarck. Main speakers were Dr. Rick Haney, an ARS soil scientist from Texas, and Ray Archuleta, a soil health specialist/agronomist from North Carolina.

- *Media and printed resources:* Two newsletters were developed, with a total distribution of 620 each.
- *Workshops, tours and trainings:* A total of 370 attended this 2014 event.

2012 Soil Health Garden Tour
This major garden tour was held July 25, 2012. It covered topics that included: 1) Soil demonstration with slake test; 2) infiltration and rainfall simulator; 3) making compost and applying compost tea; 4) cover crops for the garden; 5) mulch planted potatoes; and 6) combination plants and pollinators. This event was attended by 102 people.

2013 Soil Health Garden Tour
The 2013 garden tour was held Aug. 14. Covered topics included: 1) Soil demonstrations with slake tests; 2) infiltration and the rainfall simulator; 3) making compost and applying compost tea; 4) cool season cover crop combinations; and 5) growing corn and pole beans together. This event was attended by 116 people.

2014 Soil Health Garden Tour
Jay Fuhrer presented an activity that involved adults and children explaining soil during the Aug. 5, 2014, garden tour. Topics were presented on: 1) Brix testing; 2) planning for pollinators; 3) insects in North Dakota; and 4) diversity. The garden tour was attended by 60 people.

Information and education
Numerous tours and education events have been hosted at Menoken Farm since the beginning of the Menoken Farm Soil Foodweb program. Groups from Australia, France, the Netherlands, South Africa, and the United States, along with grade schools, high schools and colleges have toured the Menoken Farm. Approximately 1,133 people have toured Menoken Farm during this grant period to date.

Demonstration projects
(2) Burleigh County SCD – Menoken Farm Soil Foodweb-Phase II
Two subgrants were given to the Burleigh County SCD from the Dakota Prairies RC&D 319 grant to help fund equipment, materials and supplies to allow Menoken Farm to gear up for soil health on-site demonstrations.

- *Equipment:* In late 2012, the third and final lease payment was made on a Sittler compost windrow turner model 509 with water wagon and crop spreader.
- *Materials and supplies:* In 2012 a subgrant assisted Menoken Farm in paying for: 1) Cropping supplies and composting materials; 2) repairs/maintenance; 3) soil and biological tests; and 4) a no-till drill wheel.

Equipment, land, supplies and materials
This grant has allowed Burleigh County SCD to purchase a few pieces of critical equipment to operate the Menoken Farm education site. This includes the following:

- A 2001 JD tractor for $80,000. A total of $30,000 was paid down when the tractor was leased on April 3, 2013. Then, another payment of $26,036.91 was made on April 1, 2014. Another lease payment of $26,036.91 is due April 3, 2015.
- A 5100 White corn planter with 7 splitters for $12,000
- A spray coupe for $2,500
- A pellet fork (and charges to install on loader bucket): $9,156.78

Materials and supplies continue to be one of the largest expenses for the learning site. Through June 30, 2013, these costs totaled $31,089 and were broken down under the following categories:

- Fuel: $1,964
- Cropping: $19,205 (seed, custom work and spraying services)
- Composting materials: $9,920 (manure and hauling, grapple rental, loader rental, microbial food, supplies, bale processor, hay and transporting, composting parts, composting)

Through Feb. 28, 2014, these costs totaled $26,324 under the same categories:

- Materials/supplies: $3,400 (fuel)
- Cropping: $18,297 (seed, custom work and spraying services)
- Composting materials: $4,627 (includes Soyaplex, hauling manure and hay bales)

Because costs have been higher than anticipated, many supplies have been and will be supplied by Burleigh County SCD. In addition to fuel, cropping and composting expenses, Burleigh County SCD has spent money on electrical service, repairs and other necessary items.

Also, thousands of volunteer hours have gone into the farm during this period to make it sustainable. Some of these services include seeding, weeding and watering gardens; harvesting produce; making repairs; picking up seed and seeding cover crops and fields; planning and work on compost pile; turning compost pile; crop spraying; cleaning compost turner; tree planning; and placing weed barrier.

ATTACHMENT B

Map of Menoken Farm Site

Menoken Farm
Burleigh County Soil Conservation District
Field 1
11.1 ac
Field 2
11.3 ac
Field 3
11.8 ac
Field 4
11.8 ac
Field 5
11.5 ac
Field 6
12.4 ac
Field 7
13.0 ac
Field 8
13.0 ac
Field 9
13.2 ac
Field 10
12.6 ac

ATTACHMENT C

The Menoken Farm: Advancing Soil Health

The Menoken Farm

"Advancing Soil Health"

Established 2009

Introduction

The Menoken Farm is an educational site consisting of 150 acres of cropland owned and operated by the Burleigh County Soil Conservation District. The purpose is to restore the health of the soils and move production agriculture toward sustainability; by eliminating fungicides, insecticides, GMO's, and commercial fertilizer; minimizing herbicides, soil disturbance, and fossil fuel impacts wherever feasible; all while increasing the health and resiliency of the entire ecosystem. The Soil Foodweb is enhanced by applying compost, compost extract, compost teas, fish emulsion, and seed inoculants on the east half of each field each year. Production method decisions mimic native rangeland with crop diversity, combination cover crops, a continuous live root allowing for maximum sunlight harvest, and appropriate animal impact. Native pollinators and beneficial insects are also encouraged in the holistic management strategy of the Menoken Farm.

Addressing Resource Concerns

The Burleigh County Soil Health Team identified a number of resource concerns across this landscape upon initial purchase. These included a lack of soil surface armor, minimal biological diversity, poor nutrient cycling, slow infiltration, collapsed soil aggregates, minimal soil organic matter composition, and little beneficial insect habitat.

- **2009:** Concentrated on providing the basic building blocks to improve soil health; these included increasing soil cover (armor) and crop diversity by crop rolling and seeding cover crop mixes with high amounts of diversity. Feeding the soil a diverse and expanded diet was a key in jump starting the biological activity. A complete biological soils analysis was completed, with plans for future monitoring utilizing the baseline data.

- **2010:** Focused on seeding annual crops and cover crop mixtures. With the cover crop mixtures, we also added a very dynamic component in the form of pollinators. We felt that if we continue to build a healthy and diverse environment and supply it with a continual food source, it will attract the right balance of organisms, both above and below the soil surface. In addition, we applied compost, compost teas, compost extracts, and raw milk. Cattle were also introduced to provide additional diversity and utilize the tools of grazing and animal impact to place residue on the soil surface and cycle nutrients. We also started using compost that utilized our own raw materials from the farm along with some carbon and/or nitrogen based ingredients from nearby farms.

- **2011:** Sheep were added to the Menoken Farm to serve multiple purposes. First, they provided a method of weed control that eliminated the need for herbicide use. Secondly, they provided another source of diversity to the environment. Their grazing preferences differ from those of cattle which have been and will continue to be used at the Menoken Farm. Additionally, the hoof impact that the sheep administered to the land varied in form and intensity from the cattle, and therefore contributed to the increased functionality of the mineral cycle.
  In addition, a no-till garden was established at the Menoken Farm. The garden also serves multiple purposes. First, it serves as another educational tool. The concepts learned from gardening, cropping, and grazing can all be used to improve our understanding of the whole farm. Secondly, the garden represents the direct connection between our soils and our food source. Although it is small scale, it serves as a method of experimenting with ideas before they are taken to the larger scale cropping production level.

- **2012:** Poly-grain cover cropping mixtures are being added with the intent to harvest multiple annual crops simultaneously, along with having a cover crop already established. The garden is being moved to an adjacent location to share its biological benefits with additional areas of the farm. The diversity of the garden is also being enhanced by planting multiple species of fruits and vegetables together to further our efforts to improve soil health. Additionally, with the continued use of mob grazing of sheep and cattle, we feel we can take the next step towards creating a sustainable landscape for food and fiber production. More trees were also added to the landscape to further enhance the biological diversity of the farm as a whole.

- **2013:** Additional plant and animal diversity and their respective production techniques highlight the plan for the coming year. An inter-seeding planter was purchased in order to utilize cover cropping with row crop plant species, as well as being able to put down compost tea directly with the seed. In addition, two additional growing environments are being created to produce food directly. One, a high tunnel hoop house, will allow more weather sensitive food crops, such as tomatoes and peppers, to be grown at the farm; and two, conditioned straw bales are being used to provide a carbon rich, space efficient, raised bed garden for growing onions and potatoes. Chickens and hogs are two new livestock species being explored for their ability to bring additional biology to the soil health system. Lastly, we are initiating our "conservation biological control" process. For instance, we are seeding sunflowers with an understory of plants which provide a habitat for predator and parasitoid insects; thus eliminating the need for insecticides. This companion plant community will also supply nutrients and weed suppression.

- **2014:** A new addition to the Menoken Farm has been added in the form of perennial grasses, legumes, and forbs. These higher succession level plants have been introduced to repair soils in dire need of a continuous live root every hour of every day possible. This sustained, yet ever evolving and diversifying plant community provides insect habitat and nutrition over a greater window of time each year, allowing for a heavier influence of predator and pollinator insect species in the ecosystem as a whole. As permanent forage is added to this annual cropping based farm, we believe an ever greater level of health and self-sufficient function can be achieved. The combination of so many levels of living organisms being attracted to this site should no doubt create greater diversity and ensure ever strengthening resiliency.

The Future

Production, profit, and the health of plants, animals, and people all directly relates to the health of the soils we manage. We expect to see a continuing positive trend in soil health as we introduce more and more diversity and focus on addressing the real problems in the ecosystem. With the holistic management approach taken at the Menoken Farm, we feel it can play a crucial and beneficial role in the experimentation and demonstration of sustainable agriculture and food production.

ATTACHMENT D

Milestone Table

MILESTONE TABLE
Menoken Farm Soil Foodweb II

TASK/RESPONSIBLE ORGANIZATIONS	OUTPUT	QUANTITY	SFY15	SFY16	SFY17
Objective 1: Deliver a cropping and grazing plan					
Task 1 - Seeding and maintaining fields and garden Group 1	Successful planting of all 10 fields and garden	11			
Task 2 - Manage and maintain compost marterials Group 1	Large compost area used for the entire Menoken Farm	1			
Task 3 - Install pipelines, water tanks and fencing Group 1	Completed water tanks and enclosures for cattle	1			
Task 4 - Care and handing of animals Group 1	Secure cattle and provide feed and water to them	10			
Task 5 - Maintain and manage high tunnel garden Group 1	Sucessful high tunnel greenhouse	1			
Task 6 - Staff time to design and implement all project components Group 1	Successfully completing all project objectives and tasks	1			
Objective 2: Gather and compile monitoring information					
Task 7 - Monitor impacts from all 10 Menoken Farm fields Groups 1, 2 and 4		10			
Objective 3: Provide education and demonstration activities					
Task 8 - Conduct education and demonstration events Groups 1 and 3	Completed education and demonstration events at Menoken Farm	20			
Task 9 - Arrange and host 12 summer tours Groups 1 and 3	Completed 12 summer tours at Menoken Farm	12			
Task 10 - Produce 8 educational videos Group 1	Completion and posting of 8 short Menoken Farm videos	8			
Task 11 - Produce 1 brochure, 1 newsletter and maintain Web site Groups 1, 2 and 3	Competed and distribted brochure and newsletters; dynamic Web site	3			

Group 1 - Burleigh County Soil Conservation District (SCD): Lead all work activities

Group 2 - Dakota Prairies RC&D (DP): Provide technical assistance and serve as fiscal agent to administer project grant funds

Group 3 - USDA Natural Resources Conservation Service (NRCS): Provide technical assistance to local sponsors for field tours and workshops

Group 4 - North Dakota Department of Health: Assist with data collection and dissemination