SECTION 319

NONPOINT SOURCE POLLUTION

CONTROL PROGRAM

SOIL HEALTH PLANNING AND IMPROVEMENT PROJECT

Segment 1

FINAL REPORT

By

South Dakota Soil Health Coalition

August 2020

This project was conducted in cooperation with the State of South Dakota and the United States Environmental Protection Agency, Region VIII.

Grant #999818517, #999818519

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Executive Summary

Project Title: Soil Health Improvement and Planning Project – Segment 1

Project Start Date: July 24, 2017 Project Completion Date: August 31, 2020

FUNDING

Total Project Budget		$460,300
319 EPA Grant	$100,000	
319 EPA Grant Amendment	$ 25,000	
Total EPA Grant Funds		$125,000
Total Expenditure of EPA Funds		$108,025
Total Section 319 Match Accrued		$316,904
CWSRF	$100,000	
Other Federal	$ 79,076	
Total Expenditures		$504,005

SUMMARY ACCOMPLISHMENTS

Soil Health Improvement and Planning Project successfully promoted information and education to local landowners and the general public providing a better understanding of soil health and its relationship to water quality with a coordinated statewide effort. The project achieved the established milestones. In doing so, the project reached three thousand sixty-one contacts, provided or attended forty-two workshops or demonstration tours, delivered twelve news articles, and coordinated one thousand seven hundred thirty-two grazing management acres.

Soil Health Improvement and Planning Project, new to South Dakota, proved to be a valuable part of the strategy to protect watersheds – educating producers and landowners on the implementation of soil health practices that reduce non-point source pollution by improving water infiltration on cropland and rangeland. The partnerships of federal, state, academia, and non-profit organizations created South Dakota Soil Health Coalition (SDSHC) which leveraged the strength of each to deliver a project that is effective and useful for the citizens of South Dakota.

SDSHC was created by a group of partners along with concerned farmers and ranchers to continue implementation of soil health practices that reduce Nonpoint source (NPS) pollution through best management practices.

1.0 Introduction

Soil Health Planning and Improvement Project began in 2017 with the newly formed South Dakota Soil Health Coalition as the project sponsor. Prior to the project, watershed protection outreach and education were primarily coordinated by the South Dakota Discovery Center I & E project as well as each watershed project areas with minimal outreach within their agreements. The South Dakota Soil Health Coalition (SDSHC) partnered with the South Dakota Association of Conservation Districts (SDACD), outsourcing employment of the coordinator for the South Dakota Soil Health Coalition. The coordinator and the directors explored options for the effective manner to reach producers and the general public on the importance of soil health to water quality in South Dakota, establishing an outreach education plan.

The USDA Natural Resources Conservation Service (USDA-NRCS) provided the coordinator office space, computer access along with training for planning practices and Farm Bill related documentation. USDA-NRCS was a key partner with further outreach and technical efforts in South Dakota. South Dakota Department of Environment and Natural Resources (DENR) directed the focus areas of the established project boundaries. A memorandum of understanding with South Dakota State University Extension laid the framework for the outreach coordinator/information specialist, establishing leadership and professional guidance for the project.

SDSHC pursued the broad geographic focus to ensure that all South Dakotans were being reached with the important message of watershed protection. Under the current structuring of 319 projects, South Dakotans who live in impaired watersheds where there is an active improvement project are reached with watershed specific information and education. However, that leaves a vast number of unreached and formerly reached citizens who are not receiving any information about the importance of water quality. Delivering wide array of information supporting the current watershed improvement projects enhances the probability for the continual and repeated soil health practices for water quality benefits.

The project used a variety of modes to reach different audiences. Producers were reached through one-on-one visits, workshops/tours, websites, and outreach efforts with social, audio, video and print media. The youth was reached through school visits, soil health bucket distribution, water festival participation, SD Discovery Center Soil Day, FFA presentations, SD State Fair contribution and Ag Day Ag Friday involvement.

2.0 Project Goals, Objectives and Activities

The goal of the Soil Health Planning and Improvement Project Segment One was to improve water quality with soil health practices through education and outreach as well as working with producers on agricultural best management practices. Our goal is a collective effort to increase sustainable agricultural production through diversification and improved soil health and water quality.

The project provided information and education to local landowners, youth, communities, agency personnel, consultants and the general public showing a better understanding of the importance, function, and technical design of agricultural soil health practices and related water quality benefits.

SDSHC utilized a multi-step approach for successful project outcome. Our desired goals utilized the ensuing objectives, following described tasks with the listed work products.

Objectives with related tasks and products are:

Objective 1: Develop BMP plans that reduce sediment and nutrient runoff, integrate livestock on cropland, and improve grassland management.

The tasks and products for Objective 1 are:

- **Task 1:** Develop BMP Plans
  - Product 1: Landowner contacts (350)

    BMP plans (15)
  - Product 2: Develop 1,500 acres of integrated grazing management on cropland

Through the project, producers were educated and provided with information regarding the continual implementation of water quality and soil health management practices on their land. Contacts were developed through the mentor program, Soil Health Sit-Downs and through partner engagement.

Without a pollutant reduction target included in segment one, SD DENR shared the cover crop STEPL program for information and education. With producers implementing cover crops whether as full season, inter seeding, after small grain harvest, or after silage, SDSHC collaborated with SD DENR staff and grabbed the opportunity to learn the impact of the lengthened living root toward load reductions.

Pollutant	Load Reduction
Nitrogen (lbs)	4846
Phosphorus (lbs)	1658
Sediment (tons)	1078

Table 1

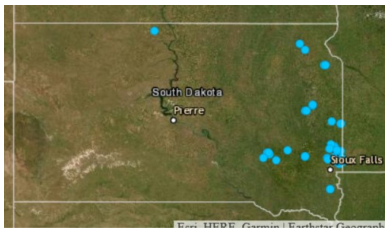


Figure 1

Table 1: NPS Load Reductions utilizing STEPL cover crop program. Table 8 included in appendices on page 30 highlights 2020 impact by sub watershed data. Figure 1: Map depicts locations of cover crop fields included in STEPL program..

When incorporating livestock and grazing cover crops, best management practice allows the animal to graze 1/3, trample 1/3, and maintain 1/3 of the forage for soil protection. Grazing cover crops and/or crop residues allows livestock to be taken off perennial grasslands earlier in the fall, extending the grass recovery period, providing a higher nutritional diet for the livestock, and increasing the opportunity for water infiltration.

SDSHC and partners developed a tool for livestock integration – a cover crop grazing stick makes formulas available for managing cover crop forage and livestock animal units using efficient conservation methods. South Dakota Grassland Coalition, U.S. Fish and Wildlife Service, USDA-NRCS, South Dakota Game Fish and Parks, Pheasants Forever, and Ducks Unlimited partnered on the development and financial aspects to deliver the cover crop grazing sticks for producers and agriculture and conservation professionals.

Figure 2: Cattle grazing cover crop in southeast South Dakota following oats harvest.

The following are key points of introducing animals into lush cover crops so the ruminant animals can adjust to their new diet:

- *Gradually introduce livestock to cover crops slowly over a few days.*
- *Ensure they are well fed before integration.*
- *Consider offering some dried forages or access to both grassland and cropland.*

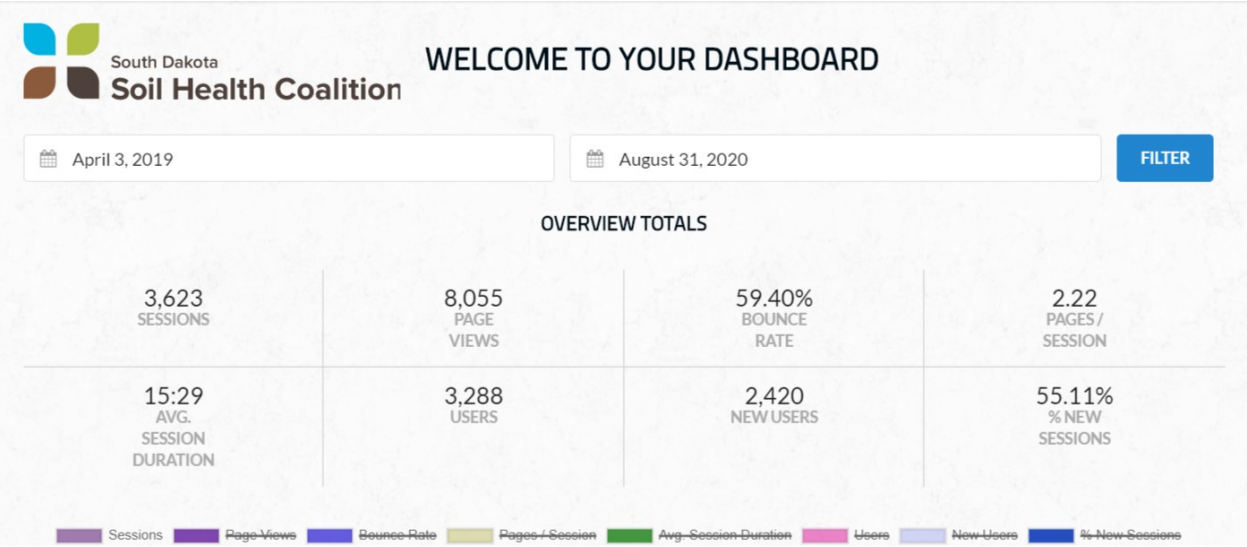
Figure 3: Grazing reduces livestock waste associated with confinement, helping to manage water quality and nutrient management concerns.

Figure 4: Fall and winter grazing of cover crops or the summer grazing of full season cover crops allows adequate plant recovery which provides opportunity for water infiltration and reduced runoff.

SDSHC recognized a hurdle for integrating livestock on cropland due to the increased reduction of livestock on operations in South Dakota, especially in the areas within the watershed project boundaries. With that in mind SDSHC partnered to create and launch the SD Grazing Exchange www://sdgrazingexchange.com which connects livestock owners and landowners/operators. Grazing of cover crops is an excellent way to incorporate all five principles of soil health, achieving the benefit of water quality.

Figure 5: SD Grazing Exchange helps livestock producers connect with landowners for the betterment of South Dakota. *Below is a flyer developed to promote the sdgrazingexchange.com website.*

Figure 5: Analytics during the project period from the Grazing Exchange proves the site provides a tool for livestock integration.



Objective 2: Develop and Distribute Information and Education

SDSHC mission tracks Objective 2 with the distribution of information and education. With a vast array of avenues, SDSHC strived to surpass this objective through all media distribution avenues.

The tasks and products for Objective 2 are:

- **Task 2: Landowner and producer contacts**
    - Product 3: Contact thirty-seven (37) producers and/or landowners to discuss improvement of soil health through diverse rotations, cover crops, placement of fertilizers and deep-rooted perennials and develop plans for BMP's.

Soil Health Sit Downs provided an avenue to reach producers to discuss improvements on their operation.

Figure 7: A Soil Health Sit Down in Redfield brought producers from key areas in the James River Watershed.

With the development of the soil health assessment card, SDSHC worked with producers to evaluate their operation in a field-by-field process. After completing the assessment producers acquire the basis for best management practices.

Figure 8: Assessment card is available on SDSHC website at sdsoilhealthcoalition.org which provides easy access.

SDSHC Soil Health Assessment Scorecard Rev.1

South Dakota Soil Health Coalition

Soil Health Assessment Scorecard

Producer Name: _____
Field ID: _____
Date: _____

Soil Organic Matter Content: _____
Field Management: _____

Indicator	Least Desirable					Most Desirable					Indicator Observations (Declining Soil Health ← → Improving Soil Health)		
	1	2	3	4	5	6	7	8	9	10	1	5	10
Soil Cover (tillage may affect)											Previous crop residue covers less than 50% of the soil surface throughout the	Previous crop residue covers 50-70% soil surface throughout the year	Previous crop residue covers more than 70% of the soil surface throughout the year
Biological Activity (soil moisture and temperature may affect)											No/very little earthworm or other organisms presence observed, previous crop residue deteriorates very little throughout the year without tillage, legumes have poor nodulation	Less than one earthworm per shovel full/few beneficial organisms observed, previous crop residue moderately deteriorated	Earthworm count >3 per shovelful/active presence of other organisms, previous crop residue deteriorates quickly at soil surface without tillage, legumes contain large nodules, fungi are present (identical to spider web)
Soil Disturbance (Intensity)											Conventional-till, broad area tillage involving two or more tillage trips, repeated yearly. Intense soil disturbance to a depth of 12+ inches	Minimum-till: single pass tillage, strip-till, non-consecutive yearly tillage passes. Moderate soil disturbance to a depth of 4-6 inches	No-till, minimal soil disturbance
Soil Disturbance (Duration)											Conventional-till, 5+ years, consecutively	Reduced/no-till, less than 4 years	Long-term no-till, 5+ years
Living Roots											Growing plant/living root present in the soil less than 4 months of the year	Growing plant/living roots present in the soil 4 to 6 months of the year	Growing plant/living roots present in the soil more than 6 months of the year
Crop Diversity											No crop rotation: same crop grown consecutively	Alternate between 2 separate crops yearly, some cover crops	3+ different crop rotation, extensive cover crops used
Soil Fertility Management											Anhydrous ammonia application, extensive synthetic fertilizer use	Moderate synthetic fertilizer use, some manure application applied sparingly	Biologically based fertilizer sources applied, including manure
Soil Erosion (Wind)											Airborne "dust" soil particles, visible black snow (winter)	Minimal airborn "dust" soil particles, slight dark discolored snow	No airborne particles, white colored snow in winter
Soil Erosion (Water)											Active rills and gullies present	Moderate rills and gullies present	No active signs of water erosion
Observations after rainfall event											Excessive surface water ponding for extended time after rainfall event, long-term muddy field conditions, hard, crusted soil surface when dry	Some ponding occurs after rainfall event, surface water subsides within a day, short term muddy field conditions are expected	No surface water ponding after rain event, muddy field conditions are short to non-existent
Soil Structure (0-6")											Powdery when dry, hard chocolate bar consistency after rain	Somewhat powdery, moderately hard after rain	Crumbly chocolate cake/cottage cheese like consistency
Soil Structure (6-12")											Soil structure breaks horizontal or platy, roots grow laterally	Soil has moderate platy structure, some lateral root growth	Granular or blocky structure, no root limitations
Livestock											No livestock integration	Some livestock integration, grazing pasture land or previous crop residue, no rotational grazing	Routinely rotationally grazed pasture land or cover cropped fields

-

- **Product 4:** Five (5) tours were conducted to demonstrate the results of diverse rotations and deep rooted perennials, methods of applying cover crops in row crops to include aerial application or interseeding, and proper placement of fertilizer, testing for soil fertility and the economics of these activities.

Table 2: Tours featuring cover crops, soil fertility economics, soil biology, interseeding

Tours		
Locations	Date	Attendance
Edmunds County	9/7/2017	42
Minnehaha County	9/17/2017	120
Lawrence County	9/26/2017	58
Hughes County	5/2/2018	38
Spink County	6/28/2018	59
Stanley County	15-Aug-18	40
Day County	9/20/2018	53
Beadle County	7/2/2019	12
Moody County	9/17/2019	6
Minnehaha County	9/19/2019	45

- **Product 5:** Two hundred and forty acres (240) no-till farming and three hundred seventy-five (375) acres of cover crops.

County	Acres	Type
McCook	70	Cover crops
Minnehaha	240	No-till
Davison	100	Cover crops
Grant	45	Cover crops
Kingsbury	60	Cover crops
Minnehaha	100	Cover crops
	615	

Table 3: Demo plot locations, acres and type.

Figure 9: Tour in Beadle County November 2nd 2017 highlighting no-till.

Figure 10 Group: Diverse cover crops, interseeding of cover crops with various methods demonstrated in plot tours, helping to achieve Product 4. Increased awareness and/or knowledge of best management practices aids in adoption and continuation of the practices.

Figure 11: Cover crop plots throughout the state shared a variety of possibilities for producers to consider on their operations. Examples of cover crop mixes were shared as well as practical advice to help producers plant their own cover crops Producers are unsure of how they can adapt existing equipment they have to establish cover crops without insermountable machinery investment. Assisting with options provides reassurance and aids in decisions to make management changes.

Figure 12: Cover crops provide ample forage after corn harvest on the interseeded field.

Figure 13: Sign near Miron Farm with quote from Al Miron, original member of board of directors for South Dakota Soil Health Coalition. SD Dept of Transportation Data Recorder showing an average of over 80,000 views a week of the billboard.

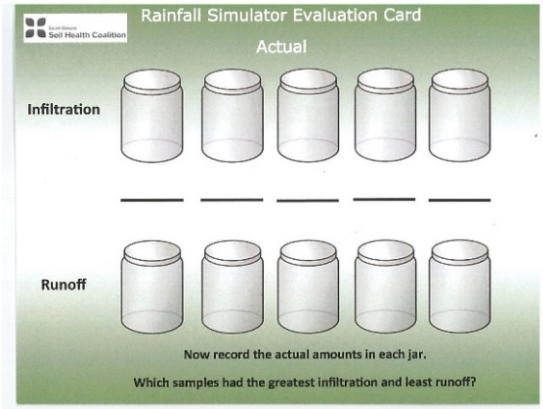
Miron Farm in the heart of the conventional tilled region of southeast South Dakota provides the setting for the no-till demonstration farm. Miron Farm not only allows tours of producers needing the additional "seeing is believing" step to make changes but also sets the stage for a site for training conservation professionals. Change is difficult for many; however, information and education about the science and technology available now is key for others to make the choice to implement best management practices.

- **Product 6:** One annual tour (3 total tours) to educate and inform the public and landowners about reduced runoff, increased water infiltration, and improved soil health, especially organic matter and its water holding capacity.

Soil Health School sets the stage for the annual tour hosted by South Dakota Soil Health Coalition and partners. In 2018, 2019 and 2020 school attendees and host locations located in the center of the target area for watershed improvement projects. Establishing the school in the watershed allowed SDSHC to help participants in the annual two-and-a-half-day event understand how improving soil health can improve water quality. Soil Health School is designed for agricultural producers as well as anyone with an interest in learning how to manage soils for resiliency, the environment and profit. The agenda features classroom style presentations by producers and technical experts from across the region as well as hands-on experiences in the field. Highlights include area producers sharing their challenges and successes for improving soil health to an average class size 30-40 per year.

Figure 14: This is the logo SDSHC created for the South Dakota Soil Health School.

Figure 15: During the Rainfall Simulator Demonstration, Soil Health School participants watch and learn the impacts of management decisions have on your operation and those downstream. SDSHC developed an eye-opening card designed for watching the rainfall simulator. Those using the card and seeing the simulator for the first time shared an "ah-ha" moment, taking the card with them to remember the effective visual of water infiltration and runoff.



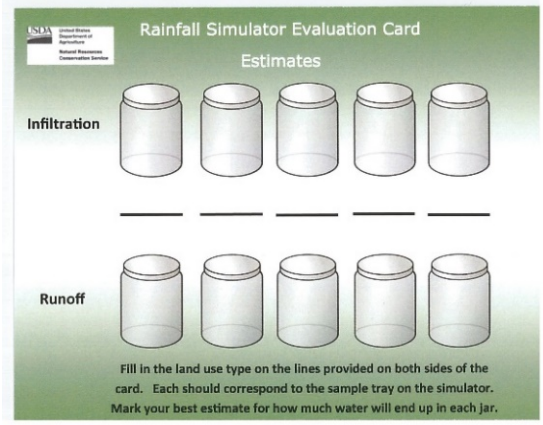


Table 4: School Attendance

SD Soil Health School			
Year	# Participants	Locations	
2017	35	Roscoe	
2018	42	Salem	
2019	42	Salem	
2020	30	Mt Vernon	19 on waiting list limited number due to year

Objective 3: Implement outreach program

South Dakota Soil Health Coalition outreach efforts include a wide array of media.

The task and products for Objective 3 are:

- **Task 3:** Create an awareness of project goals and objectives
  - **Product 7:** Nine (9) work group meetings

Presenting at key partner board meetings regarding the creation of SD Soil Health Coalition and the Improvement and Planning Project established ground floor efforts toward increasing water quality through outreach and partnerships.

Meetings	Date	Presented	Attended	Others
EDWDD	7/19/2018	x		Jason Kontz
JRWDD	9/13/2018	x		
State Tech	2/12/2019	x		
Every Acre Counts	4/5/2019		x	Austin Carlson
NCSS	4/10/2019	x		Doug Sieck
Chief Lohr	5/3/2019	x	x	
State Tech	5/22/2019		x	
SDSU/SDSU Ext	6/19/2019	x	x	
SD Soybean	6/25/2019	x		Jason Kontz
Every Acre Counts	7/15/2019		x	
SD GFP	8/22/2019	x		
State Tech	9/26/2019		x	
Task Force meeting	12/10/2019	x		Levi Neuharth
Ag Unity			x	
EPA--Gregory Sopkin	8/1/2019	x		Dennis Hoyle
Governor's Round Table	8/29/2019	x		Dennis Hoyle
SDACD			x	
SDGC			x	
SD Cattlemen's			x	
SDACD			x	
Ag Unity			x	
Carbon meeting--SDSU				
ARS--Customer Focus				
Ecosystem Market Consortium	10/3/2019	x	x	
State Tech				
Leopold	7/16/2019		x	
Governor's Ag Summitt	7-10/112019		x	
SD/ND collaboration	4/25/2019	x		
SD/ND collaboration	4/3/2019		x	Dan Forgey
Partner meeting	7/8/2019	x		

Figure 16: An example of partner meetings educating on SDSHC and the project goals.

- Eight (8) News articles

SDSHC released articles, commercials, videos, and newsletters to the media and on our website sdsoilhealthcoalition.org. Articles published by various print media cemented the influence of the general public. After the release of an article, South Dakota Association of Rural Water Systems contacted SDSHC to reprint the article within their magazine *Quality on Tap, distributed* to all rural water members. SDSHC highlighted SD watersheds with an article which was published in state and regional outlets. Current projects chose to highlight their goals within the article. For print media distribution reach as delivered from the major outlets, see Table 5. Seventy-five articles and newsletters during project period with twelve for the project goals Table 6 and Table 10.

Table 5: Print media distribution reach.

Print Media Distribution Reach	
Publication	**Circulation**
Tr-State Neighbor	21,228 total, 14,338 in SD, 3,067 in IA, 2,930 in MN, 621 in NE
Farm Forum	31,000 circulation
Dakota Farmer	22,000 circulation
Successful Farming	393,000 subscribers, 1.3 readers per copy, 511,000 total reach, 13 issues per year
On Pasture	Online publication, 100,000 readers per month
Huron Daily Plainsman	7,800 circulation

Table 6: News articles and newsletters designated for project deliverables. News articles entire list included with appendices Table 10 page 33-35.

News Articles and Newsletters

Name	Written by	Date	
Soil Visions--newsletter	Cindy Zenk	Sep. 2017	319
Soil Visions--newsletter	Cindy Zenk	November 2017	319
Soil Visions--newsletter	Cindy Zenk	January 2018	319
Soil Visions--newsletter	Cindy Zenk	March 2018	319
Unique Venture In Beadle County Showcases Vibrant Soil Health Systems	Connie Groop		319
Soil Health Pays off in Crop Resiliency	Janelle Atyeo	November 12, 2018	319
Strategies For Weed Management Using A No- Till System	Kara Pugsley		319
No-till success Story Conquering Erosion With Sturdier Soil	Kara Pugsley		319
Eliminating Problems Now to Leave Healthier Soil For Next Generation	Kara Pugsley		319
Creating Resilient Soil Southeast SD Farmer Discusses Soil health Techniques	Kara Pugsley		319
Watershed Projects Throughout The State Improve Water Quality & Soil Health	Lura Roti	May 14, 2020	319
Soil Health Practices Revive Salinity Areas regenerating Dead Zones	Lura Roti	July 17, 2020	319

Audio and video commercials reach enables SDSHC to deliver topics for the betterment of the land and water in South Dakota. Tables 7-8 and Figure 17 highlight the topics developed as well as the impact of the commercials. Downloadable audio commercials can be found on our website for partners to use in presentations and discussions with producers and influencers or for interested producers to hear a message while driving a tractor. Contacts were initiated as the result of the commercials aired.

Table 7: Audio commercial topics.

Audio Commercials Topics							
Diversity	**Wildlife**	**Soil Cover**	**Limiting Disturbance**	**Integrating Livestock**	**Keeping Living Roots in the soil**	**Biology and Organic Matter**	**Water Quality**
Diverse crop rotations 2017	Soil health benefits for wildlife	Reducing soil erosion	Impacts of tillage on soil structure	Grazing Management of grasslands	Establishing season long cover crops	Soil microorganisms	Water quality challenges and solutions
Diverse crop rotations 2018	Wildlife benefits of cover crops	Increasing water infiltration	Negative effects of tillage on temperature	Soil health problem areas and management	Salinity in SD Soils	Carbons role on your farm	Cover crops increase organic carbon and water holding capacity
Diverse crop rotations with George Lightheiser	Benefits of cover crops with Dennis Hoyle	Increased residue feeds soil biology	Tillage increases compaction and no-till as a solution	Grazing on cropland	Reducing Nutrient Loss	Microbial activity in the soil	Increasing infiltration and drought tolerance
Financial Benefits of Winter Wheat		Increased residue feeds soil biology with Al Miron	Decreasing compaction	Grazing of cover crops	Introduction to cover crop benefits	Microbial activity in the soil with Levi Neuharth	Increasing infiltration and drouhgt tolerance with Dennis Hoyle
Reducing insecticide costs		Increased residue prevents soil erosion	Decreasing compaction with Lee Kopriva	Integrating livstock onto cropland	Maintaning living roots year round	Effects of soil temperature	
Weed suppression and soil health practices		Increased residue with Terry Ness	No-till November	Onto cropland with Lee Kopriva	Utilizing excess moisture	Cycling of nutrients	
Deep Rooted Perennials in crop rotations			No-till November with Al Miron		Reducing input costs using cover crops		
Combatting weeds and pests while decreasing inputs							
Cycling of nutrients with Shawn Freeland							

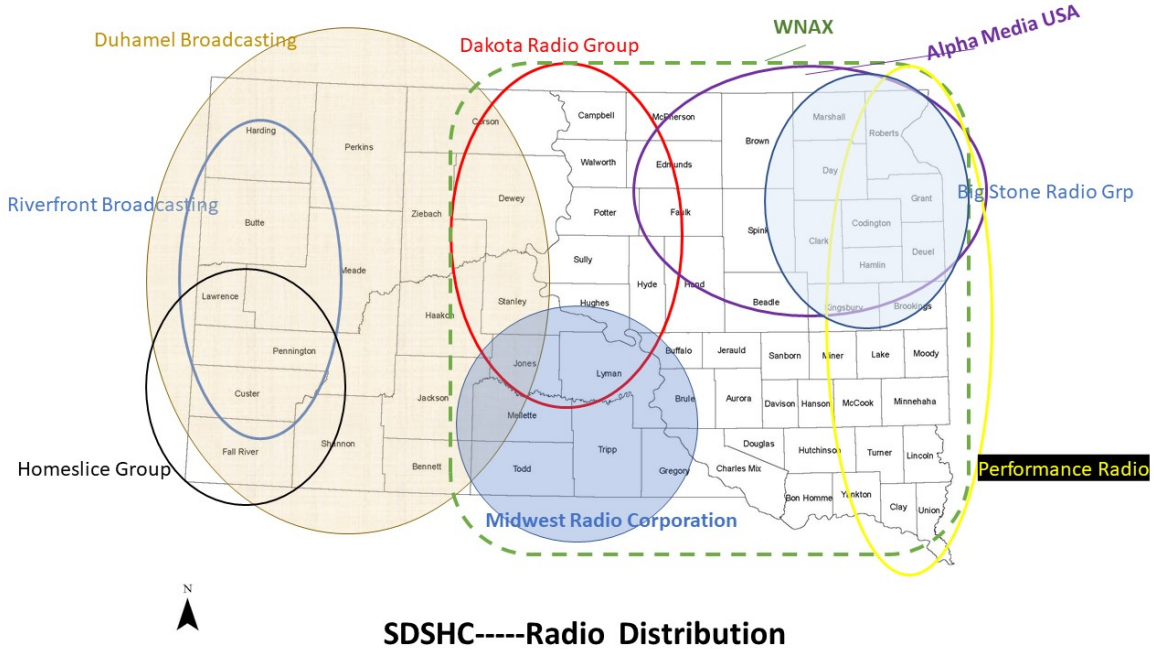


Figure 17: Radio commercial distribution.

Table 8: Radio Station Reach included appendices on page 29.

SDSHC utilizes developed print, audio and video content on all aspects of the social media platforms. Key partners including Region VIII EPA, SDACD, USDA-NRCS, SDSU Extension, Pheasants Forever, Ducks Unlimited, SD Soybean, conservation districts, SD Farmer's Union amplify the SD Soil Health Coalition message. Educating on water quality importance with producers, consumers and the general public sharing the importance of management practices for the betterment of the land and water. Figure 18: An example of the video commercials designed and aired on local television stations and RfDtv National Agricultural Network. Table 9: Television Station Impact significance proves millions reached with video message. Fifteen commercials aired on each network throughout the grant period.

"Our Amazing Water Resources"
Mark Misar, Scotland, SD

YouTube Link: https://youtu.be/8tHXJ5UDfsw
Link To Download: https://app.box.com/s/6y15c6zb0dygkcg5naibbuxhedc76izo

"Our Amazing Stewardship"
Dennis & Jean Fagerland, Langford, SD

YouTube Link: https://youtu.be/ncvxx-lo2Ug
Link To Download: https://app.box.com/s/efuiiy5swp3vigbig88qvy7445xlh8rh

"Our Amazing Grasslands"
Healthy Agricultural Lands Are Important For Wildlife

YouTube Link: https://youtu.be/3oTFe4MvPnE
Link To Download: https://app.box.com/s/8xvpuos8zvsoci8fmq9c72lf0c2yoov

"Our Amazing Pollinators"
Dean & Candice Lockner, Ree Heights, SD

YouTube Link: https://youtu.be/K5SCM2vEBbo
Link To Download: https://app.box.com/s/btv2peqji0iy54ccz737rd66zy44nrgm

"Our Amazing Water Resources"
Chad Schooley, Castlewood, SD

YouTube Link: https://youtu.be/n4V8flvpOuY
Link To Download: https://app.box.com/s/zy92atvjfif9br9ztu3njds8xjjv4m9e

"Our Amazing Soils"
Jordan Reimnitz, Corsica, SD

YouTube Link: https://youtu.be/zcGkl3LVuWg
Link To Download: https://app.box.com/s/ln3a71fn34osa8s3r61xeivldz3hz2x

"Our Amazing Agriculture"
Cody Jorgensen, Ideal, SD

YouTube Link: https://youtu.be/qDuojnmYesA
Link To Download: https://app.box.com/s/fz7uvf963qz03oedji09zv8qwrv6163x

Figure 18: 30-second commercials created to provide impact with producers, consumers, landowners, influencers, youth, agricultural professionals. Commercials are available to download and use in presentations, on social media, and one on one discussions with producers on adopting soil health practices.

Television Stations Impact		
Station	**City**	**Reach**
KOTA	Rapid City	65,855 households
KEVN	Rapid City	49,171 households
KCLO	Rapid City	86,610 households
KELO	Sioux Falls	229,420 households
KSFY	Sioux Falls	229,400 households
KDLT	Sioux Falls	229,400 households
KTTW	Sioux Falls	262,520 households

Table 9: Impact reach of local television stations.

Objective 4: Document and report project progress

The task and products for Objective 3 are:

- **Task 4:** Monitor project progress and evaluate project
  - **Product 8**: Reporting Annual GRTS and Final Report

Appendix A summarize the objectives, tasks and products achieved with the Soil Health Planning and Improvement Project on page 28.

Planned and Actual Milestones, Products, and Completion Dates.

The Soil Health Planning and Improvement Project had a target of two thousand five hundred fifty-three (2,553) products or milestones to achieve. The total number of milestones achieved was five thousand five hundred twenty-nine (5,529). A summary of planned and completed milestones for each objective, task and product can be found in Appendix A.

MONITORING AND EVALUATION

Project monitoring will be completed by a team consisting of:

- SDSHC directors,
- The project coordinator,
- SDSHC staff,
- SDSU staff (outreach coordinator) and
- Other Advisory Team members and other project partners.

The information collected was used by the SD Soil Health Coalition to complete annual (October) reports of project activities, provide a copy to all project partners and funders and prepare the final report.

Evaluation of success in reaching the project goal was accomplished by monitoring project activities to measure established milestones and contributions to improving sustainability on operations utilizing soil health practices. Overall, project success was measured by the impact SDSHC provided to educate the public on the importance of a healthy watershed and working with individual producers with their goals in protecting/improving water quality.

Monitoring Activities

Project activities were monitored and evaluated relative to project milestones. The information collected included:

- Number of people reached during outreach events
- Project accounting (expenditures, receipts, matching funds and their sources),
- Outreach circulation and distribution,
- Acres of demo plots and tours established
- Grazing on cropland acres
- Load reductions realized from the cover crop STEPL systems and
- Evaluation of workshops/schools sponsored to determine if the activity helped to attain the overall project goal.

The data collected is included in the Project Goals, Objectives and Tasks Section of this report by product and within Appendix A

Evaluation

The data collected through monitoring activities indicate that:

- project milestones were met or exceeded,
- the outreach component of the PIP exceeded in transferring information about and increasing awareness about water quality benefits achieved from soil health practices,
- there is support for soil health practices as an effective environmental practice by conservation and agricultural groups such as the South Dakota Association of Conservation Districts, South Dakota Farmers Union, South Dakota Corn and South Dakota Soybean and
- managed grazing practices, no-till and cover crop plantings reduce NPS pollution to surface waterbodies.

BEST MANAGEMENT PRACTICES DEVELOPED OR REVISED

Best management practices education and implementation

- documented the effectiveness of the implementation of an effective outreach and education plan sets the stage for NPS reduction
- distribution of soil health buckets and lesson plans
- provided information regarding the placement of practices to achieve reduction of nutrients, sediment and fecal coliform bacteria loads to TMDL waterbodies and
- increased the acceptance of managed grazing on cropland and grassland by not only livestock producers but also crop producers, influencers including bankers and agronomists, teachers, environmental organizations

COORDINATION AND PUBLIC PARTICIPATION

Coordination

Project activities were directed by the project coordinator provided through a management agreement with SDACD. The coordinator, SDSHC staff and directors were responsible for producer assistance, tour leadership, coordinating meetings for creating awareness of project goals and objectives and assistance at the soil health school**.** The coordinator's activities were completed with supervision provided SDSHC directors and SDACD.

In setting policy and program direction, the coalition board used input from partner agencies and organization. As indicated previously in this report, input and coordination of efforts between the partners was accomplished at SDSHC board of directors meetings and resource meetings scheduled by partner agencies for similar purposes.

Coordination efforts to develop and review the accomplishments of cooperative agreements with partner agencies and groups were completed by direct interaction with the partner(s) who were party to the agreements. Among the partners with which the coalition had formal or informal cooperative agreements during the project period were:

- USDA NRCS,
- SDACD,
- USFWS,
- SD GF&P,
- SDSU,
- SDACDE—South Dakota Association of Conservation District Employees,
- DU,
- PF,
- SD Discovery Center,
- Master Gardeners,
- SDSU Extension,
- SD Grassland Coalition and
- Local producers

Public Participation

Public participation was encouraged using the activities completed to implement the project outreach and information program (Objective 2). The activities included:

- workshops,
- soil health schools,
- news releases,
- tours
- school presentations
- water festivals
- Ag Day Ag Friday
- field days
- social media
- radio and television commercials
- websites
- soil health conference
- test plots
- soil health awareness day

Refer to Tables of summaries of the activities listed above.

7.0 Aspects of the Project That Did Not Work Well

Most projects have at least one aspect that presents challenges. The Soil Health Planning and Improvement Project was no exception. SDSHC, newly formed organization required time to establish knowledge of the databases for completion of project progress through reporting and milestones. The need for outreach around watersheds is essential as there is little happening in this regard in the state through other entities besides the funded projects. Building the capacity of watersheds to address impaired waters cooperatively should be a priority of the grant but it was not. This is particularly true when it comes to the topics of soil health principles preparing the land including forestland, grassland and cropland to withstand the vast weather extremes from droughts to flooding, using green infrastructure in urban areas within the watershed to mitigate water quality impacts from runoff, specifically from storm events that are predicted to become more numerous and more intense.

8.0 Future Activity Recommendations

The Soil Health Planning and Improvement Project has been funded for an additional two years per the recommendation of the 319 Nonpoint Source Task Force.

The key difference is the directional focus to working on best management practices and cooperatively working with existing watersheds to aid in the delisting of impaired waterbodies. However, the project utilized the existing projects and partners in segment one for financial implementation, segment two provides practice establishment funding. Continuation of outreach and education from the existing project, while strengthening unified partnerships for the betterment of South Dakota's water quality lays the framework for the project across the state.

Appendix A : Summary of Activities, Milestones, and Outcomes		
Goal/Objective/Task/ Product	**Milestones**	**Outcome**
Contract Management	1 planned 1 completed	**SDACD Administrative management**
Project Coordinator	1 planned 1 completed	**Hired Coordinator**
SDSU Extension Coordination (0.1)	1 planned 1 completed	educational and professional resource
Non-Salary		
Objective 1. Develop BMP		
Task 1: Develop BMP plans to Reduce Nonpoint Sources		
Product 1. Conservation Contacts	350 Planned 3061 completed	contacts through workshops, booths, one on one
Soil Health plans	15 planned 17 completed	Soil Health Assessment cover crop plantings and diversity plans
Product 2. Develop Integrated Grazing Management on Cropland		
Grazing management on cropland	1,500 ac planned 1,732ac completed	Livestock integration increase water infiltration and reduces runoff. Providing the resting of grazed pastures
Objective 2: Develop and Distribute I &E		
Task 2: Landowner and producer contacts		
Product 3. 25 Contacts 12 contacts	37 planned 42 completed	Planned contacts
Product 4. 3 Tours 2 tour	5 tours planned 10 completed	Tours able to show practices first hand
Product 5. 2 Demonstration plots		
160 acres demo plot no-tll 80 acres	240 acres planned 240 acres completed	No-till acres show water infiltration
250 acres demo plot cover crop 125 acres	375 acres demo plot cover crop planned and completed	Cover crops provide living root to stimulate microorganisms and increase organic matter
Product 6. Annual Tour	3 tours planned 5 tours completed	tours able to show practices first hand
Objective 3: Public Outreach		
Task 3: Create Awareness of Goals and Objectives		
Product 7. Workgroup meetings and media/news articles		
6 workgroup meetings 3 workgroup meetings	9 meetings planned 29 completed	Inform partners and public on benefits to achieve water quality
2 news articles 6 newsletters/articles	8 articles planned 12 completed	Newsletter and articles inform the general public
Objective 4: Monitor, Evaluate,and Report Progress		
Task 4: Report Progress		
Product 8. Monitor project progress and evaluate project		
Annual GRTS (cost included in personnel)	2 planned 2 completed	
Final Project Report	1 planned 1 completed	

Table 11: Radio Impact for SDSHC ads

Station	Individual stations	Response
Midwest Radio Corporation (KWYR)	KWYR	15,000 in SD and 10,000 in NE
WNAX		All South Dakota
	WOLF FM (southeastern SD)	350,000 in the WOLF group -- reach about 25% ev/ week.
Results Radio		476,200 population (ages 12+) in listening area
	KKLS-FM	68,300 wkly listeners
Table 8: NPS 2020 Load reductions acres impacted by watershed and landuse.		ly listeners
	KMXC-FM	33,600 wkly listeners
	KIKN-FM	29,900 wkly listeners
	KXRB Combo	22,200 wkly listeners
	KSOO-FM	17,100 wkly listeners
	KSOO-AM	6,800 weekly listeners
Alpha Media USA		100,000 population in listening area, 15,000 streaming online for each station each month
Riverfront Broadcasting		143,400 population (ages 12+) in listening area
	KDDX-FM	17,900 wkly listeners
	KOTA-AM	11,300 wkly listeners
	KQRQ-FM	16,200 wkly listeners
	KZZI-FM	13,100 wkly listeners
	KZLK-FM	9,200 weekly listeners
Big Stone Radio Group		167,515 in the listening area.
Dakota Radio Group		Total population of 152,471.
	KGFX AM 1060	84,000 within listening area.
Homeslice Group	KOUT-FM	205,000

2020				
	Load Reductions BY Sub Watersheds			
	Acres	**N Load lb/yr**	**P Load lb/yr**	**Sediment Load t/yr**
SD-BS-R-Split Rock_01_USGS	90	167.9	56.6	43.1
SD-BS-R-Beaver_02	96	177.9	59.9	45.6
SD-BS-R-Beaver_02	100	184.6	62.1	47.3
SD-JA-R-JAMES_09	100	72.8	20.5	14
SD-JA-R-JAMES_10	200	138.2	38.2	25.7
SD-VM-R-LONG_01	115	151.4	47.7	35
SD-BS-R-PIPESTONE_01	45	90.2	30.7	23.5
SD-BS-R-BIG_SIOUX_07	250	215.2	62	43
SD-BS-R-BIG_SIOUX_04	120	99	28.9	20.3
SD-JA-R-JAMES_09	410	233	58.4	36.8
SD-JA-R-FIRESTEEL_01	1000	515.4	124.8	75.5
SD-BS-R-BIG-SIOUX_04	60	50.8	15.6	11.3
SD-BS-R-BIG-SIOUX_07	100	115	35.9	26.2
SD-BS-R-Split Rock_01_USGS	45	90.2	30.7	23.5
SD-MN-R-WHETSTONE_S_FORK_02	50	51.9	16	11.6
SD-VM-R-LITTLE_VERMILLION_01_USGS	150	149.3	45	32.2
SD-BS-R-BIG_SIOUX_08	40	81.2	27.7	21.2
SD-BS-R-Beaver_02	150	182.1	56	40.6
SD-BS-R-Split Rock_01_USGS	80	151.1	51	38.9
SD-BS-R-Split Rock_01_USGS	150	265.6	88.9	67.4
Totals	3351	3182.8	956.6	682.7

Table 8: NPS 2020 Load amounts and acres impacted by watershed

SDSHC Budget--Appendix B to Exhibit A

Soil Health Planning and Improvement	**Budget**			**Expended**		
Segment 1 Amendment 1	**Total**	**319-EPA**	**Other funds**	**Total**	**319-EPA**	**Other**
Personnel Support						
Project Coordinator (1.0 FTE)						
Salary and Benefits	$169,300	$36,900	$132,400	$180,252.92	$36,900.00	$143,353
Non Salary Expenses (travel, mileage, perdiem, office supplies)	$43,000	$36,600	$6,400	$24,220.28	$23,572.59	$648
Contract Management						
SDACD	$15,000	$15,000		$13510.43	$13,510.43	
SDSU Extension Coordination (0.1)	$30,000	$30,000		$30,000.00	$30,000.00	$0
Subtotal	$257,300	**$118,500**				
Objective 1. Technical Assistance	$0					
Task 1: Develop BMP plans to Reduce NonPoint Sources	$0					
Product 1. Conservation Contacts	$65,000		$65,000	$102,168.99		$102,169
Landowner Conservation Contact (250) 100	$0	$0				
Develop BMP soil health plans (10) 5	$0	$0				
Product 2. Develop Integrated Grazing Management on Cropland	$0					
1000 ac grazing mmt ie portable windbreaks, fencing, water development 500ac	$16,000	$0	$16,000	$41,068.03		$41,068
Subtotal	$81,000	**$0**				
Objective 2: Develop and Distribute I &E	$0					
Task 2: Information and Education Activities	$0					
Product 3. 25 Contacts 12 contacts	$1,000		$1,000	$84513.74		$84,513.74
Product 4. 3 Tours 2 tour	$17,000	$1,500	$15,500			
Product 5. 2 Demonstration plots	$52,000		$52,000			
160 acres demo plot no-tll 80 acres	$0					
250 acres demo plot cover crop 125 acres	$0					
Product 6. Annual Tour	$20,000	$3,000	$20,000	$16,241.89	$4,041.89	$12,200
Objective 3: Public Outeach	$0					
Task 3:Create Awareness of project goals and objectives	$0					
Product 7. Workgroup meetings and media/news articles	$32,000	$2,000	$30,000	$12,029.21		$12,029
6 workgroup meetings 3 workgroup meetings	$0					
2 news articles 6 newsletters/articles	$0					
Objective 4: Monitor, Evaluate,and Report Progress	$0					
Task 4: Report Progess	$0					
Product 8. Monitor project progress and evaluate project	$0					
Annual GRTS (cost included in personnel)	$0	$0				
Semi-monthly/monthly (cost included in personnel)	$0	$0				
Final Project Report (cost included in personnel) by October 31,2021	$0	$0				
Total Project Cost	**$460,300**	**$125,000**	**$338,300**	**$504,005.49**	**$108,025**	**$395,981**

Table 12: Reported project contacts and events

Tours and Worksho

Name	Location	Date	Attendance
Al Miron's--tour	Crooks SD	Sep. 2017	120
Cycle Farms	Spearfish SD	Sep. 2017	58
Soil Health School	Roscoe/Aberdeen	Sep. 2017	35
David Brandt	Ipswich	1/16/2018	97
Annual Meeting	Watertown	1/17/2018	450
David Brandt	Belle Fourche	1/18/2018	48
Soil Health Field Day Ray Archuleta	Flandreau	6/12/2018	156
Soil Health Field Day Ray Archuleta	Redfield	6/12/2018	38
Soil Health Field Day Ray Archuleta	Dakota Lakes	6/13/2018	72
Soil Health Field Day Ray Archuleta	Winner	6/13/2018	62
Bus Tour	North Dakota	6/28-29/2018	59
Blue Dasher field tour	Estelline	7/10/2018	62
Soil Health School	Salem	9/5/2018	42
Healing Earth	Watertown	2/19/2019	80
Minnehaha Field Tour	Crooks SD	3/18/2019	8
Blunt Café' Talk	Blunt	4/4/2019	15
Soil Health sit down	Renner	4/14/2019	4
USD Sustainability Days	Vermillion	4/20/2019	35
Soil Health sit down	Selby	4/23/2019	13
No-till Garden workshop	Gettysburg	4/29/2019	38
Pollinator plot	Presho	5/9/2019	80
Desmet Growing Youth	DeSmet	6/10/2019	40
Lincoln Co Sitdown	Canton	7/23/2019	13
Hutchinson Sitdown	Parkston	7/25/2019	8
Coteau field day--	David Krugers	7/30/2019	38
Stehly Farm Tour	Mitchell/Mt Vernon	9/10/2019	25
Jason Kontz tour	Colman	9/17/2019	5
Soil Health School	Salem	9/4/2019	42
Soil Health sit down	Kennebec	9/13/2019	15
Stehly Farm Visit	Mitchell	9/10/2019	25
David Kruger field tour	Milbank	9/16/2019	9
Louie Nigg	Sisseton	9/19/2019	1
Lee Kopriva	Raymond	9/19/2019	1
Day CD to field tour	Twin Brooks	10/7/2019	20
Milpa	Watertown	10/22/2019	10
Stockgrowers Workshop	Rapid City	10/31/2019	100
Young Farmers Workshop	Deadwood	1/10/2020	35
Soil Health Conference	Watertown	1/15-16/2020	475
LATI	Watertown	2/4/2020	49
Soil Health Wkshp	Mitchell	2/13/2020	400
C&B Workshop	Sioux Falls	3/5/2020	425
Steve Sigdestad	Pierpont	4/1/2020	1
State Tech meeting	Huron	5/20/2020	77
Field tour	Flandreau	5/21/2020	8
SDACD SE Tour	Flandreau	7/22/2020	30

Table 10: Total News Articles and Newsletters

Name	Written by	Date	
Soil Visions--newsletter	Rebecca Bader	May 2017	CA
Soil Visions--newsletter	Rebecca Bader	July 2017	CA
Soil Visions--newsletter	Cindy Zenk	Sep. 2017	319
Soil Visions--newsletter	Cindy Zenk	November 2017	319
Soil Visions--newsletter	Cindy Zenk	January 2018	319
Soil Visions--newsletter	Cindy Zenk	March 2018	319
Soil Visions--newsletter	Cindy Zenk	May 2018	CA
Soil Visions--newsletter	Cindy Zenk	July 2018	CA
Soil Visions--newsletter	Cindy Zenk	September 2018	CA
Soil Visions--newsletter	Cindy Zenk	November 2018	CA
Soil Visions--newsletter	Cindy Zenk	January 2019	CA
Soil Visions--newsletter	Cindy Zenk	March 2019	CA
Soil Visions--newsletter	Cindy Zenk	May 2019	CA
Soil Visions--newsletter	Cindy Zenk	July 2019	CA
Soil Visions--newsletter	Sarah/Cindy Zenk	September 2019	CCG
Soil Visions--newsletter	Sarah/Cindy Zenk	November 2019	CCG
Soil Visions--newsletter	Sarah/Lura Roti	January 2020	CCG
Soil Visions--newsletter	Sarah/Lura Roti	March 2020	CCG
Soil Visions--newsletter	Sarah/Lura Roti	May 2020	CCG
Soil Visions--newsletter	Sarah Scroggins	July 2020	CCG
Soil Visions--newsletter	Stan Wise	September 2020	CA
Practices Focused on Soil Health Provide Solutions to Compaction, Erosion and Inconsistent Moisture	Connie Groop		CA
Unique Venture In Beadle County Showcases Vibrant Soil Health Systems	Connie Groop		319
Improved Soil Health Provides the Key to Workload Challenges on Cattle Operation in McPherson County	Connie Groop		CA
Resiliency In the Face of Extreme Weather Major Stress	Janelle Atyeo	June 2020	CA
Soil Health Pays off in Crop Resiliency	Janelle Atyeo	November 12, 2018	319
Soil Management Now Affects Long Term Outcomes	Janelle Atyeo	July 3, 2019	CA
Weathering the Storms of 2019, Results Seen this Planting Season	Janelle Atyeo	July 2020	CA
Strategies For Weed Management Using A No- Till System	Kara Pugsley		319
No-till success Story Conquering Erosion With Sturdier Soil	Kara Pugsley		319
Improving Grass Production and Protecting Native Species with Mob Grazing	Kara Pugsley	June 7, 2019	CA
Eliminating Problems Now to Leave Healthier Soil For Next Generation	Kara Pugsley		319
Creating Resilient Soil Southeast SD Farmer Discusses Soil health Techniques	Kara Pugsley		319
Burying your Briefs Discovering the Keys to Soil Health Tightey Whitie Style	Kara Pugsley		CA
Trevor Zantow	Kara Pugsley		CA
Watershed Projects Throughout The State Improve Water Quality & Soil Health	Lura Roti		319

The Land is Our Legacy	Lura Roti	April 11, 2019	CA
Soil Health Practices Revive Salinity Areas regenerating Dead Zones	Lura Roti	July 17, 2020	319
SD Governor Noem Proclaims Feb 24 Is Soil Health Awareness Day	Lura Roti	January 23, 2020	CA
Research Show Farmers Can't Rush Results	Lura Roti	April 3, 2020	CA
Register For 2020 Soil Health School	Lura Roti	July 16, 2020	CA
Palmer Amaranth Is an Aggressisve Threat To SD Fields	Lura Roti	March 31, 2020	CA
Off Season Tips to Maximize Equipment Performance	Lura Roti	December 9, 2019	CA
			CA
Mother of God Monastery Milpa Garden Yields Fresh Produce and Soil Health	Lura Roti	November 12, 2019	CA
Master Gardener Credits No-Till Gardening with Increased Soil Health and Decreased Weeds	Lura Roti	March 22, 2019	CA
Keeping It Interesting SD Farmers Test Interseeding & Other Soil Health Practices	Lura Roti	June 8, 2020	CA
Impacting the Future Of South Dakota's Soil health One Bucket at a Time	Lura Roti	August 2019	CA
Grazing Livestock on Cover Crops Improves Soil Health & Quality of Life	Lura Roti	June 16, 2020	CA
South Dakota Soil Health Coalition Hires Communications Coordinator	Sarah	November 16, 2017	CCG
South Dakota Soil Health Coalition Announces Annual Meeting To Be Held In Watertown January 17, 2018	Sarah	December 1, 2017	CCG
South Dakota Soil Health Coalition Hires Communications Coordinator	Sarah	December 4, 2017	CCG
South Dakota Soil Health Coalition Will Host Joe Breker, David Brandt, And Allen Williams At January Annual Meeting	Sarah	December 29, 2017	CCG
Retired Soil Health Specialist Jeff Hemenway Presented With Inaugural Friend of Soil Health Award	Sarah	January 24, 2018	CCG
South Dakota Soil Health Coalition Appoints New Board Members	Sarah	March 6, 2018	CCG
Soil Health Road Show Scheduled for June 12-13	Sarah	May 21, 2018	CCG
Important Health Message For you and your Soil	Sarah	June 2019	CCG
Soil Health Events on No-till and Inter-Seeding of Cover Crops in South Dakota July 10-11, 2018	Sarah	June 26, 2018	CCG
Minnehaha County Summer Grazing and Soil Health Workshop August 17, 2018	Sarah	June 29, 2018	CCG
Soil Health Movement Receiving Strong Support In South Dakota	Sarah	July 5, 2018	CCG
Vacancy announcement: Soil Health Technician Assigned to the South Dakota Soil Health Coalition	Sarah	August 21, 2018	CCG
Three Day Soil Health SchoolHeldatStiefvater FarmNear Salem, SD	Sarah	September 21, 2018	CCG
Keynote Speakers Announced For 2019 Soil Health Conference	Sarah	December 7, 2018	CCG
Third Annual SD Soil Health Conference Focuses on Management Decisions For the Future	Sarah	January 31, 2019	CCG
2019 “Friend of Soil Health” and Inaugural “Legacy Award” WinnersHonored At South Dakota Soil Health Coalition Conference	Sarah	February 25, 2019	CCG
New South Dakota Grazing Exchange Website Officially Released	Sarah	May 17, 2019	CCG
Survey Conducted To Determine How Best To Reach The Next Generation With The Soil Health Message	Sarah	June 1, 2019	CCG
Survey Conducted To Determine How Best To Reach The Next Generation With The Soil Health Message (short version)	Sarah	June 20, 2019	CCG
S.D. Governor Noem Proclaims Feb 21 is Soil Health Awareness Day	Sarah	January 23, 2020	CCG
Legacy and Friend of Soil Health Awards Presented at 2020 Soil Health Conference	Sarah	January 30, 2020	CCG

Legacy Soil Health Award Presented To Salem Producers Kurt & Kathy Stiefvater	Sarah	February 12, 2020	CCG
Brian Johnson Elected To SD Soil Health Coalition Board, Dave Ollila To Join Staff	Sarah	February 13, 2020	CCG
Survey Results: South Dakota soil health farmers and ranchers more optimistic, less stressed than conventional farmers	Sarah	March 5, 2020	CCG
Salinity Article	Stan	August 21, 2020	CA
Farmer Discovers stark evidence of past erosion	Stan	August 20, 2020	CA
Playing the course: Farmer manages variety and builds resilience through soil health	Stan	September 2020	CA

Appendix C:

SDSHC Funding Source Table				
Soil Health Planning and Improvement				
Funding Sources				
	EPA Section 319	Water Quality funds	Local Cash & InKind	USDA-NRCS
Total Expended	$108,024.91	$100,000.00	$216,904.32	$79,076.26
Grand Total:		$504,005.49	SDSHC-$17,638.19 Local-$199,266.13	