Project Implementation Plan SFY23-25

Marion Reservoir WRAPS

WRAPS Coordinator: Lisa Suderman

Grant Start: July 1, 2022
Grant End: December 31, 2025
Total Allocation: $300,000

This WRAPS Implementation PIP will help accomplish the long-term goals established in Kansas' Nonpoint Source Management Plan Goals including:

1. No lake, river, stream or wetland has a violation of Kansas Surface Water Quality Standards due to nonpoint sources of pollutants and all designated uses are fully supported;
2. Kansas surface and ground water are protected from all nonpoint pollutant sources through the use of recommended water quality best management practices.
3. Reducing the levels of phosphorus, nitrogen, and sediment that adversely affect the water quality of Kansas lakes, rivers, streams and wetlands

	Year 1	Year 2	Year 3
Personnel/Fringe	$32,000	$32,000	$32,000
Admin/Indirect	$10,000	$10,000	$10,000
Travel/Supplies	$2,000	$2,000	$2,000
Strategy Implementation/BMPs	$56,000	$56,000	$56,000
Total:	$100,000	$100,000	$100,000

Estimated Load Reductions	
Phosphorus	8,152 lbs.
Nitrogen	15,061 lbs.
Sediment	4,165 tons

Strategy and Goals	Funding	Load Reductions		
		Phosphorus (lbs/yr)	Nitrogen (lbs/yr)	Sediment (tons/yr)
Implement Cropland soil health and water quality BMP's to address the TMDLs of Eutrophication and Depleted Dissolved Oxygen. The following BMPs to be completed by December 31, 2025: • 87 acres of Buffers • 200 acres of Conservation Crop Rotation • 3000 acres of No-Till with Cover Crops • 200 acres Nutrient Management Plans • 335 acres Permanent Vegetation	$103,800	5,929	10,875	4,165

Implementation of Livestock BMP's to address the TMDLs of Eutrophication and Depleted Dissolved Oxygen. The following BMP's to be completed by December 31, 2025: • 2 Acres of Filter Strips that receive run-off from animal feeding operations • 3 Alternative Livestock Watering systems (250 AUs) • 1 Pasture Feeding Site Relocation (75 AUs)	$58,200	4,186	2,223	N/A
Implement Monitoring of the Phosphorus Containment Unit Installed above the Reservoir to Determine Efficacy. • Develop an approved testing schedule • Locate a lab for processing the tests • Put together or purchase water testing kits • Pull Water Samples at the approved testing schedule times • Document the results and submit to KDHE • Monitor the phosphorus containment structure media	$2,000	N/A	N/A	N/A
Information, Education, Outreach, Communication, Social Media: Develop and implement a communication strategy for the Marion WRAPs program	$4,000	N/A	N/A	N/A

Project Information

Project Title

Marion Reservoir WRAPS Implementation SFY23-25

This WRAPS Implementation PIP will help accomplish the long-term goals established in Kansas' Nonpoint Source Management Plan including:

1. No lake, river, stream or wetland has a violation of Kansas Surface Water Quality Standards due to nonpoint sources of pollutants and all designated uses are fully supported;
2. Kansas surface and ground water are protected from all nonpoint pollutant sources through the use of recommended water quality best management practices;
3. Kansas Water Plan objectives are achieved by:
    a. Reducing the levels of pathogens, biochemical oxygen demand, dissolved solids, metals, nutrients, pesticides and sediment that adversely affect the water quality of Kansas lakes, rivers, streams and wetlands;
    b. Reducing the levels of dissolved solids, metals, nitrates and volatile organic chemicals that adversely affect the quality of Kansas ground water;
    c. Maintaining water quality conditions for unimpaired waters at a level equal to or better than existing conditions

Contact Information

Enter Sponsoring Organization Information

Sponsoring Organization Name

Marion County Conservation District

Street Address

303 Eisenhower Drive

City, State, Zip

Marion, KS, 66861-1326

Sponsor Tax Payer ID (FEIN)

480684434

Signature Authority Name

Greg Bowers

Signature Authority Email

gregb@ghrd.net

Signature Authority Phone Number

620-382-2947

Enter project contact information

Name

Lisa Suderman

Street Address

303 Eisenhower Drive

City, State, Zip

Marion, KS, 66861--1326

Phone Number

620-382-3714 ext. 3062

Email

Lisa.suderman@ks.nacdnet.net

Project Overview

List the HUC12s that are included in this project.

110702020103, 110702020104

Will a public water supply system be impacted by the project?

☒Yes
☐No

If yes, please enter the impacted public supplies.

Marion, Hillsboro, Hillsboro to Peabody

Describe the project history.

Marion Reservoir was completed in 1968. In 1997, a task force representing cities, government agencies, concerned individuals, businesses, organizations, and Tabor college met to develop a proposal to protect and enhance water quality in the reservoir and its tributaries. Marion County Conservation District (MCCD) coordinated the planning effort to obtain 319 Nonpoint Source Water Quality Project funds. The first 319 grant of $25,000 was used to conduct the Water Resources Report 99-4158. In 1998 the USGS Investigative Report identified high concentrations of dissolved solids, areas of high nitrite, plus nitrates, areas of total phosphorus levels exceeding USEPA guidelines, areas of excessive atrazine and areas of fecal coliform bacteria. The nonpoint pollutant sources occurred throughout the entire watershed. Following the recommendations of the Task Force and applying the information determined by the USGS Report, MCCD developed a watershed plan for Marion Reservoir

in 2002. The first documented occurrence of blue-green algae blooms was in May/June 2003. The Marion Lake 9 element plan was approved in 2012.
The first goal of the Marion WRAPS SFY20-22 grant was to maintain and enhance water quality in Marion Reservoir and its tributaries by adoption of best management practices that reduce nutrient loads entering the Reservoir and its tributaries to achieve a 70% reduction of phosphorus. Strategies developed to achieve these goals were to meet with influential operators and concentrate on livestock operations above the reservoir. To use targeted soil health meetings to facilitate peer to peer discussions about BMP adoption successes and challenges. To date there are 430 new acres of No-Till with Cover Crops. In addition, 21 acres of previously farmed land was seeded to permanent cover and 11 acres of grassed waterways were completed. Alternative watering systems and use exclusion fences on the North Cottonwood were installed and approximately 300 head of livestock were excluded from the river. A demonstration farm centrally located in the county was planned and a donation of 3 fields near the Marion Reservoir were provided by the Kansas Department of Wildlife and Parks (KDWP). Unfortunately, the fields have been frequently flooded and weed and tree infiltration has been a constant battle. Multispecies cover crops planted immediately after commodity crop harvest were used and soil tests were taken at the beginning of WRAPS involvement with these fields. Soil tests will be taken again spring 2022 and any changes will be documented but the location has not been conducive to either farming or the hoped-for visitation by local producers to observe progress. This strategy will not be continued in the upcoming grant. The WRAPS grant, while not able to fund large scale livestock relocation projects, has been instrumental through its coordinator working with NRCS to assist interested producers with documentation, paperwork, education, outreach and offering cost share on non-NRCS funded alternative BMPs like livestock stream crossings and windbreaks. A livestock field day was hosted by WRAPS in February 2022 to tour completed facilities and provide information and education on site removal in the impaired watershed areas. The field day was attended by over 80 producers and was only limited in size by the available meeting space. The coordinator's attendance at 6 soil health producer meetings offered by soil health organizations, federal agencies, and sister WRAPS programs achieved increased emphasis on information and education in the WRAPS priority areas. Due to global issues and the inability to attend in-person meetings electronic communication was used to keep in touch with the latest information in the nationwide soil health/water quality community. Winter 2021 and 2022 3 soil health learning opportunities were presented by WRAPS with nationally recognized speakers. The meetings were well attended and received and have garnered additional applications for approved soil health practices with the WRAPS program. Directly adjacent to the reservoir is a large, licensed livestock feeding facility that appears to drain directly into the reservoir. With the approval of the Army Corps of Engineers we were given permission to test the run-off from the facility. The caveat was that they requested we test from 3 areas and not just the area we chose coming off of partially a crop field and partially the feed lot. March 16th, 2021, we had sufficient run-off to pull water samples and deliver them to the testing facility. The results showed phosphorus 1,178% higher than the EPA allowable amount of 0.28 mg/L. Construction began on a phosphorus containment structure in summer 2021. The structure was placed in spring 2022 and this grant has requested funds for monitoring the run-off from the structure to track the efficacy of the structure to capture and decrease the amount of phosphorus in run-off reaching the reservoir.

Enter the project start date (MM/DD/YYYY)

07/01/2022

Enter the project end date (MM/DD/YYYY)

12/31/2025

Describe your Stakeholder Leadership Team (SLT),

In 1997, a task force representing cities, government agencies, concerned individuals, businesses, organizations, and Tabor college met to determine if there was a need to identify potential pollutants in Marion Reservoir and to develop a proposal to protect and enhance water quality in the reservoir and its tributaries. The original SLT was comprised of almost entirely of city, county, state, and governmental agency personnel and lacked producer participation. Current SLT members include local government, federal government, members of learning institutes but the predominant members are producers located in the identified priority areas. The SLT has a goal of formal meetings each quarter at a designated local meeting room. Between meetings and in the event that a meeting will not be conducted due to unforeseen circumstances the coordinator is in contact with the SLT by email monthly to provide budget updates, new and completed project updates, information, education opportunities, upcoming meetings and conservation and water quality events and articles.

SLT Members: List the name, role, affiliation, and email for each SLT member.

Dale Ehlers SLT Member WRAPS Technician daleehlers@eaglecom.net; Jeff Youk SLT Member Producer youkland@hotmail.com; Ed Svitak SLT Member Conservation District Member eddysvitak@yahoo.com; Bruce Schroeder SLT Member Conservation District Member brucejanschroeder@hotmail.com; Kent Becker SLT Member Marion County Commissioner beckerkentd@gmail.com; Larry Paine SLT Member Manager for the City of Hillsboro lpaine@cityofhillboro.net; Chasen Gann SLT Member Producer chasen.gann@gmail.com; Ron Dirksen SLT Member Conservation District Board Member Producer rkdirksen@gmail.com; Greg Bowers SLT Member Conservation District Board Member gregb@fhrd.net; Roger Holter SLT Member City Administrator for Marion Kansas roger@marionks.net; Jeff Davidson Watershed Field Coordinator Kansas State University jdavidso@ksu.edu; David Mueller Marion County Commissioner muel@tctelco.net; Sharon Olmstead Marion County Health Department somstead@marioncoks.net; Rickey Roberts Kansas State Extension Agent rroberts@ksu.edu; Randy Svitak SLT Member Producer rsvitak@tctelco.net; Matt Meyerhoff Supervisory District Conservationist NRCS matt.meyerhoff@usda.gov; Howard Freerksen Forester with the Kansas Forest Service Kansas State University hfreerksen@ksu.edu; Ryan Peters SLT Member Producer lazyjpbar@gmail.com; Sara Morey County Executive Director Farm Services Agency sara.morey@usda.gov; John Christiansen SLT Member Producer john.christiansen@terrafinancialinc.com; Steve Bartel SLT Member Producer bartelharvesting@gmail.com; John Duerksen SLT Member Producer jduerk@swbell.net; Kevin Jost SLT Member Producer lazyjkevin@gmail.com; Cody Penner SLT Member Producer cpenner4@gmail.com; Scott McCrone SLT Member Environmental Specialist US Army Crop of Engineers Tulsa District scott.a.mccrone@usace.army.mil.

Project Scope

Describe the TMDLs and/or water quality impairments directly addressed in this project.

Marion Reservoir and its watershed has three impaired waters, all with existing TMDLs; Marion Reservoir-Eutrophication-High Priority; French Creek-Deficient Dissolved Oxygen-Medium Priority. The implementation of Best Management Practices (BMPs) in the approved plan are intended to directly address the High Priority eutrophication impairment for Marion Reservoir. In addition, the medium priority dissolved oxygen impairment on French Creek should be positively affected by the implementation of these BMPs.

Please describe how this watershed has been assessed. This will include aerial assessments, soil and water tests, survey data, land use cover, and any other important information.

Eleven sub watersheds were modeled using the Generalize Watershed Loading Function (GFWLF). The 10 year modeling results indicated that an average of 263 tons of TN and 67 tons of TP are exported annually from the watershed to the lake. GWLF is a mid-range watershed loading model developed to assess non-point source flow and sediment and nutrient loading from urban and rural watersheds. GWLF provides the ability to simulate runoff, sediment, and nutrient loadings (N and P) from a watershed given variable-size source area (e.g., agricultural, forested, and developed land). It also has algorithms for calculating septic system loads and allows for the inclusion of point source discharge data. It is a continuous simulation model, which uses daily time steps for weather data and water balance calculations. GWLF is considered to be a combined distributed/lumped parameter watershed model. About 81% of the TN (213 tons) and 80% (54 tons) entering the reservoir comes from the North Cottonwood River whereas French Creek exports the remaining nutrient loads. Two municipal wastewater treatment plants (Canton and Lehigh) together contribute 1.4 tons of TN and 0.4 tons of TP per year. Nutrient losses from streambank erosion only contribute about 1% of the total watershed nutrients. The result of a 10-yr BATHTUB simulation show that the internal nutrients from the sediment are an important source of causing algal blooms in the lake. ArcGIS was used to map the Marion Reservoir watershed. The USDA Revised Universal Soil Loss Equation Version 2 (RUSLE2) program was used to estimate the erosion potential in the watershed. All the fields in the watershed were surveyed by visual inspections to assess practices used on each field used in the NRCS rapid assessment. If question arose from this survey the local conservation district and WRAPs coordinator contacted producers about the practices installed on the fields in question.

Budget

Personnel			
Budget Line	**Grant Request**	**Match**	**Total**
Year 1	**$32,000.00**	**$12,000.00**	**$44,000.00**
Year 2	**$32,000.00**	**$12,000.00**	**$44,000.00**
Year 3	**$32,000.00**	**$12,000.00**	**$44,000.00**
Total Requested	**$96,000.00**	**$36,000.00**	**$132,000.00**
Description	**Personnel includes only the salary of the 0.4 FTE coordinator. The coordinators responsibilities will include but is not limited to the following. Work with producers and landowners to implement agricultural best management practices (BMPs) to improve water quality in the identified priority areas. Provide technical assistance and expertise needed to install approved BMPs. Provide outreach to local watershed citizens to improve information and education regarding water quality and the WRAPS program locally and statewide. Manage a focused campaign to engage producers and other stakeholders regarding practices that have been proven to improve water quality and soil health. Achieve annual BMP implementation goals as stated in the approved 9 element watershed plan. Create all affidavits, amendments (if needed), status reports and final reports. All reports will be submitted on a timely basis and will contain a clear and accurate accounting of the grant's status. Maintain accurate accounting for all budget items in the grant. Report monthly to the Administrative Agency and the SLT on the financial status of the grant and associated bank account. Match includes the sponsoring organization's staff's time to coordinate WRAPS BMP implementation and maintain separate budget and financial records subject to state and federal taxes separate from other district funds; producer referrals, assistance with workshops and SLT meetings $24,000.00, SLT members time and travel expenses to attend meetings and conferences that provide information and education to support the overarching WRAPS goals $12,000.00**		

Fringe			
Budget Line	**Grant Request**	**Match**	**Total**
Year 1	**$0.00**	**$0.00**	**$0.00**
Year 2	**$0.00**	**$0.00**	**$0.00**
Year 3	**$0.00**	**$0.00**	**$0.00**
Total Requested	**$0.00**	**$0.00**	**$0.00**
Description	**N/A**		

Travel			
Budget Line	**Grant Request**	**Match**	**Total**
Year 1	**$1,000.00**	**$0.00**	**$1,000.00**
Year 2	**$1,000.00**	**$0.00**	**$1,000.00**
Year 3	**$1,000.00**	**$0.00**	**$1,000.00**
Total Requested	**$3,000.00**	**$0.00**	**$3,000.00**
Description	**Travel expense include miles driven in the watershed to promote and implement BMPs. Registration fees, mileage, lodging and meals to attend multi-day meetings/conferences.**		

Supplies			
Budget Line	**Grant Request**	**Match**	**Total**
Year 1	**$1,000.00**	**$700.00**	**$1,700.00**
Year 2	**$1,000.00**	**$700.00**	**$1,700.00**
Year 3	**$1,000.00**	**$700.00**	**$1,700.00**
Total Requested	**$3,000.00**	**$2,100.00**	**$5,100.00**
Description	**Supply expenses include but are not limited to office supplies, paper/printer/ink, envelopes, postage, pens/pencils, folders, digital copy devices, notebooks, manuals, calendars, maps, outside printing of flyers/brochures, reports, stakeholder leadership team meeting supplies. Match includes speaker fees, meeting rooms, building, park and partner sponsored materials and supplies where the WRAPS program is promoted.**		

BMP/Strategy Funding			
Budget Line	**Grant Request**	**Match**	**Total**
Year 1	**$53,000.00**	**$52,000.00**	**$105,000.00**
Year 2	**$53,000.00**	**$52,000.00**	**$105,000.00**
Year 3	**$53,000.00**	**$52,000.00**	**$105,000.00**
Total Requested	**$159,000.00**	**$156,000.00**	**$315,000.00**
Description	**Recruitment and Installation of Cropland BMP's in targeted cropland areas as identified in the 9-element plan. Recruitment and installation of Livestock BMP's in targeted livestock areas as identified in the 9-element plan. Producer education through meetings and targeted outreach using physical and electronic delivery methods. Match Landowner contribution to the successful installation of approved BMP's, state entities and local government entities portion not covered by WRAPS funding.**		

Contractual Services			
Budget Line	**Grant Request**	**Match**	**Total**
Year 1	**$3,000.00**	**$2,000.00**	**$5,000.00**
Year 2	**$3,000.00**	**$2,000.00**	**$5,000.00**
Year 3	**$3,000.00**	**$2,000.00**	**$5,000.00**
Total Requested	**$9,000.00**	**$6,000.00**	**$15,000.00**
Description	**Dale Ehlers WRAPS Technician 450 hours at $20.00 for conservation planning, engineering and development of approved specifications for WRAPS funded cropland and livestock BMPs and meeting with producers on an as needed basis. Match-State Employees, County Engineer, Contractors and Agronomists assistance with planning and installation of BMP's in the WRAPS priority areas.**		

Other			
Budget Line	**Grant Request**	**Match**	**Total**
Year 1	**$0.00**	**$0.00**	**$0.00**
Year 2	**$0.00**	**$0.00**	**$0.00**
Year 3	**$0.00**	**$0.00**	**$0.00**
Total Requested	**$0.00**	**$0.00**	**$0.00**
Description	**N/A**		

Indirect			
Budget Line	**Grant Request**	**Match**	**Total**
Year 1	**$10,000.00**	**$0.00**	**$10,000.00**
Year 2	**$10,000.00**	**$0.00**	**$10,000.00**
Year 3	**$10,000.00**	**$0.00**	**$10,000.00**
Total Requested	**$30,000.00**	**$0.00**	**$30,000.00**
Description	**Sponsoring organization administrative fees associated with staff, accounting audits, office equipment, phones, computers etc.**		

WRAPS Strategic Planning

General Plan Implementation

Implementing Years 11 through 13 of the approved Marion Reservoir WRAPS 9-Element Watershed Plan. The load reduction goals of these years of the plan are 13,647 pounds of nitrogen, 6,469 pounds of phosphorus. The strategies in this project implementation plan will achieve 15,061 pounds of nitrogen and 8,152 pounds of phosphorus, and 4,165 tons of sediment.

The below strategies will focus on one or more specific impairments identified in the 9-Element Watershed Plan. As this grant does not provide enough funding to fully implement the identified best management practices from the plan, project coordinators will partner with various other natural resource programs to leverage resources for the implementation of such practices. These programs include but are not limited to county conservation districts state cost share programs, Natural Resources Conservation Service (NRCS) programs, Kansas Dept. of Wildlife and Parks, Farm Service Agency, municipalities, and other nonprofit organizations.

Practices implemented beyond the below strategies will focus on the improvement of soil health, watershed hydrology, and the mitigation of impairments identified in the 9-Element Watershed Plan. These practices could include Conservation Crop Rotation, No-Till, Vegetative Buffers, Cover Crops, Permanent Vegetation, Perennial Vegetation, Precision Nutrient Management, Vegetative Filter Strips, Relocation of Livestock Feeding Sites, Alternative Livestock Watering System and Livestock Stream Crossings.

What are the resources that you will need for General Plan Implementation?

Mapping, local knowledge, and testing to locate sediment and nutrient loading hot spots. Knowledge of high impact BMPs new and established that can be implemented in the WRAPS priority areas to positively impact water quality. Forming partnerships with influential producers and, continuing education on designing precision nutrient management plans. Knowledge of current projects being addressed for water quality in the priority areas. Knowledge of soil testing technologies, Knowledge of cutting-edge vegetative management strategies being utilized in other regions, targeted livestock outreach above the Reservoir and on the North Cottonwood River. Access to lab services for monitoring phosphorus containment unit effectiveness. Agricultural Industry leaders as contacts. Producer meetings to introduce new and established BMP's to new producers or old producers looking for new methods. Increased knowledge of the carbon credit market and how the carbon sequestering practices can benefit water quality and provide additional monetary avenues to incentivize high impact BMP adoption. Revisit producers that have shown previous interest in the WRAPS program but did not choose to adopt water quality practices in the past. Local news media contacts. Utilize social networks to benefit outreach and education.

Strategy One

Provide a general summary of Strategy One

Implement Cropland soil health and water quality BMP's to address the High Priority TMDL of Eutrophication in HUCs 110702020103, 110702020104 and Depleted Dissolved Oxygen in HUC 110702020104

What are the goals for this strategy?

The following BMPs to be completed by December 31, 2025:

BMP	Acres	Nitrogen	Phosphorus	Sediment
Buffers	87	2,252 lbs	1,611 lbs	1045 Tons
Conservation Crop Rotation	200	187 lbs	95 lbs	79 Tons
No-Till with Cover Crops	3,000	7,042 lbs	3,525 lbs	2,524 Tons
Nutrient Management Plans	200	189 lbs	95 lbs	79 Tons
Permanent Vegetation	335	1,205 lbs	603 lbs	438 Tons

Implementation of these Cropland BMP goals will reduce Nitrogen by 10,875 lbs, Phosphorus by 5,929 lbs, and Sediment by 4,165 tons.

Tactics and action steps

1.Using local knowledge and windshield surveys note on maps field and producers currently not implementing soil health or water quality practices.

a. Produce a list of all producers and landowners in 110702020103 and 110702020104 during the first six month of the grant currently not participating in the WRAPS program and using current resources available to the WRAPS coordinator organize their addresses, phone numbers or email addresses for focused outreach on soil health and water quality and the opportunities available through WRAPS.

b. Network with 5 producers that have already converted cropland to grass and contact their neighbors.

c. Establish a goal for each of the Cropland BMP's by contacting 2 producers weekly, posting on social media weekly regarding the opportunities for cost share to establish conservation practices and quarterly reset to revisit the goals established and refocus efforts on goals not met.

d. Conduct Soil Health Meetings yearly beginning in the winter of 2022/2023

1. Schedule soil health seminars about innovative practices and results for the winter months.

2. Use the Soil Health Alliance and other soil health organization for speaker recommendations

3. Contact producers actively implementing soil health practices and that regularly attend soil health workshops about speakers and topics they would like to hear.

2. Continuing education on innovative cover crops and combinations of crops to benefit soil health,

a. Subscribe to online media sources for soil health

b. Subscribe to online media sources for water quality

c. Attend soil health, water quality and carbon meetings available to me locally

3.Nutrient management plans for producers working with the WRAPs program. Nutrient Management is defined as managing the amount, source, placement, form, and timing of the application of nutrients and soil amendments. Nutrient Management plans use intensive soil testing and have nitrogen and phosphorus reduction efficiencies.

a. Contact professionals already working as certified Technical Service Providers (TSPs) for Nutrient Management

b. Locate course work available to complete my certification

c. Using social media ie Facebook and Twitter send out information on the benefits of nutrient management and how production inputs can be decreased.

d. Contact producers that have worked with the WRAPS program previously adopting no-till and cover crops and have a nutrient management meeting with presentations from Technical Service Providers on the step and benefits of developing a nutrient management plan.

4.Perennial PULSE

a. Research effectiveness in commodity crop rotations
b. Research studies indicating improvement in soil health and plant community resilience
c. Contact "early adopters" on Kernza in the priority areas regarding the benefits they have received by introducing a perennial pulse into their cropping system. Asking them for testimonials and encourage peer to peer meetings with interested producers

Perennial PULSE to be included in the Conservation Crop Rotation: Conservation crop rotation is a written plan where producers grow different crops on the same piece of land year after year in a planned, reoccurring sequence. This may include alternating row crop production with a high residue-producing crop as compared to a low residue-producing crop. A pulse is an annual or perennial legume grown for human or animal consumption. Research has shown that including a pulse crop in a dryland rotation can bring significant financial and agronomic benefits. The traditional wheat-corn-beans or wheat-wheat system of crop production common in the watershed area lacks diversity, does not efficiently manage precipitation, and leads to declines in soil organic matter (OM) and soil productivity. Growing a pulse crop in rotation with wheat can help bring some balance to soil in terms of health, biological activity, and overall potential productivity. Legumes fix N from the atmosphere through Rhizobia bacteria that grow in association with plant roots. When bacteria invade the roots of legumes, they fix atmospheric N gas (N2). This mutually beneficial, or symbiotic relationship, helps both organisms. The bacteria receive energy from the plant, and in exchange the plant receives 'free' N. Pulse crops are a good choice for diversifying a cropping rotation. These legumes will get their N indirectly from the atmosphere. This reduces overall input and cost of fertilizer. In addition, pulse crop residue breaks down quickly, providing some N credit to a following crop. This credit is approximately 10–20 lb. N/acre depending on yield but can be substantially higher if the pulse crop is managed as a cover crop. Benefits from the inclusion of alfalfa in a rotation have been detected up to 17 years after its removal from the soil. Having perennial forages in the system even 3 out of 10 years is a significant benefit. The addition of a perennial PULSE can also alter weed communities and could reduce the number of broadleaf seeds in the weed seedbank. Surface sediment run-off has been shown to decrease when alfalfa has been added to the cropping rotation due to the complex and deep root structure. Alfalfa carries a sense of marketing risk for some producers due to cost of planting, harvesting, and marketing. We would encourage producers to take a long-term view toward environmental stability when including alfalfa in their rotation.

Kernza intermediate wheatgrass is a novel perennial grain and forage crop with the potential to provide multiple ecosystem services. Through its continuous above-ground productivity, i.e., perennially, Kernza reduces annual weed populations, protects soil from erosion, and increases pollinators and insect diversity. Kernza's perennial nature also leads to a reduction in nutrient

leaching, an increase in the soil organic carbon pool and other beneficial soil properties, and improvements in biota linked to high soil quality. Therefore, Kernza can recover ecosystem services that usually are lost due to annual grain agriculture. This transition to more sustainable agriculture is usually the main motivation for early-adopter growers. In addition to environmental benefits, growing Kernza as a dual-use perennial
crop provides two sources of income to farmers: forage and grain. Kernza grain is highly valued by the market for making baked goods and beer and demand is growing from environmentally conscious consumers

a. Research effectiveness in commodity crop rotations

b. Research studies indicating improvement in soil health and plant community resilience

c. Contact "early adopters" on Kernza in the priority areas regarding the benefits they have received by introducing a perennial pulse into their cropping system. Asking them for testimonials and encourage peer to peer meetings with interested producers

d. Provide cost share to incentivize planting of perennials

e. Assist with the writing and planning of conservation plans for conservation crop rotations

Key performance indicators for the tactics

BMP Indicators –

BMP Implementation	Year 1	Year 2	Year 3
Conservation Crop Rotation (63% PULSE planting)	50 acres	100 acres	50 acres
No-Till Cover Crops	1,000 acres	1,000 acres	1,000 acres
Vegetative Buffer	30 acres	30 acres	20 acres
Permanent Vegetation	100 acres	100 acres	135 acres
Nutrient Management	30 acres	30 acres	27 acres

2 producers contacted weekly
2 soil health workshops annually
1 nutrient management meeting annually

What are the resources that you will need and use to get the tactics done?

BMP Implementation	Year 1	Year 2	Year 3
Conservation Crop Rotation	$1,575	$3,150	$1,575
No-Till Cover Crops	$22,000	$22,000	$22,000
Vegetative Buffer	$1,500	$1,500	$1,3500
Permanent Vegetation	$5,000	$5,000	$6,750
Nutrient Management	$250	$500	$250

BMP Total $94,400.00.
Dale Ehlers WRAPS Technician contract labor $4,500.00.
Soil Health meetings $3,500.00.
Additional google earth training, Publisher training to produce mailers, postage $200.00.
Cell phone and vehicle for in person producer meetings. Subscribe to online soil health information outlets $200.00.
Continuing education to become a nutrient management technical service provider $1,000.00.
Total for Cropland BMP Implementation $103,800.00

Strategy Two

Provide a general summary of Strategy One

Implementation of Livestock BMP's to address the identified Marion Reservoir TMDLs of Eutrophication and Depleted Dissolved Oxygen in 110702020103 and 110702020104

What are the goals for this strategy?

The following BMP's to be completed by December 31, 2025:

BMP Implementation	Units	Nitrogen	Phosphorus
Vegetated Filter Strips	2 acres	1,932 lbs.	1,026 lbs.
Relocated Feeding Sites (75 AUs)	1	966 lbs.	513 lbs.
Alternative Watering Systems (250 AUs)	3	1,288 lbs.	684 lbs.

The implementation of six livestock BMP projects during the three years of the grant in the identified HUC 12s will result in a phosphorus load reduction of 2,223 pounds and a nitrogen load reduction of 4,186 pounds at the end of the SFY23-25 3-year WRAPS grant.
The following are estimated Animal Units (AUs) using local knowledge of stocking rates due to the Marion Reservoir WRAPS plan not addressing the livestock goals in Animal Units (AUs) but in lbs of nutrients reduced in the run-off reaching the reservoir.
Relocation of Livestock Feeding Sites 1, 75 Animal Units (1 AU = 1,000lbs)
Livestock Alternative Watering systems 3, 250 Animal Units
Goal from the Marion Watershed Plan Phosphorus 873lbs; Nitrogen 430lbs

Tactics and action steps

1.Using local knowledge and windshield surveys to note on maps field and producers who currently have livestock directly adjacent to impacted waterbodies or physically utilizing impacted waterbodies for water.

a. Produce a list of all producers and landowners in 110702020103 and 110702020204 during the first six months of the grant that currently do not participate in the WRAPS program and locate addresses, phone numbers or email addresses for them for focused outreach on water quality and livestock BMP's available through WRAPS and partner agencies.

b. Network with 3 producers that have already implemented livestock practices and contact their neighbors.

c. E stablish a goal for each of the Cropland BMP's by contacting 2 producers weekly, posting on social media weekly regarding the opportunities for cost share to establish conservation practices and quarterly reset to revisit the goals established and refocus efforts on goals not met

d. Using data from cropland BMP's established in the livestock priority areas contact producers that have established cropland practices that also own livestock to assess any livestock BMP implementation opportunities.

2. Continuing training with Google Earth to identify unknown feeding sites and identify the landowner/producer using available computer resources and local knowledge. Establishing a relationship by identifying commonalities with personal and phone contacts.

a. Reach out to people with known Google Earth skills

b. Research Google Earth training opportunities

c. Using established relationships with NRCS to stay abreast of projects and opportunities in the Marion Reservoir watershed areas and the areas directly adjacent to the reservoir.

3. Attend Livestock Field Days offered in the area to stay attuned to new developments with changes in the handling of livestock and their environments. Use the information garnered at these field days to keep the SLT and targeted livestock producers abreast of local and regional opportunities and learning opportunities.

a. Check livestock Publications offered in the Area

b. Check K-State Extension Livestock newsletters.

4. Attend Local Livestock Sales

a. Form partnerships with local Livestock Sales to build a base of contacts "in the know" regarding livestock markets, issues livestock producers are facing, challenges that could affect adoption of livestock BMP's.

b. Establish new contacts with producers in the priority areas and stay abreast of local cattle markets as the variable nature of cattle markets will affect producers' willingness and ability to implement conservation practices.

Key performance indicators for the tactics

BMP Indicators –

BMP Implementation	Year 1	Year 2	Year 3
Vegetated Filter Strips	0.5 acre	1 acre	0.5 acre
Relocated Feeding Sites	0	1	0
Alternative Watering Systems	1	1	1

5 producers contacted weekly

What are the resources that you will need and use to get the tactics done?

BMP Implementation	Year 1	Year 2	Year 3
Vegetated Filter Strips	$1,875	$3,750	$1,875
Relocated Feeding Sites	$0	$12,500	$0
Alternative Watering Systems	$10,000	$10,000	$10,000

Livestock Total $50,000.00.

Dale Ehlers WRAPS Technician providing BMP planning and installation technical assistance $4,500.00.

Livestock Field Days $3,500.00.

Additional google earth training, Publisher training to produce mailers, postage $200.00.

Cell phone and vehicle for phone calls and in person producer meetings.

Total for Livestock BMP Implementation $58,200.00

Strategy Three

Provide a general summary of Strategy Three

Implement Monitoring for Efficacy of Phosphorus Containment Unit Installed above the Reservoir

What are the goals for this strategy?

To assess the effect of a phosphorus containment unit to reduce phosphorus run-off to the reservoir

Tactics and action steps

1. Develop an approved testing schedule with KDHE during the first six months of the grant.
    a. Work with my project offer to develop a schedule
    b. Submit the schedule to KDHE
    c. Develop an Excel Spreadsheet of the schedule
2. Locate a lab for processing the tests in the first month of the grant.
    a. Ask my project officer for lab suggestions
    b. Google local water testing labs
3. Put together or purchase water testing kits
    a. If the lab does not provide a testing kit purchase them from a supplier
4. Pull Water Samples at the approved testing schedule times
5. Document the results and submit the results to KDHE
6. Monitor the phosphorus containment structure media.
    a. Document the color, texture, and general state of the phosphorus uptake media when water samples are taken
    b. Replace the media as needed
    c. Deliver used media to the local recycling center located in Marion Kansas

Key performance indicators for the tactics

Year 1 a testing schedule is developed and approved by KDHE, Year 2 and 3 testing will be done at the approved intervals, phosphorus uptake material will be monitored and replaced as needed, Year 2 and 3 the results of the samples will be entered into a spreadsheet and submitted to KDHE along with the official results from the approved lab.

What are the resources that you will need and use to get the tactics done?

A contract with PACE analytical labs for water analysis.
Phosphorus testing kits $500.00
Lab Fees $1,500.00
Total for Water Tests $2,000.00.
Phosphorus media has been donated to the WRAPS program by Marion Manufacturing so there is no cost associated with media replacement.

Strategy Four

Provide a general summary of Strategy Four

Information, Education, Outreach, Communication, Social Media

What are the goals for this strategy?

To develop and implement a communication strategy for the Marion WRAPs program

Tactics and action steps

1. Develop a brochure by September 2022
    a. Work to improve skills in Publisher
    b. Fine tune a simple but effective message
    c. Use available artwork to draw attention to the brochure
    d. Distribute 200 brochures to local agricultural "hubs" using local knowledge and work of mouth.
    e. Check the number of brochures at each location monthly and restock as needed.
2. Develop a Facebook page by January 2023
    a. Take an online course on developing an effective Facebook Page
    b. Develop a Marion WRAPS Facebook page
    c. Contact other similar groups about the Facebook page so they will promote it
    d. Post conservation articles and information weekly regarding water quality
    e. Check each available morning for messages, share photos and share posts form similar pages
    f. Use Facebook to engage producers with informational topics and cost share opportunities.
    g. Track the amount of people that follow the Facebook page and respond to inquiries promptly so to improve the exposure of the Marion WRAPS program.
3. Develop a Quarterly newsletter by December 2022
    a. Talk to other organizations that have a newsletter about their experience
    b. Locate the best software for newsletter development
    c. Develop a mailing list using coordinator's knowledge and access to producer information online and in print
    d. Work each week toward finding articles and information to the newsletter
    e. Mail the newsletter out to the mailing list 4 times a year (September, December, March and June).
    f. Advertise other programs and opportunities available
    g. Highlight completed projects.
    h. Solicit producers' feedback on interesting topics.

Key performance indicators for the tactics

200 Brochures distributed annually
50 Facebook followers
2 Soil Health Seminars annually
1 Livestock Meeting annually
10% increase in attendees for each meeting
4 newsletters mailed annually
2 newsletter follow up contacts each quarter, receiving producers' feedback on interesting topics and requests for additional information.

What are the resources that you will need and use to get the tactics done?

Printing Supplies or Professional Printing of a Marion WRAPs Brochure $1,000.00; Newsletter Mailings $3,000.00 Total for Information and Outreach $4,000.00.