NEBRASKA NONPOINT SOURCE MANAGEMENT PLAN

Strategic Plan and Guidance for Implementing the
Nebraska Nonpoint Source Management Program – 2021 through 2036

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ACRONYMS AND ABBREVIATIONS

PREFACE

The Nebraska Environmental Protection Act (Nebraska Revised Statute § 81-1501 to 1532) authorizes the Nebraska Department of Environment and Energy (NDEE) "...to develop comprehensive programs for the prevention, control, and abatement of new or existing pollution of the air, waters, and land of the state" and "...to act as the state water pollution ... control agency for all purposes of the federal Clean Water Act…" (Neb. Rev. Stat § 81-1504). The NDEE has been designated the lead state agency for nonpoint source management by the Governor of Nebraska.

In 1987 Congress amended and reauthorized the Clean Water Act to address the nation's current and future water quality problems. The Water Quality Act of 1987 amended the declaration of goals and policy in the Clean Water Act by adding the following:

> *"... it is the national policy that programs for the control of nonpoint sources of pollution be developed and implemented in an expeditious manner so as to enable the goals of this Act to be met through the control of both point and nonpoint sources of pollution."*

This policy focuses on the importance of controlling nonpoint sources of water pollution.

The Water Quality Act of 1987 also added Section 319 to the Clean Water Act. Section 319 required the states to prepare a Nonpoint Source Assessment Report and to prepare and actively implement a Nonpoint Source Management Program. It also authorized significant federal financial assistance for implementation of nonpoint source management activities. The purpose of the Nebraska Nonpoint Source Management Program is to facilitate management of nonpoint source pollution in the state while addressing the requirements of Section 319.

This document was compiled by the NDEE. Several federal, state, and local agencies and non-governmental groups involved in nonpoint source management provided information and helped facilitate its preparation. It represents a fourth update of implementation documentation to support the Nebraska Nonpoint Source Management Program. It follows the "*Nebraska Nonpoint Source Management (Section 319) Report*" prepared by the Nebraska Department of Environmental Control (currently Department of Environment and Energy) in 1989, the "*Nebraska Nonpoint Source Management Program*" developed by the state Nonpoint Source Task Force in 1990, and the "*Strategic Plan and Guidance for Implementing the Nebraska Nonpoint Source Management Program – 2000 through 2015"* developed by NDEE in 2000. This document addresses new opportunities to effectively direct technical and financial resources toward restoring and protecting water resources and resolving statewide nonpoint source issues of concern. It was also developed with due consideration of the recommendations for revising state Nonpoint Source Management Programs included in the U.S. Environmental Protection Agency's 2014 guidance document "Key Components of an Effective State Nonpoint Source Management Program."

MISSION OF THE NEBRASKA NONPOINT SOURCE MANAGEMENT PROGRAM

The mission of the Nebraska Nonpoint Source Management Program is to protect the quality of Nebraska's water resources from nonpoint source pollution and to improve waters that have been degraded by nonpoint source pollution wherever possible.

VISION STATEMENT FOR THE NEBRASKA NONPOINT SOURCE MANAGEMENT PROGRAM

Nebraska will be recognized as a leader among states in addressing nonpoint source pollution through efficient and effective implementation of water quality management actions. This vision will be realized by effectively collaborating with partner organizations to support well-defined, highly focused watershed-based projects that measurably reduce the degradation of surface and groundwater resources by nonpoint source pollution. Projects will be designed to integrate all available tools to restore and protect the human and ecological health of targeted waters.

ACKNOWLEDGMENTS

Many hours of collecting information, discussion, drafting, editing and rewriting were invested in producing this Nonpoint Source Management Plan to meet the challenge of restoring water resources degraded by runoff pollution and to protect high quality water resources from nonpoint source pollution threats over the next fifteen years. The Nebraska Department of Environment and Energy wishes to express its gratitude to a core of individuals who led this effort.

Brandon Beethe (NDEE) provided document review and editing.
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The Department also extends its appreciation to partner organizations that provided input on their programs and activities and provided interim review of sections of the plan.

Chapter 1 INTRODUCTION

The national Nonpoint Source Management Program authorized under Section 319 of the Clean Water Act (1987 amendment) was initiated in 1990 as a demonstration program to encourage the adoption of best management practices to control nonpoint source pollution. State programs focused on demonstration of practices to address priority "Issues of Concern" in priority watersheds or at statewide or regional levels. By the late 1990s, the program focus shifted away from limited demonstration to subsidizing installation of conservation practices to restore impaired waters in select watersheds. That focus was solidified with the required revision of state nonpoint source management plans in 2000.

Over the past five years, Nebraska has implemented its "*Nonpoint Source Management Plan: Strategic Plan and Guidance for Implementing the Nebraska Nonpoint Source Management Program – 2015 through 2030."* In that time, Nebraska has been a leader among states in implementing a nonpoint source pollution management program through a collaborative approach with many other agencies, organizations, and non-traditional partners. This approach offers effective coordination of resources and expertise to reach a diverse audience of land managers and achieve effective installation of conservation practices. Nebraska is among the leading states in reporting reductions of nitrogen, phosphorous, and sediment loads to receiving waters. Collaboration among the state's many conservation partners to implement a holistic approach to nonpoint source management that focuses on both the watershed and the receiving water made these successes possible.

This document, Nebraska Nonpoint Source Management Plan: *Strategic Plan and Guidance for Implementing the Nebraska Nonpoint Source Management Program – 2021 through 2036*, (NNPSMP) balances disparate, but important issues, by providing for a sound mix of large and small projects, local and regional projects, restorative and protective projects, communication, monitoring, investigation of causes and impacts of nonpoint source pollution, and evaluation of conservation practices and project effectiveness. It strives to identify and promote opportunities for nonpoint source management actions that not only improve water quality, but also provide other ecological, social, economic, and public health benefits.

The immediate function of this revised Nebraska Nonpoint Source Management Plan is to provide guidance to the Nebraska Department of Environment and Energy in implementing the Section 319 program. Its larger and more important function is to provide a framework for collaborative efforts to focus the expertise and resources of multiple partners in implementing programs and projects that sustainably restore and protect water resources from nonpoint source pollution. This management plan is intended to be a resource to assist conservation partners and potential project sponsors in identifying and developing nonpoint source management activities and projects. It builds on the experiences and successes of implementing the previous plan as illustrated below.

Highlights and Special Achievements From 2015-2020

During the first five years of implementing the *Strategic Plan and Guidance for Implementing the Nebraska Nonpoint Source Management Program – 2015 through 2030*, there were many highlights and achievements. When written, the Plan was designed to make Nebraska a leader in collaborative and innovative efforts to develop and implement projects and activities to improve and protect water quality. The key to realizing this vision was building on the strong and positive relationships among the conservation agencies and organizations in the state. While each activity and project had its own special accomplishments, some innovations rise above the rest in illustrating Nebraska's leadership in addressing nonpoint source pollution.

WATER QUALITY IMPROVEMENTS

The delisting of three stream segments with impairments was achieved within the course of the 2015-2020 NPS Management Plan. Shell Creek Segment LP1-20700 was delisted for impairment of Aquatic Life Use due to the reduction of atrazine contamination. The delisting in the 2018 Nebraska Integrated Report is the first known delisting of a stream for atrazine contamination resulting from implementation of a watershed management plan

in the nation. The delisting was the culmination of planning and installation of conservation practices that began in 1999. The achievement was celebrated with a press conference and picnic with local stakeholders and statewide partners. The delisting continues to receive national recognition for its success.

Gov. Ricketts and Jim Macy at the Antelope Creek delisting celebration, September 2018

Efforts to improve water quality and flooding conditions in Antelope Creek (segment LP2-10900) began with planning in the late 1990's. Plans included a large infrastructure project to widen and daylight a stretch of Antelope Creek to increase channel capacity, realign streets and pedestrian routes, and as a result a large area near downtown are no longer in the 100-year floodplain. Watershed management included a series of projects to trap and filter runoff in rain gardens, wetlands, permeable pavers and other urban Best Management Practices (BMPs). Antelope Creek was delisted for impairment of Aquatic Life Use due to low dissolved oxygen levels in the 2016 Nebraska Integrated Report and delisted for impairment of Recreational Use due to E. coli contamination in the 2018 Nebraska Integrated Report.

COOPERATIVE PARTNERSHIPS

Liaisons. The 2015-2030 management plan maintained the existing liaison arrangement between the NDEE and University of Nebraska Extension, USDA Natural Resources Conservation Service and Nebraska Association of Natural Resources Districts. These liaisons provide a cadre of professionals from core organizations to improve inter-organization collaboration and improve the quality of programs and projects to manage nonpoint source pollution. They provide access to the depth and breadth of expertise and resources within these organizations to advance management of nonpoint source pollution in Nebraska. Other states have begun to develop similar partnerships.

National Water Quality Initiative. The Nebraska Department of Environment and Energy continued to cooperate with USDA Natural Resources Conservation Service in supporting National Water Quality Initiative (NWQI) projects in the Wahoo Creek and Big Sandy Creek watersheds. The Bazile Creek NWQI area was revised to more effectively address groundwater nitrate contamination issues in the Bazile Groundwater Management Area. Planning for a hybrid NWQI project in the Turkey Creek Watershed and Wilber wellhead protection area is in progress to address atrazine and E. coli impairments in the stream and nitrate contamination in the source water aquifer for the Cities of Wilber and DeWitt. A planning process was initiated to update the Wahoo Creek NWQI plan.

Source Water Protection Initiative. Nebraska Department of Environment and Energy and University of Nebraska Extension cooperated with USDA Natural Resources Conservation Service (NRCS) in developing the priorities and strategy for implementing the Source Water Protection Initiative included in the 2018 farm bill. Nebraska's initiative addresses nitrate contamination of groundwater effecting wellhead protection areas as well as water shortages at community water supplies. NDEE chairs the Source Water Protection sub-committee of the NRCS State Technical Committee.

Bazile Groundwater Management Area. In 2016, the Bazile Groundwater Management Area Plan was accepted by EPA as an Alternative to a 9-Element Plan. This groundbreaking acceptance was nationally the first groundwater-focused plan to qualify for 319 Project Funds under the new 2014 guidelines for the national 319 Program. The acceptance also set the stage for further development of similar plans for source water protection for Nebraska communities. As part of the new 2014 guidelines for the 319 program, planning projects could not be funded with program funds. After the acceptance of the Bazile plan, NDEE solidified a strategy to fund Drinking Water Protection Management Plans (DWPMP) with the Drinking Water State Revolving Fund's (DWSRF) Source Water Protection Program. DWPMPs are written as an Alternative to a 9-Element Plan and once accepted, qualify for 319 project funds. Since 2016, two DWPMPs have been accepted by EPA Region 7 (Auburn and Fairbury); several other DWPMPs are currently being written.

INNOVATIVE TOOLS

Basin Rotation Monitoring. A matrix was created to prioritize monitoring sites for the basin rotation monitoring program (Figure 8.1). The matrix assigns priority points for ambient stream sites within the targeted river basin, sites requiring follow up assessment, unassessed streams and stream segments within active or planned Section 319 watershed projects. The basin rotation monitoring approach allows periodic data collection at more sites on smaller streams than the monthly ambient monitoring program allows. The approach focuses more intensive monitoring in one to three river basins each year on a six-year rotation schedule. Having water quality data representative of smaller watersheds improves project planning and evaluation.

Quality-Assessed Agrichemical Contaminant Database for Nebraska Groundwater. The Quality-Assessed Agrichemical Contaminant Database for Nebraska Groundwater was developed as a central depository for groundwater monitoring data collected by numerous organizations, mainly Natural Resources Districts (NRDs). Data are assigned a quality flag of 1 (lowest) to 5 (highest) based on a review of the amount and type of quality assurance and quality control used in obtaining the result. Data are accessible for both agency and public use at https://clearinghouse.nebraska.gov/. The database serves as the basis for the annual Nebraska Groundwater Quality Report to the Nebraska state legislature.

Nebraska Statewide Groundwater Monitoring Network. The Nebraska Statewide Groundwater Monitoring Network was developed by the state's NRDs and the Department of Environment and Energy (NDEE) to better assess and develop trends in Nebraska's groundwater quality. The network consists of a defined subset of wells identified through the Agrichemical Contaminant Database that are monitored regularly. Data are used by NRDs to delineate and set regulations for Groundwater Management Areas and by NDEE to develop the annual Nebraska Groundwater Quality Report for the State Legislature.

Technological Advances. Nebraska has worked continually with its partners to develop and refine information and methods to improve planning, implementation, and assessment of projects to abate nonpoint source pollution. NDEE worked closely with NRCS in developing the Conservation Assessment and Ranking Tool (CART) for Nebraska. The Department provided Geographic Information System (GIS) shape files mapping impaired waters, watersheds with 9-element management plans, and source water protection areas to factor into the ranking points for USDA's Environmental Quality Incentives Program (EQIP) and other program applications. NDEE developed an Unmanned Aerial Systems (drone) program to assist in planning, monitoring and evaluating projects. Three staff are certified drone pilots.

NEW FUNDING STREAMS

SRF Set-Aside Funds. The Nebraska Drinking Water State Revolving Fund (DWSRF) was developed primarily to assist publicly owned water systems with construction of drinking water treatment and delivery systems. A portion of those funds were set aside to support smaller projects, including nonpoint source pollution management projects. In Nebraska, the 15% set-aside funds are used primarily for planning and implementing activities and conservation practices in wellhead protection areas.

Water Sustainability Fund. The Nebraska legislature created the Water Sustainability Fund in 2014 to address rising demands for water uses in the face of limited or declining water supplies and persistent water quality impairments. Projects may address increased water retention, improved efficiency of water use, restoration of impaired waters, protection of high quality water resources, improved stream flows and compliance with interstate compacts.

INNOVATIVE PLANNING

Drinking Water Protection Management Planning. The Nebraska Department of Environment and Energy initiated advanced planning efforts to improve upon previous wellhead protection plans. The new approach extends groundwater flow modeling to the 50-year time of travel and includes planning for implementation of conservation practices within the delineated Source Water / Wellhead Protection Area. The drinking water management plans are written as an Alternative to a 9-Element Plan to be eligible for Section 319 funding. Funding is provided through set-aside funds from the Drinking Water State Revolving Fund

Alternative to TMDL Plans (5-alts). NDEE developed, and EPA agreed to an alternative process for developing restoration plans for impaired waters in lieu of a TMDL. The process incorporates elements of a TMDL into 9-element watershed management plans to restore impaired waters. This process avoids some of the more cumbersome elements of developing a TMDL, and ties attainment of pollutant limitations directly to implementation of BMPs designed to reduce pollutant load reductions and achieve water quality standards. When the watershed management plan is approved, the waterbody is reclassified as Category 5-alt in the Nebraska Integrated Report indicating the waterbody is impaired, but a watershed plan is being implemented to meet pollutant load reductions calculated for the 5-alt waterbody.

National Water Quality Initiative (NWQI) Pilot Projects. Beginning in 2018, USDA revised the National Water Quality Initiative (NWQI) to include a planning phase for watershed management projects. NDEE already collaborated with NRCS to align NWQI projects with implementation of 9-element watershed plans. The introduction NWQI Pilot projects, allows NDEE to further collaborate with NRCS in developing NWQI projects that meet the 9-element requirements for watershed plans and make the projects eligible for Section 319 funding. Section 319 funds previously dedicated to watershed planning now can be directed to project implementation.

Community-based Watershed Planning. A Citizens Advisory Council representing the varied interests of local stakeholders is organized to work directly with a Technical Advisory Team composed of conservation professionals to develop water quality management plans for select watersheds. Local stakeholders take the lead in shaping the expectations for water quality improvements and selection of the practices acceptable to the community. Community-based watershed planning greatly increases the percentage of stakeholder participants and accelerates local acceptance and installation of best management practices in future projects. Other states have adopted Nebraska's process.

Large Area Plan Implementation. A sub-watershed rotation strategy was employed to fully implement a watershed management plan in the 380,000 acre Shell Creek watershed through a series of phased projects. One or more new sub-watersheds opened each year and remained eligible for project funding for two years. This process concentrated installation of management practices in a relatively small area in any given year, accelerated local adoption of conservation practices and improved the ability to demonstrate project accomplishments. Implementation of phased projects through sub-watershed rotation makes large area planning a viable alternative to repetitive planning for separate smaller watersheds.

New Lake Watershed Planning. Developing and implementing watershed management plans prior to construction of new lakes is a high priority in Nebraska to prevent them from quickly succumbing to sediment and nutrient impairment. Watershed plans for new reservoirs include all of the elements of a plan for an existing reservoir, but generally include additional in-lake protective practices. Installing in-lake practices during the initial construction process is much cheaper, easier, and more efficient than retrofitting these practices as part of a reservoir renovation. Ideally watershed management plans are implemented two years prior to the start of reservoir construction but can be effectively achieved concurrent with reservoir construction. The process of watershed planning and inclusion of in-lake protective practices has become standard procedure in designing and constructing new reservoirs in Nebraska.

INNOVATIVE PROGRAM ACTIVITIES AND CONSERVATION PRACTICES

On-Site Wastewater System Upgrade Practice. Adoption of new regulations and new design standards for on-site wastewater systems in 2004, offered an opportunity to address this potential source of bacterial and nutrient contamination of waters. The On-site Wastewater System Upgrade practice for Section 319 projects was created to support pumping and inspection of on-site wastewater systems and to replace systems installed before 2004. This highly popular practice is restricted to projects implementing a watershed management plan. Over 300 systems were inspected and more than 200 systems upgraded to current design standards through watershed projects.

Lands for Conservation. Access to agricultural land for installation of structural conservation practices is severely limited by crop production during the growing season (May – October) and by harsh winter conditions (January – February). The Crop Production Deferment practice was created to remove this obstacle to timely implementation

of watershed management projects. Producers are paid the average county cash rental rate, determined with help from NRCS staff, to defer crop production on the area delineated for construction (not whole fields) to allow access for summer construction. The area must have sufficient ground cover prior to construction and must be planted to a cover crop immediately after construction to prevent erosion. Acceptable cover may include early maturing crops (e.g., small grains), forage, and grass that the producer may harvest prior to construction. The land must be available no later than August 1 for construction to begin. Construction must be completed within the year of deferment. The producer is compensated after construction is completed and the cover crop is planted.

Lake Renovation. Since provisions of the Clean Lakes Program (Clean Water Act Section 314) were fully incorporated into the Section 319 program, Nebraska has been the national leader in supporting lake renovation through the Nonpoint Source Management Program. These projects provide a capstone to successful watershed management by addressing the in-lake loading (recycling) of nonpoint source pollutants that cannot be addressed through implementation of conservation practices in the watershed. Through collaboration with Nebraska Game and Parks Commission, local Natural Resources Districts and local communities, Nebraska's Nonpoint Source Management Program assisted in renovating 30 public reservoirs and 36 community park ponds. Many of these lakes were delisted for one or more impairments. Others were placed in a new Integrated Report impairment Category 4R indicating unstable nutrient equilibrium in a newly renovated lake. Follow up evaluation of some lake renovation projects indicated a strong association of water quality improvement with removal of rough fish populations. Alum application generally proved effective in reducing phosphorous recycling (in-lake loading) in sand pit and oxbow lakes. The effect was greater when coupled with rough fish removal.

Chapter 2 PROGRAM IMPLEMENTATION

The Nebraska Department of Environment and Energy (NDEE) is designated as the lead agency for developing and implementing the Nonpoint Source Management Program in Nebraska. NDEE provides leadership for this program on two levels: 1) facilitating coordination of programs and activities directed at nonpoint source pollution management by other organizations and 2) administering the Clean Water Act Section 319 Program in the state. On both levels, Nebraska relies on cooperation and coordination among local, state and federal conservation organizations to efficiently and effectively implement the Nonpoint Source Management Program statewide.

Program Development and Oversight

The Nebraska Nonpoint Source Management Program is designed to achieve measurable improvement in the quality of Nebraska's surface water and groundwater resources. The goals of this program will be achieved through iterative processes in partnership with other agencies, organizations and citizens.

NDEE staff are responsible for planning long-term goals and strategies for reducing nonpoint source degradation of water quality in the state and protecting outstanding water resources. They achieve this by assessing water quality data to identify waters impaired by or in need of protection from nonpoint source pollution, identifying priorities for management actions, and developing guidelines for implementing programs and projects to address nonpoint source water quality concerns in the state. NDEE staff work with partner organizations through committees and consultation to identify opportunities to direct the resources of the separate partner programs to address nonpoint source water quality concerns.

NDEE solicits and works closely with potential project sponsors to tailor project proposals to accomplish the priorities of the state's NPS management program. NDEE staff assess project proposals based on the goals and objectives of the state's NPS Management Plan, the project's potential to reduce NPS pollution and improve water quality, the project sponsor's readiness to proceed, and their performance on any past projects they may have had.

DATA COLLECTION AND ASSESSMENT

NDEE relies on monitoring data collected by its own staff and by other partner agencies to determine if and where contamination of surface or groundwater occurs in the state. NDEE has lead responsibility for collecting and assessing surface water quality conditions in the state and for determining whether surface waters meet the physical, chemical, or biological standards necessary to support designated beneficial uses. The state's Natural Resources Districts (NRDs) have lead responsibility for monitoring groundwater quality and reporting results to the Nebraska Groundwater Quality Clearinghouse.

IDENTIFICATION OF WATERS FOR MANAGEMENT ACTIONS

NDEE identifies waters eligible for either restorative or protective management action under the NPS Management Plan. Waters identified for restorative management action are streams and lakes that do not meet water quality standards (impaired), wetlands that do not provide expected ecological functions (degraded), and groundwater resources that have elevated levels of nitrate-nitrogen and/or other contaminants. Waters identified for protective management actions are streams and lakes that meet all of their designated uses (unimpaired), wetlands that have high functional values, and high-quality groundwater resources. Waters not identified in this plan for restorative or protective management actions may be considered if compelling evidence is presented to justify such actions. The selection process differs for each waterbody type: streams and lakes, wetlands, and groundwater.

Streams and Lakes

A four-step protocol is used to identify streams and lakes for restorative or protective management actions.

- Step 1: determine whether the waterbody is impaired or unimpaired.
- Step 2: determine whether the impairment or threat to water quality is due to a point source or nonpoint source of pollution. Waters solely impaired or threatened by point source pollution are excluded from the list.
- Step 3: determine whether the impairment or threat to water quality is due to manageable pollution or due to natural causes (e.g., selenium, chloride, pH), air-borne contaminants (e.g., mercury), legacy compounds (e.g., PCBs), or similar unmanageable pollutants. Waterbodies solely impaired or threatened by natural or unmanageable pollution are excluded from the list.
- Step 4: determine whether the implementation of available BMPs can effectively improve or protect water quality based on the size or characteristics of the waterbody. Large rivers and reservoirs, regulating reservoirs for irrigation systems, canals and similar complex systems generally are deemed unmanageable and are excluded from the list.

The protocol described above is applied to the assessment of designated uses of streams and lakes in the most current Nebraska Integrated Report. Selected streams and lakes assessed to be impaired for one or more of its designated uses (Categories 5, 5-alt, 4a and 4r) are included in the list of Impaired Streams Identified for Restorative Management Actions (Appendix B, Table B.1) or the list of Impaired Lakes Identified for Restorative Management Actions (Appendix C, Table C.1). Selected streams and lakes assessed to meet all of their designated uses (Category 1) are included in the list of High Quality Streams Identified for Protective Management Actions (Appendix B, Table B.2) or the list of High Quality Lakes Identified for Protective Management Actions (Appendix C, Table C.2). Streams and lakes for which the designated uses are incompletely assessed (Category 2) or unassessed (Category 3) are not considered for restorative or protective management actions.

Groundwater

Groundwater is managed and regulated locally by 23 separate (NRDs) in Nebraska. Each District has a slightly different approach to managing groundwater, making it more complicated to identify groundwater areas eligible for restorative or protective management action than it is for streams and lakes. The common approach among the NRDs is to delineate surface areas where the concentration of a contaminant exceeds certain trigger levels in the underlying the aquifer. Trigger levels are typically based on drinking water Maximum Contaminant Levels (MCL) set by EPA. These areas vary from Phase 1 where little or no regulation is imposed up to Phase 4 where significant reporting and management actions are imposed. Progression upward in the Phase scheme (Phase 1-4) is driven by exceeding the trigger level for a concentration or percent of the MCL identified for each Phase level. The trigger values and hence the Phase levels are not consistent among the NRDs. A Phase 2 designation or higher indicates an elevated concentration of contaminant in the groundwater that presents a local concern. To date, all phases of management are for nitrate-nitrogen.

For simplicity, NDEE uses the local NRD's designation of a Phase 2 (or higher) groundwater quality management area to identify groundwater areas eligible for restorative management actions with the caveat that the area must include one or more wellhead protection areas. NDEE does not identify NRD designated groundwater quality management areas for protective management actions.

NDEE also recognizes individual community wellhead protection areas and source water protection areas for restorative and protective management actions. The wellhead or source water protection area must be delineated and have a current map. Areas identified for restorative management action must have a concentration in the underlying groundwater equal to or above the trigger level set by the local NRD for a Phase 2 groundwater quality management area or notification (e.g., Administrative Order) from Nebraska Department of Health and Human Services to the community to take management action to protect public health. Wellhead or source water protection areas (including new wellhead areas) with ≤ 5ppm nitrate-nitrogen concentration in the underlying aquifer are identified for protective management actions. Groundwater areas identified for restorative and protective management actions are listed in Appendix D.

Wetlands

NDEE will partner with the Nebraska Game and Parks Commission (NGPC) to identify, on a case-by-case basis, wetlands for restorative or protective management actions. The Nebraska Wetland Program Plan (WPP) (LaGrange, 2019) includes using watershed planning to restore and protect wetlands. The 319 Program will consider protective or restorative actions to wetlands that are included in a 9-element watershed management plan. This plan has identified 3 priority wetland complexes, found in Appendix D (Table D.1), and will also consider unnamed, rare or unusual wetlands, such as fens, bogs, or saline wetlands as described in a 9-element watershed management plan.

NDEE will accept a rapid assessment protocol, which has been fit to Nebraska conditions, for determining whether a wetland supports its expected ecological functions. The NGPC is in the process of refining a Rapid Assessment Method for Nebraska wetlands (LaGrange, 2015) which may be used to assess wetlands for 319 purposes. Wetlands determined to be degraded are deemed eligible for restorative management actions. Those determined to satisfactorily provide their expected ecological functions are eligible for restorative management actions. The area eligible for either restorative or protective management actions includes the watershed draining to the wetland. Wetlands identified for restorative or protective management actions are listed in Appendix D.

Wildlife and Aquatic Life Habitat

Wildlife and aquatic habitat are recognized as an integral part of the ecological function of a watershed including mitigation of nonpoint source pollution. Restoration or protection of habitat for wildlife and aquatic species should be a component of implementing watershed-based management plans. Section 319 funds may be used for habitat-based projects where a watershed-based plan and appropriate impairment designations exist.

TECHNICAL ASSISTANCE

NDEE staff provide a variety of technical assistance and services to support management of nonpoint source pollution. Staff specialists evaluate the condition of water resources and the potential to rehabilitate degraded resources or to protect unimpaired resources. They may recommend restoration activities or alternative uses of the resource. Staff also help in developing restoration strategies, management plans and project proposals.

PLANNING

The dynamic nature of nonpoint source pollution issues and frequently changing programs to address them pose both challenges and opportunities. NDEE employs a continuous planning approach to adapt the Nonpoint Source Management Program to those changes. Frequent consultation with other conservation organizations and close coordination with their programs allows the Nonpoint Source Management Program to remain an effective complement to other conservation efforts in the state. Periodic review of internal procedures and program management practices continuously improves the efficiency and effectiveness of the program.

CONSISTENCY REVIEWS

NDEE reviews certain federal programs and projects to assure that they do not violate regulatory standards and do not conflict with policies and activities of the Nebraska Nonpoint Source Management Program. The consistency review also provides a mechanism to identify opportunities to collaborate on mutually beneficial activities. A listing of federal programs and projects identified to be reviewed for consistency with the state's Nonpoint Source Management Program is given in Table 2.1.

Table 2.1 Federal Activities Identified for Consistency Review

U.S. Department of Agriculture	● Conservation Reserve Program ● Conservation Stewardship program ● Environmental Quality Incentive Program ● Agricultural Conservation Easement Program ● Regional Conservation Partnership Program ● Watershed and Flood Prevention Operations Program ● National Water Quality Initiative
U.S. Army Corps of Engineers	● Section 404 Permits (through 401 certification) ● Section 1135 habitat restoration project plans
U.S. Fish and Wildlife Service	● Wallop-Breaux project plans

Participation in various interagency committees provides a forum for agencies to discuss plans and activities that might affect other agencies. This fosters discussion regarding required permits, specific over-sight of certain activities and project actions that might interfere with ongoing or planned activities of other organizations.

The NRCS State Technical Committee and associated sub-committees is the largest and most accessible forum for interagency coordination of activities related to agriculture. Army Corps of Engineers activities are reviewed through the Clean Water Act Section 401 Water Quality Certification process. Wallop-Breaux activities are reviewed through consultation with Nebraska Game and Parks Commission and US Fish and Wildlife Service.

NDEE submits its grant applications and plans for major activities to area planning agencies for review and comment. Responses from these agencies are considered and may be forwarded to EPA and/or other entities, as appropriate, to assure effective input on NDEE activities.

Administration of the CWA Section 319 Program

The Nebraska Department of Environment and Energy administers the Clean Water Act Section 319 program in Nebraska. The Nebraska Nonpoint Source Management Program includes six subprograms: Administration and Operations, Special Services, Targeted Studies and Special Initiatives, Watershed and Groundwater Area Planning, Small Projects Assistance, and Large Projects Assistance. These subprograms provide the necessary focus and flexibility to efficiently and effectively target resources in order to improve nonpoint source planning and to better address identified concerns. Responsibilities for program implementation are shared among NDEE staff specialists who develop and manage activities related to core resources and program components with oversight by a program coordinator. Core components of the program focus on lakes, streams, wetlands, groundwater, and communication. Staff specialists review and provide recommendations on subprogram activities and provide oversight of projects supported with Section 319 funds.

Administration and Operations

The Administration and Operations subprogram provides funds to support the internal needs of the NDEE for planning, monitoring, assessment and communication and to support technical assistance for external projects.

Project Development and Administration

NDEE staff are responsible for administering projects funded with Section 319 funds to assure that grant conditions are met, and project tasks are completed. This is done, in part, through review and selection of project proposals. Experience has shown that careful project design up front helps prevent most problems that may otherwise develop. Staff project managers keep abreast of project progress through semi-annual project reports, frequent communications and meetings with project sponsors, and periodic site visits. Staff project managers review materials and products of the projects as well. Staff review project budgets and reimbursement requests to assure expenditures are consistent with budgeted tasks. Project requirements are explained in guidance for the

various programs and for developing project implementation plans. Further oversight is achieved through performance and financial reviews of individual projects.

PROJECT PERFORMANCE REVIEW

Staff conduct a performance review for each project. A performance review consists of reviewing the Project Implementation Plan (PIP) with project sponsors and verifying that tasks were completed as described in the PIP. Verification of tasks may require field visits to confirm installation of conservation practices or facilities. Staff will strive to conduct a performance review near the mid-point of a project to allow for course corrections and at the end of some projects to confirm completion of all project tasks. All projects will receive periodic performance review during the course of the project.

PROJECT FINANCIAL REVIEW

Staff will conduct a financial review on each project. The review will verify that grant funds and match funds were expended as described in the project budget. The review also will assure that expenditures are appropriately documented in the sponsor's project files and are eligible activities. Financial reviews will be conducted periodically to allow for timely corrections, if necessary. Some projects will be selected for an additional financial review at the close of the project. The financial review will be documented in the project file with a memorandum summarizing the findings and recommendations from the review.

REPORTING

State and EPA staff communicate frequently to review progress, discuss policy and guidance changes, and to resolve difficulties in implementing the program. Annual reports and periodic program reviews provide an opportunity to evaluate progress in meeting objectives and make substantive changes in implementation strategy.

Progress of the program and individual projects is reported in several ways. NDEE staff submit annual reports to EPA on major tasks identified in annual NDEE work plans through the Grant Reporting and Tracking System (GRTS). Though some of these specific activities may span several years, they are reported incrementally as annual tasks, allowing NDEE tasks to be closed annually. GRTS is used as the primary method of reporting administrative details of the program. A narrative annual report serves a dual function as both an outlet for success stories and for summaries of administrative details. Annual performance reports for each open grant are submitted to EPA within 90 days of the end of the grant project/budget year. In addition, an annual report summarizing the accomplishments of Nebraska's Nonpoint Source Management Program are submitted to EPA by December 31 each year. Redundant reporting is minimized to the extent possible by consolidating information entered into GRTS that can be retrieved by EPA to satisfy reporting requirements.

Sponsors of external projects report progress through semi-annual reports to NDEE. NDEE staff review these reports and enter them into GRTS. Sponsors submit final project reports to NDEE upon completion of project tasks. NDEE reviews the final reports and approve or recommend revision of the report. Projects are closed when final reports and final financial statements are approved.

The NDEE forwards final reports for individual projects, submit final reports for internal projects and initiatives, and provide final financial statements to EPA upon completion of all tasks and projects described in the appropriate fiscal year's work plan. Within 45 days of submission and/or during the grant closeout process, EPA screens a subset of project final reports as part of its oversight responsibilities. Upon receipt of appropriate documentation, the grant is closed.

In addition to the required reporting under Section 319, the NDEE periodically reports program activities and financial status through other mechanisms. These include the Nebraska Integrated Report and reports to the Environmental Quality Council, state legislature, governor's office, and other entities.

SPECIAL SERVICES

From time to time, NDEE identifies a need for special services to enhance or accelerate implementation of the State Nonpoint Source Management Plan. Funds are provided in the Nonpoint Source Management Program to

accommodate this need and are negotiated in the state work plan on an annual basis. Services are administered through contractual arrangements with external partners or contractors. Our program partially funds liaison positions with University of Nebraska Extension and Nebraska Association of Resources Districts. NDEE funding for the Wellhead Protection Network and Nebraska Groundwater Quality Clearinghouse are other examples of special services. These arrangements, although temporary, may continue for extended periods. Funds are budgeted annually if the services are continued. Services may provide support for internal or external activities.

TARGETED STUDIES AND SPECIAL INITIATIVES

NDEE occasionally identifies special needs for information to support program management decisions, improve monitoring strategies and methods, justify water quality determinations, evaluate the effectiveness of conservation practices, or support similar actions. In addition, unique opportunities appear from time to time for the NDEE to support projects that are highly compatible with the goals of the Nonpoint Source Management Program, but don't easily fit into traditional project guidelines. The Targeted Studies and Special Initiatives subprogram provides funds to support projects that meet these special needs and opportunities. Targeted studies and special initiative projects are developed internally by NDEE and approved by EPA. Projects may be conducted by NDEE staff or commissioned to external partners or contractors. Previous examples of targeted studies and special initiatives include funding for watershed plan development, LiDAR data acquisition, and assessment of sand pit lake renovations using alum treatment.

WATERSHED AND GROUNDWATER AREA PLANNING

NDEE employs three types of planning to support nonpoint source management projects. These are Basin Management Plans, Watershed Management Plans, and Groundwater Area Management Plans. **Basin Management Plans** provide coverage of a river basin or sub-basin that allow multiple projects to be developed and implemented under the umbrella of the common basin plan and are designed to be developed and implemented by individual Natural Resource Districts. Significant targeting is done in Basin Management Plans such that targeted areas make up no more than 20% of the total Basin area. In some cases, due to the boundaries of NRD, Basin Management Plans may cover one or more HUC 8 areas. When this is the case, each individual HUC 8 should have its own sub-plan within the overall Basin plan with targeted areas making up no more than 20% of an individual HUC 8. When the Basin area contains HUC 8 fragments, plan development should be coordinated closely with NDEE to assure appropriate targeting is accomplished for an acceptable 9-element watershed based plan. **Watershed Management Plans** focus on a more local scale, providing direction for one or more sub-watershed projects. **Drinking Water Protection Management Plans** provide coverage for projects to restore or protect groundwater resources (e.g., groundwater recharge area, wellhead protection area).

In general, projects that implement a Watershed Management Plan (e.g. watershed projects, waterbody restoration projects) are considered to be restoration efforts. Projects that implement a Groundwater Area Management Plans (i.e. groundwater projects) are considered to be protection efforts. Based on the number of projected projects for the next five years and the schedule given in Table A.1, NDEE estimates that approximately 90% of project funds will be used for restoration projects and 10% will be used for protection projects.

Once an acceptable Basin, Watershed or Groundwater Area Management Plan is established, project sponsors may use them to develop **Project Implementation Plans (PIPs) to** direct activities for individual projects designed to achieve the objectives of the governing basin, watershed or groundwater area management plan. Section 319 funds may be used to support development of basin plans, watershed plans and groundwater area plans. The development of project implementation plans is not eligible for Section 319 funding. Proposals may be submitted at any time. Project implementation plans must be approved by EPA in order to qualify for Section 319 funding. Requirements for watershed-based planning projects are described in Chapter 11.

SMALL PROJECTS ASSISTANCE

The Small Projects Assistance subprogram was created to provide a rapid funding mechanism for small projects of great importance to the Nonpoint Source Management Program and to provide a mechanism to capture unique opportunities in imminent need of funding. Proposals may be submitted at any time. Project implementation

plans are approved at the state level. Project proposals may be submitted at any time and will be considered as funds are available. General Conditions for Small Projects Assistance projects are described in Chapter 11.

LARGE PROJECTS ASSISTANCE

The Large Projects Assistance subprogram supports large-scale projects to restore or protect water quality within a defined watershed or a defined groundwater management area and supports statewide projects to demonstrate emerging technologies or remove potential contaminants from the environment. Projects designed to enhance statewide capacity to provide educational programming and materials on management of nonpoint source pollution may be eligible for Section 319 support under the Large Project Assistance subprogram. Project proposals may be submitted at any time and will be considered as funds are available. Project implementation plans must be approved by both NDEE and EPA. Requirements for Large Project Assistance projects are described in Chapter 11.

Chapter 3 LONG TERM GOALS, OBJECTIVES, TASKS AND METRICS

Implementation of the Nebraska Nonpoint Source Management Plan is guided by long term goals and objectives designed to identify and address deficiencies to restore and protect Nebraska water resources from nonpoint source pollution. The goals facilitate: 1) implementation of the state Nonpoint Source Management Program, 2) communication and education regarding nonpoint source pollution and 3) implementation of activities and projects that will successfully reduce nonpoint source pollution in its water resources. Metrics establish the standard of measure to demonstrate progress towards the accomplishment of program goals, objectives and tasks.

The state Nonpoint Source Management Plan will be implemented through specific tasks designed to accomplish the interim objectives toward achieving the goals of the program. Other actions to address unforeseen opportunities that advance the goals of the Nonpoint Source Management Plan will be identified in the Section 319 Annual Plan of Work. The State Management Plan - Schedule (Table A.1) identifies program activities expected to be accomplished over the period of the entire Nonpoint Source Management Plan (2021-2036).

Goals – Objectives - Tasks

GOAL 1. **The primary goal of the Nebraska Nonpoint Source Management Program is to reduce nonpoint source water pollution and improve water quality in the state. The program will be a comprehensive and collaborative program that efficiently and effectively implements actions to restore and protect water resources from impairment by nonpoint source pollution.**

Objective 1. *Actions for management of nonpoint source pollution will be based on sound data and effective directing of resources.*

Task 1. Review and, as necessary, revise monitoring and assessment methods and protocols to assure that data accurately detect and quantify nonpoint source threats and impairments, and that data are useful in guiding nonpoint source management decisions.

Task 2. Evaluate nonpoint source pollution threats and impairments to water resources through ongoing monitoring, data assessment, and special studies.

Task 3. Revise, biennially, the lists of waters identified for restorative or protective management actions to identify degraded or impaired waters and high quality waters for nonpoint source pollution management actions based on the latest state Integrated Report, published reports, special studies, and consultation with natural resources specialists.

Task 4. Review and amend the state Nonpoint Source Management Plan at least every 5 years to update, at a minimum, the milestones, and schedule for implementation.

Objective 2. *Strong working partnerships and collaboration among appropriate local, state and federal agencies and organizations will be established and maintained regarding management of nonpoint source pollution.*

Task 1. Participate in the USDA State Technical Committee and other inter-organizational advisory committees and work groups to communicate issues regarding management of nonpoint source pollution.

Task 2. Develop and support local citizen advisory groups to assist in planning and implementing local nonpoint source pollution management projects and activities.

Task 3. Utilize interagency liaisons to facilitate coordination and integration of program activities.

Task 4. Conduct consistency reviews of select federally funded programs and activities in accordance with established procedures.

Objective 3: *Comprehensive and systematic strategies will be employed to restore and protect water resources from nonpoint source pollution and to communicate nonpoint source pollution information.*

Task 1. Develop basin, watershed, and drinking water protection management plans that meet EPA guidelines for a 9-element or alternative management plan and utilize multiple complementary conservation programs.

Task 2. Implement projects throughout the state that restore and protect water resources, reduce loading of pollutants, and lead to delisting of impaired waters or protection of high quality waters.

Task 3. Update at least two existing 9-element watershed management plans or alternative plans over the next five years (2021-2026).

Task 4. Develop at least two 9-element (or alternative) drinking water protection management plans over the next five years (2021-2026).

Objective 4. *The status, effectiveness and accomplishments of programs, projects and activities directed toward management of nonpoint source pollution will be continually assessed and periodically reported to appropriate audiences.*

Task 1. Conduct progress and financial reviews of Clean Water Act Section 319 projects.

Task 2. Track and assess implemented projects and activities to assure that restoration and protection of water resources and distribution of nonpoint source information are adequately addressed in a timely manner.

Task 3. Summarize program and project accomplishments and recommendations for further actions in annual, periodic and final reports and in project success stories.

Task 4. Submit 2 success stories to the EPA over the next five years (2021-2026).

GOAL 2. **Resource managers, public officials, community leaders and private citizens will understand the effects of human activities on water quality and support actions to restore and protect water resources from impairment by nonpoint source pollution.**

Objective 1. *Deficiencies in knowledge needed to improve decisions regarding management of nonpoint source pollution will be identified and investigated.*

Task 1. Identify and evaluate emerging or poorly understood nonpoint source pollutants such as bacteria, blue-green algae, hormones and antibiotics, and their sources in Nebraska.

Task 2. Develop and improve management practices to control nonpoint source pollution.

Objective 2. *Tools to effectively transfer knowledge and facilitate actions regarding management of nonpoint source pollution will be developed, improved and maintained.*

Task 1. Develop and improve guidance documents for developing and implementing basin management plans, watershed management plans, drinking water protection management plans, and project implementation plans to restore or protect water resources.

Task 2. Develop and improve guidance documents for developing and implementing effective communication programs, projects, and activities to educate key audiences about management of nonpoint source pollution.

Task 3. Develop and distribute audience-specific materials and methods to inform and engage community leaders, local media, youth, educators, and other defined audiences regarding nonpoint source pollution management.

Metrics

METRIC 1. **Increase the number of wellhead protection areas covered by a 9-element (or alternative) management plan by 20% over the next five years (2021-2026).**

METRIC 2. **Update at least two existing 9-element watershed management plans or alternative plans over the next five years (2021-2026).**

Chapter 4 THE NONPOINT SOURCE POLLUTION PROBLEM

Nonpoint source (NPS) pollution, unlike pollution from point sources (e.g., industrial and municipal wastewater treatment plants, etc.), comes from many diffuse sources and results in the degradation of the chemical, physical, and/or biological quality of water. Nonpoint source pollution is generally caused by rainfall, snowmelt, or irrigation water running off or percolating through the ground. As the water moves, it picks up and transports natural pollutants as well as pollutants associated with human activities, potentially depositing them into lakes, streams, wetlands, and aquifers. Atmospheric deposition and hydromodification are also sources of nonpoint source pollution.

Nonpoint Source Pollution in Nebraska

Nonpoint source pollution of Nebraska's surface and groundwater resources is a significant and widespread problem. Based on land use statistics, agricultural nonpoint sources are indicated as the primary source of stream water quality degradation in the state. The most common impact to lake water quality in the state is excessive siltation attributed to accelerated runoff at agricultural, urban, and construction sites. Although degradation of groundwater quality is increasingly being reported, or discovered in the state, the groundwater supply for most Nebraskans is of good quality. Major sources of groundwater contamination in Nebraska include agricultural activities (primarily excessive fertilizer applied to row crops), leaking underground storage tanks, septic systems, and waste disposal.

Categories of Nonpoint Source Pollution

For planning and management purposes, Nebraska focuses on eight nonpoint source pollution categories recognized by EPA. Emphasis on each category is relative to their contribution in the state.

- Agriculture
- Hydromodification
- Land Disposal
- Construction
- Urban Runoff/Stormwater
- Resource Extraction
- Silviculture
- Other

AGRICULTURE

The primary pollutants from cropland are sediment, nutrients, and pesticides (including herbicides, fungicides, and insecticides), and potentially, salts and minerals from irrigated land. Runoff and percolation from feedlots, intensively grazed pasture and rangeland can contribute nutrients, organic matter, and fecal bacteria to receiving surface waters and underlying groundwater. Livestock grazing freely within stream riparian areas can destabilize streambanks and damage riparian vegetation.

HYDROMODIFICATION

Physical alterations of watersheds, drainage ways, stream channels, and other land characteristics can impact surface water quality by introducing pollutants, altering flow regimes, and degrading habitat.

Channelization of streams and other changes in the landscape that increase the volume and velocity of runoff can accelerate erosion of the stream bed and banks and can physically degrade or destroy important aquatic habitats. Removal of riparian vegetation can increase water temperature, destabilize streambanks and reduce the ability of the riparian zone to filter pollutants. Conversely, reducing flows through diversions or depletions can limit the suitability of aquatic habitats to support fish and macroinvertebrate populations and decrease a stream's ability to assimilate pollutants without causing harmful effects. Diversion of water sources and draining and filling of wetlands greatly limits the functional value of these waterbodies for waterfowl usage, flow regulation, and water filtration. Incision of streambeds, whether mechanically or through natural or accelerated erosion, can lower the water table and dewater wetlands and local aquifers. Significant hydromodification concerns in Nebraska include impacts on streams and lakes resulting from landscape alterations and stream channelization, and impacts on

groundwater and wetlands caused by water diversion, draining and filling wetlands and lowering of groundwater levels through stream channel degradation.

LAND DISPOSAL

Both toxic and nontoxic pollutants from land disposal of wastes can be transported to surface water and groundwater. Runoff from land disposal sites can contribute sediment, nutrients, fecal bacteria, and a myriad of toxic substances to receiving waters. Regulation of land disposal in Nebraska limits the impact of these potential sources. Abandoned landfill sites, streamside dumping, roadside dumping, improper manure application, and ineffective onsite wastewater systems are the primary concern for land disposal pollution in Nebraska.

CONSTRUCTION

Erosion rates from construction sites typically are 10 to 20 times that of agricultural lands, and runoff rates can be as high as 100 times that of agricultural lands, resulting in localized impacts on water quality that may be severe. Construction sites may also generate other pollutants including fertilizer, pesticides, petroleum products, construction debris, and other solid wastes. Enhanced stormwater management regulations have greatly reduced pollution from larger construction sites in Nebraska, but runoff pollution from smaller sites and maintenance operations persist.

URBAN RUNOFF / STORMWATER

The urban nonpoint source problem is most acute in more heavily populated areas, although runoff from smaller communities and individual properties can be locally significant. Rainwater running off roofs, lawns, streets, parking lots, industrial sites, and other areas transports sediment, heavy metals, inorganic chemicals, litter, petroleum products, fertilizers, and fecal bacteria to surface waters. Some of these pollutants also may percolate into groundwater. Ineffective onsite wastewater systems in small communities and combined sanitary and storm sewers in Omaha also are sources of concern for nutrient and bacteria contamination of water resources in Nebraska.

SILVICULTURE

Silviculture activities include road building, pesticide application, removal of trees, logging operations, and site preparation for revegetation. Sediment from road building and site preparation has the largest potential to impact water resources, although fertilizers and pesticides may cause periodic impacts. Because of Nebraska's relatively small forestry industry, nonpoint source pollution from silviculture generally is limited to small local impacts.

RESOURCE EXTRACTION

Resource extraction (i.e., mining) cannot be viewed as a homogeneous source of nonpoint source pollution. Many different materials are "mined", each with its own set of nonpoint source problems. Mining is a relatively small industry in Nebraska consisting primarily of sand and gravel extraction in the flood plains of large rivers. Lack of discharge from these operations limits their surface water impact mostly to disturbance of local aquatic habitat and hydrologic alteration. Poor management of gravel mining operations potentially could impact groundwater. Deep well extraction of petroleum and uranium has potential to pollute groundwater, most likely by the introduction of brine water to local aquifers. Close regulation of these industries in Nebraska limits their contribution to nonpoint source pollution.

OTHER

Some nonpoint source pollutants are difficult to categorize within a well-defined group. These include pollutants such as acid rain and mercury that are introduced to water resources through atmospheric deposition. Elements, such as selenium, arsenic, or mercury, that occur naturally in some soils or bedrock may leach into water resources in high enough concentrations to cause impairment. Legacy compounds such as PCBs and DDT that are no longer used may persist in sediments and leach into the water column or accumulate in fish tissue. Random events such as chemical spills and disturbance from recreation and other activities also may degrade water resources. Water quality impairments from selenium and mercury are common in Nebraska, but generally are beyond effective management.

Chapter 5 IDENTIFICATION OF IMPAIRED WATERS FOR RESTORATIVE ACTIONS

Effective implementation of the Nonpoint Source Management Program requires the direction of technical and financial resources to restore high-value water resources most impacted by nonpoint source pollution. Waters identified for restorative management actions include waters determined to be impaired for one or more designated uses (303(d) list, Category 4 or Category 5) in the state's Integrated Report and other waters determined by partner organizations to be negatively impacted by nonpoint source pollution.

This chapter defines the types of water resources and the criteria for identifying these resources for restorative management actions. Projects to restore waters degraded by nonpoint source pollution must be designed to implement a comprehensive management plan that addresses known or potential sources of nonpoint source pollution that may threaten the water resource.

Streams and Rivers

Attention to streams has been a relatively small component of state's Nonpoint Source Management Program. This was largely due to the greater focus given to lakes and reservoirs because of their predominance as the primary resource for aquatic recreation in Nebraska. As restoration projects on many of the major recreational lakes have been completed, interest in abating nonpoint source pollution of streams has increased.

Bacterial contamination (*E. coli*) is the primary cause of impairment to Nebraska streams. Sources of bacteria range widely from livestock, septic systems, and wildlife.

The presence of atrazine in Nebraska's surface waters reflects the magnitude of its usage and the local conditions where it is applied. The highest atrazine levels have been found to be associated with runoff events from intense spring rains, shortly after the herbicide has been applied. Streams exceeding atrazine limits are impaired for Aquatic Life Designated Use.

Agricultural and urban development and channelization of streams has greatly accelerated the natural processes of erosion and deposition that produce stable meandering streams. Increased flow and altered flow patterns cause deep incision of the stream channel, disconnection from the natural floodplain and subsequent streambank instability. Destabilized streams degrade aquatic habitat and increase the delivery of sediment and other pollutants to downstream waters.

Concentrated installation of conservation practices designed to reduce soil erosion in a watershed may introduce "hungry water" that accelerates bed and bank erosion within the receiving steam. Both stream stability and aquatic habitat may be degraded in the process. Destabilized streams will continue to erode until the water column acquires a sufficient sediment bed load for the erosion/deposition process to again reach equilibrium. Attention to stream stability and aquatic habitat protection should be included in a well-designed watershed management project to avoid these unintended consequences. Nebraska recognizes the following stream types, as defined in Title 117, for restorative actions as part of a watershed management approach:

Cold Water Stream – The stream must be impaired for one or more of its designated uses. Stream projects should be designed to include protection or improvement in stream hydrologic and morphologic integrity, and to protect or improve biologic and habitat matrices.

Warm Water Stream – The stream must be impaired for one or more of its designated uses. Stream projects should be designed to include protection or improvement in stream hydrologic and morphologic integrity, and to protect or improve biologic and habitat matrices.

Streams identified for restorative management actions are listed in Appendix B (Table B.1). Other stream restoration projects may be considered where supporting data justify the project.

Lakes and Reservoirs

Nonpoint source pollution is the primary cause of water quality impairment in Nebraska's lakes. This can be attributed to three factors: 1) many of Nebraska's lakes are on-stream reservoirs that trap pollutants during runoff events, 2) intensive land disturbance by agriculture and urban construction occur within many lake watersheds, and 3) Nebraska regulations prohibit discharge of point source pollutants directly into lakes and reservoirs. The two most common problems impacting the state's lakes are sedimentation and accelerated eutrophication. High levels of E. coli bacteria and harmful algal blooms (HABs) occur frequently in some Nebraska lakes.

Sedimentation from upland runoff and shoreline erosion is a significant cause of impairment in Nebraska lakes. Sediment can reduce the storage volume of lakes and severely impair recreation, aesthetic and aquatic life uses. Suspended sediment increases the turbidity of the water and may decrease light penetration needed for growth of aquatic plants and increase water temperature by absorbing solar radiation. In-flowing sediments also deliver attached nutrients, particularly phosphorous, and other attached contaminants to lakes from the watershed.

Excess nutrients, especially phosphorus, can drive unsightly algae blooms that produce objectionable odors and may foster toxin-producing blooms of blue-green algae. Upland runoff is the primary source of nutrients in most lakes, but internal cycling of nutrients from legacy sediments are also a major source of nutrient loading in the water column of many Nebraska lakes. Internal nutrient loadings may mask the benefits of watershed projects if ignored. Control of internal nutrient loading can be an important component of efforts to resolve nutrient impairment of lakes.

Harmful algal blooms of blue-green algae (Cyanobacteria) has emerged as a significant cause of lake impairment. Blooms of cyanobacteria release algal toxins (primarily microcystin) into the water column that may cause skin lesions from contact and may cause intestinal distress, impaired liver function, or death from consumption of water. High nutrient levels and nutrient imbalance often are associated with algal blooms, and the exact combination of conditions that Blooms of cyanobacteria and associated toxins result in alerts being posted online and at many beaches during the recreation season.

Bacterial contamination (*E. coli*) is a significant and pervasive cause of impairment to many Nebraska lakes, causing health advisories to be issued for many swimming beaches during the recreation season. Sources of bacteria range widely from livestock operations, septic systems, and wildlife.

External loading of nonpoint source pollutants from agricultural and urban landscapes and internal loading (recycling) of pollutants in the water column threaten the longevity and pubic use of these waterbodies. Nebraska recognizes the following lake and reservoir types for restorative management actions as part of a watershed or area management approach.

Natural Lake and Associated Wet Meadows - The waterbody must be impaired for one or more of its designated uses and provide public access or other significant public benefits which management actions are designed to restore.

Publicly-Owned Reservoir - The waterbody must be impaired for one or more of its designated uses and provide public access or other significant public benefits which management actions are designed to restore.

Community Lake – The waterbody must be a community-owned lake (pond) within or directly adjacent to the city limits and be impaired for one or more of its designated uses which management actions are designed to restore.

Lakes and reservoirs identified for restorative management actions are listed in Appendix C (Table C.1). Other lake restoration projects may be considered where supporting data justify the project.

Groundwater

The most common groundwater contaminant in Nebraska is nitrate-nitrogen where contamination occurs primarily through leaching of nitrate-nitrogen from applied fertilizer through the soil profile. This contamination is most prevalent in areas with a high density of irrigated land cropped to corn, particularly in highly vulnerable areas with shallow depths to groundwater and highly permeable soil.

Pesticide contamination is occasionally detected in sampled wells. These contaminations may be associated with accidents that result in a back-flow or spill of agricultural chemicals into or near a well during farming operations. Old or poorly constructed wells are another potential source of pesticide contamination in groundwater.

Bacteria and volatile organic compounds are occasionally detected in water well samples throughout the state. Bacterial contamination is mostly associated with intrusion of surface water from nearby feedlots or septic systems through faulty well casings and other construction deficiencies. Contamination by volatile organic compounds mostly is associated with commercial and industrial operations in urban areas or with storage and processing facilities for agricultural products.

Nebraska is highly dependent on groundwater for human consumption (source of drinking water for 85% of the population) and for agricultural and industrial processes. Maintenance of high quality groundwater resources is both a human health and economic necessity. Nebraska recognizes the following groundwater areas for restorative management actions as part of a watershed or area management approach.

Groundwater Recharge Area – The groundwater recharge area must be within a Groundwater Management Area designated as a Phase Two or higher level by the local Natural Resources District, have an elevated nitrate-nitrogen concentration in the underlying aquifer and encompass one or more delineated wellhead protection areas.

Wellhead Protection Area - Individual wellhead protection areas must be within a Groundwater Management Area designated as a Phase Two or higher level by the local Natural Resources District, serve a community public water system and have a current delineation map.

Criteria for identifying groundwater recharge areas for restorative management actions are described in Appendix D (Table D.1). Other groundwater restoration projects may be considered where supporting data justify the project.

Drinking Water Protection Management Plan (DWPMP) Area – Project areas that are delineated under the DWPMP are eligible for restorative management actions after meeting the criteria for the 9 element alternative watershed-based plan.

Wetlands

Wetlands influence both water quantity and water quality. They provide flood control and conveyance as well as ecological, cultural, aesthetic, and recreational benefits. The complex microenvironments they develop are particularly beneficial in supporting biodiversity. Many species of fish, birds, reptiles, amphibians, invertebrates, mammals, and plants depend on wetlands for all or part of their life cycle. In Nebraska, nine of the 12 federally-listed and 19 of the 27 state-listed threatened and endangered species utilize wetlands (Simpson, personal communication, 2020).

Agricultural and urban development has negatively impacted wetlands in most areas of the state. Direct damage has been caused by altering wetlands through filling, ditching, or tiling. Indirect damage has resulted from conversion of prairie to row crop agriculture causing excessive sedimentation, diversion of water flows or lowering of the water table. Encroachment of invasive species is a growing threat to the integrity of aquatic habitat provided by wetlands. Agricultural and urban development activities continue to threaten wetlands from the impact of nonpoint source pollution.

Nebraska's Title 117 includes the water quality standards of wetlands. NDEE partners with the Nebraska Game and Parks Commission (NGPC) on Section 319 projects where wetlands are involved. Through the Nebraska Wetland Program Plan, NGPC, in association with EPA conducted the National Wetland Condition Assessment (NWCA) Survey which included the evaluation of wetland condition for water quality. This survey is conducted every five years. In addition, NGPC receives funding from EPA through the Wetland Program Development Grant.

In 2005, Ted LaGrange, the Wetland Program Manager for the Nebraska Game and Parks Commission, published the "Guide to Nebraska Wetlands and their Conservation Needs: Second Edition". For the purposes of 319 projects, NDEE will adopt the descriptions and conservation practices outlined in LaGrange's 2005 publication. The wetlands that Nebraska will consider for restoration actions as part of a watershed or area based management plan will be identified (delineated), assessed for expected wetland function, and a determination will be made as to whether the expected wetland function is degraded.

Identification of wetlands:

The 319 Program will consider three diagnostic environmental characteristics used to identify (delineate) wetlands (Corps of Engineers Wetland Delineation Manual, 1987). The characteristics are:

- Vegetation - defined by a prevalence of hydric (water-loving) plants adapted to growing in inundated or saturated conditions.

- Hydric soils - the presence of soils that developed under inundated or saturated conditions that limit oxygen (anaerobic conditions).

- Hydrology - defined by inundation or saturation by water at some time during the growing season (the time when plants are actively growing).

Assessment of Wetlands

In order to receive 319 funding for a project directly addressing water quality issues in wetland(s), an assessment of the current state of the wetland(s) should be included in a water quality plan. This assessment should include descriptions of the current state of their hydrology, biological and vegetative community, and soils within the wetland or former wetland footprint. Alterations to the watershed of the wetland should also be assessed. The 319 Program will accept a "rapid" assessment as long as the methodology has been fitted to wetlands in Nebraska. The NGPC is in the process of refining a Rapid Assessment Method for Nebraska wetlands (LaGrange, 2015) which may be used to assess wetlands for 319 purposes.

Once a wetland assessment has been completed as a part of an accepted Water Quality Plan or Project Implementation Plan, and the assessment indicates that the wetland(s) are not functioning as expected, the 319 Program will consider them for restoration project purposes.

Chapter 6 IDENTIFICATION OF OUTSTANDING WATERS FOR PROTECTIVE ACTIONS

Restoration of impaired waters has been the historic focus of Nonpoint Source Management Programs at both federal and state levels. However, effective management of nonpoint source water pollution must also include attention to preventing high quality waters from becoming impaired. The Nebraska nonpoint source program recognizes special water resources that merit implementation of protective measures to prevent them from becoming impaired. Waters identified for protective actions include waters determined to be supporting all of their designated uses (Category 1) in the state's Integrated Report and high-quality water resources identified by partner organizations for protective actions.

This chapter defines the types of special water resources and the criteria for identifying these resources for protective management actions. Projects to protect high quality water resources must be designed to implement a comprehensive management plan that addresses known or potential sources of nonpoint source pollution that may threaten the water resource.

Streams and Rivers

While Nebraska has abundant miles of streams of many types, private ownership of the surrounding landscape limits access for public uses. At the same time, development of watersheds for urban and agricultural uses threatens water quality and the biological communities dependent on streams. It is therefore important to protect limited high-quality stream resources available for public recreation and to protect the ecological integrity of streams that provide good water quality and support aquatic life. Nebraska recognizes the following stream types, as defined in Title 117, for protective actions as part of a watershed management approach:

Cold Water A Stream – The stream must support a reproducing population of Salmonid species and meet all of its designated uses.

State Resource Water B – The stream must be classified as a State Resource Water B and meet all of its designated uses.

Warm Water A, Warm Water B, and Cold Water B Streams – The stream must meet all of its designated uses. Streams should be rated good or better for each of the biological indicators: Index of Biological Integrity (IBI), Index of Community Integrity (ICI), and Nebraska Habitat Index (NHI). Where biologic and/or habitat data are lacking, the project must be designed to assess and achieve these metrics.

Streams identified for protective management actions are listed in Appendix B (Table B.2). Other stream protection projects may be considered where supporting data justify the project.

Lakes and Reservoirs

Natural lakes are particularly abundant in the Sandhills region of Nebraska, but occur in fewer numbers across the state, many as oxbow lakes. In addition, numerous reservoirs have been constructed in Nebraska to provide a reliable water supply for agricultural and urban development and to protect those developments from flooding. Public access to lakes and reservoirs has made them the primary resources for water-based recreation in the state. Sediment, nutrient and bacteria runoff from agricultural and urban landscapes threaten the longevity and pubic uses of these waterbodies. Nebraska recognizes the following lake and reservoir types for protective actions as part of a watershed approach.

Natural Lake and Associated Wet Meadows - The lake must meet all of its designated uses and provide public access or other significant public benefits which management actions are designed to protect.

Publicly-Owned Reservoir - The waterbody must meet all of its designated uses and provide public access or other significant public benefits which management actions are designed to protect.

New Lake-to-be-Built – The proposed reservoir must be publicly-owned and provide public access for recreation when completed. The sponsoring entity must provide assurance that funding has been secured for construction.

Lakes identified for protective management actions are listed in Appendix C (Table C.2). Other lake protection projects may be considered where supporting data justify the project.

Groundwater

Groundwater supplies drinking water to nearly 88% of the citizens of Nebraska and is the primary source of drinking water for. Most community and private drinking water systems deliver water directly from the wells to consumers with minimal or no treatment. To provide these citizens with safe drinking water, it is critical to protect groundwater and the recharge area influencing the domestic use water supply from contamination. Nebraska recognizes the following groundwater recharge areas for protective actions as part of an area management approach:

Wellhead Protection Area – The system must not be under administrative orders, for water quality violations, by Nebraska Department of Health and Human Services, nitrate-nitrogen (NO_3) concentration in the underlying aquifer must not exceed 5ppm and the area must have a current delineation map.

Criteria for identifying groundwater recharge areas for protective management actions are listed in Appendix D (Table D.1). Other groundwater protection projects may be considered where supporting data justify the project.

Drinking Water Protection Management Plan (DWPMP) Area – Project areas that are delineated under the DWPMP are eligible for restorative management actions after meeting the criteria for the 9 element alternative watershed-based plan.

Wetlands

Wetlands influence both water quantity and water quality. They provide flood control and conveyance as well as ecological, cultural, aesthetic, and recreational benefits. The complex microenvironments wetlands develop are particularly beneficial in supporting biodiversity. Many species of fish, birds, reptiles, amphibians, invertebrates, mammals, and plants depend on wetlands for all or part of their life cycle. In Nebraska, 11 of the 17 federally-listed and 20 of the 30 state-listed threatened and endangered species utilize wetlands (Simpson, personal communication, March 23, 2020).

Agricultural and urban development has negatively impacted wetlands in most areas of the state. Direct damage has been caused by altering wetlands through filling, ditching, tiling, or excavating concentration pits. Indirect damage has resulted from conversion of prairie to row crop agriculture causing excessive sedimentation, diversion of water flows or lowering of the water table. Encroachment of invasive species is a growing threat to the integrity of aquatic habitat provided by wetlands. Agricultural and urban development activities continue to threaten wetlands from the impact of nonpoint source pollution.

Nebraska's Title 117 includes the water quality standards of wetlands. NDEE partners with the Nebraska Game and Parks Commission (NGPC) on Section 319 projects where wetlands are involved. Through the Nebraska Wetland Program Plan, NGPC, in association with EPA conducted the National Wetland Condition Assessment (NWCA) Survey which included the evaluation of wetland condition for water quality. This survey is conducted every five years. In addition, NGPC receives funding from EPA through the Wetland Program Development Grant.

In 2005 Ted LaGrange, the Wetland Program Manager for the Nebraska Game and Parks Commission, published the "Guide to Nebraska Wetlands and their Conservation Needs: Second Edition". For the purposes of 319 projects, NDEE will adopt the descriptions and conservation practices outlined in LaGrange's 2005 publication. The wetlands that Nebraska will consider for protective actions as part of a watershed or area based management plan will be identified (delineated), assessed for expected wetland function, and a determination will be made as to whether the expected wetland functions are being met.

Identification of wetlands:

The 319 Program will consider three diagnostic environmental characteristics used to identify (delineate) wetlands (Corps of Engineers Wetland Delineation Manual, 1987). The characteristics are:

- Vegetation - defined by a prevalence of hydric (water-loving) plants adapted to growing in inundated or saturated conditions.

- Hydric soils - the presence of soils that developed under inundated or saturated conditions that limit oxygen (anaerobic conditions).

- Hydrology - defined by inundation or saturation by water at some time during the growing season (the time when plants are actively growing).

Assessment of Wetlands

In order to receive 319 funding for a project directly addressing water quality issues in wetland(s), an assessment of the current state of the wetland(s) should be included in a water quality plan. This assessment should include descriptions of the current state of the hydrology, biological and vegetative community, and soils within the wetland. Alterations to the watershed of the wetland should also be assessed. The 319 Program will accept a "rapid" assessment as long as the methodology has been fitted to wetlands in Nebraska. The NGPC is in the process of refining a Rapid Assessment Method for Nebraska wetlands (LaGrange, 2015) which may be used to assess wetlands for 319 purposes.

Once a wetland assessment has been completed as a part of a plan in an accepted Water Quality Plan or Project Implementation Plan, and the assessment indicates that the wetland(s) are functioning as expected, the 319 Program will consider them for protection project purposes.

Chapter 7 COMMUNICATION

Effective restoration and protection of water resources occurs only when changes in human behavior and social norms make water quality improvements sustainable. Effective communication, therefore, is critical to initiate and facilitate changes in behaviors of land managers that lead to adoption and maintenance of conservation practices to improve and conserve the state's water resources. Public and community involvement is essential to the success of nonpoint source management in Nebraska.

Benefits of Investing in Communications

A well-planned and executed communication campaign can establish understanding and trust among citizens regarding a project. Greater cooperation and increased participation by land managers in the project areas will help the project reach its implementation and water quality goals more quickly. The knowledge and skills acquired through effective communication and experience in successfully implementing conservation practices through participation in the project will lead to permanent changes in attitudes and behaviors that will sustain the project's environmental improvements. An effective communication campaign will achieve the following benefits.

- Raise awareness of the issues.
- Develop partnerships between agencies.
- Strengthen the ability of organizations to manage nonpoint source pollution.
- Motivate action.
- Persuade local decision makers to adopt new policies.
- Improve technology adoption.
- Accelerate land owners and producers adoption rates.
- Generate excitement.

Learning Process for Conservation Adoption

Solving and preventing most nonpoint source pollution problems requires people to adopt new practices and change behaviors. Therefore, it is important to address the learning process in order to affect positive behavioral change toward management of nonpoint source pollution. The two main components of the learning process that lead to the adoption of new conservation practices are:

1) gathering and evaluating new information and
2) applying the new information (Abdi Ghadim and Pannell, 1999).

During the first stage in the learning process, land managers collect, assess, and evaluate new information. This process reduces uncertainty and allows them to make good decisions that best advance overall management goals. (Marra et al, 2003). The probability of making a good decision increases over time with increasing knowledge, experience and practice (Pannell et al, 2006). During the second stage, land managers apply the newly gained knowledge to their personal situation (Tsur et al, 1990). Implementing new land management practices requires knowledge, skill and decision-making on components such as practice location, timing, sequencing scale, etc.

Using Motivations for Conservation Adoption and Behavior Change to direct communication Strategy

The following information should be used to target specific audiences, based on the nonpoint source management goals identified for individual watersheds and projects. While it is often thought that farm size, duration of land **ownership** and cost to implement practices are the factors that most influence decisions to adopt conservation practices, recent studies have shown this *not* to be the case (Ryan, et. al, 2002). Rather, **social processes** often are the most critical factor influencing a land manager's decision to adopt conservation practices.

A survey conducted in 2012 by Useful to Usable (U2U) and SustainableCorn.org asked Midwestern corn producers to indicate how influential various groups and individuals are when making decisions about agricultural practices and strategies. The results (Figure 7.1) showed that family, chemical dealers, and seed dealers have the greatest influence on land management decisions.

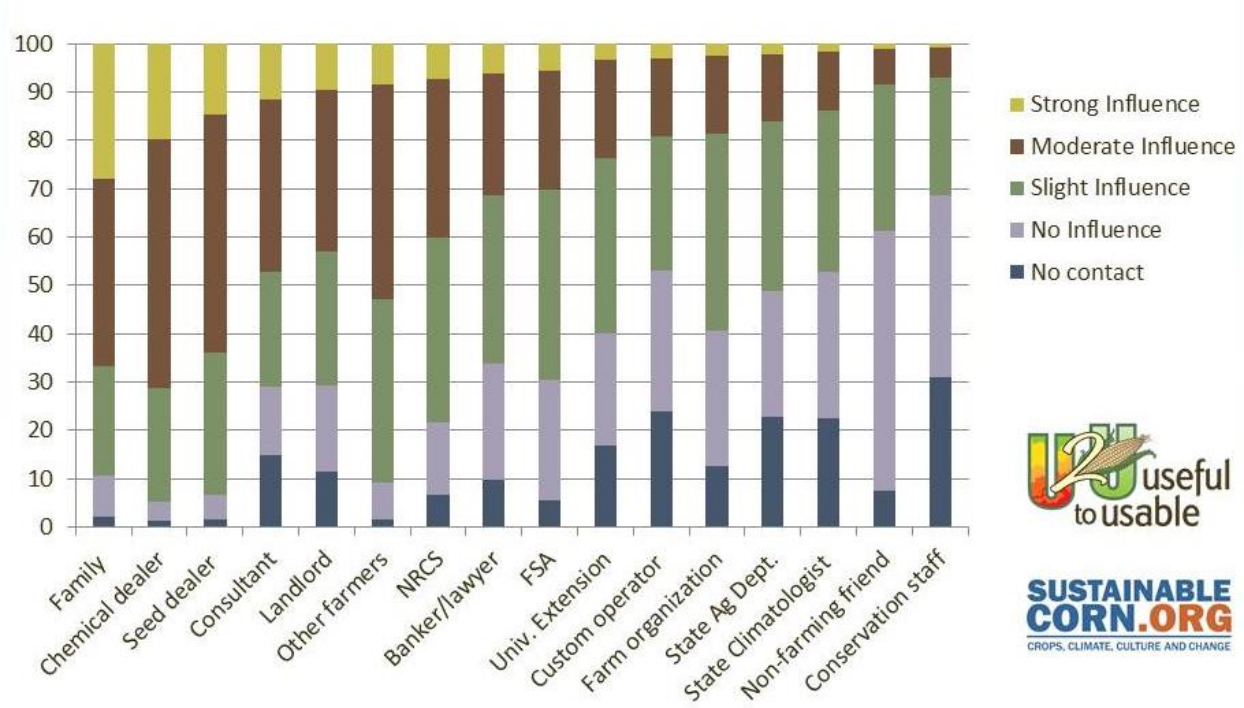

Figure 7.1 Sources Influencing Adoption of Conservation Practices

The study further investigated which groups are the most trusted source of information. The most trusted sources of information included University Extension, scientists, farm groups, and family and friends. Least trusted sources included mainstream media, online social media, radio talk show hosts, and environmental organizations (Figure 7.2).

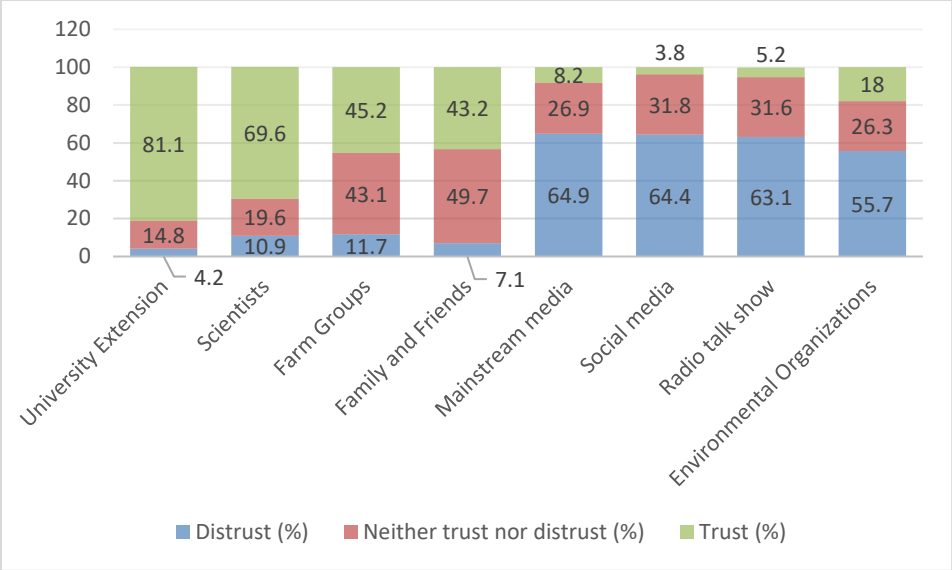

Figure 7.2 Most and Least Trusted Sources of Conservation Information

Checklist: Developing & Implementing a Communication Strategy

The communication component of Water Quality Management Plans or projects will vary depending on the program or the type, scope, and size of the project, the audiences to be targeted, and the messages to be delivered. Guidance is available in many forms for effective watershed planning, with the US EPA's *Handbook for Developing Watershed Plans to Restore and Protect Our Waters* as a primary reference. In this guidebook the US EPA identifies nine elements that are required for watershed plans, one of which includes an information and education (communication) component.

NDEE will review Management Plans and Project Implementation Plans (PIPs) using the following guidelines below to ensure an effective communication strategy is developed and implemented.

1. **Define Communication Goals.** Communication goals should support the overall watershed plan and project goals, and mirror the Nebraska NPS State Plan Goal 2: *Resource managers, public officials, community leaders and private citizens will understand the effects of human activities on water quality and support actions to restore and protect water resources from impairment by nonpoint source pollution.* Communication goals should address the following:
    - ☐ Define desired results of communication.
    - ☐ Identify how communication goals support overall plan and project goals.
    - ☐ Define intended target audiences.

2. **Review Demographic and Practice Adoption Data.** The target audience will influence the message delivered, who delivers the message, and how it is delivered. A review of demographic and practice adoption data may require readjusting communication goals. Things to consider include:
    - ☐ Review the demographic data of the target audience(s). For example, producer age, gender, racial distribution, economic range, ownership data (renters, absentee owners, etc.) education level, etc.

- Review practice adoption data. Things to consider may include, but are not limited to: general agronomic practices, conservation practices frequently adopted, timing and method of fertilizer applications, harvest methods, culturally accepted practices, acres using each conservation practice, percent of producers who use NRCS financial support, etc.
- Identify deficiencies in awareness and knowledge about water quality pollutants and sources.
- Identify deficiencies in awareness and knowledge about conservation practices.
- Identify barriers to adoption of conservation practices (e.g. economic concerns, equipment needs, land rental, etc.)

3. **Review Awareness, Attitudes and Constraints.** By further evaluating a target audience's awareness, attitudes, and constraints, communication goals and strategies can be further refined. For example, many farmers do not believe that farming activities are a significant contributor to water pollution or even that water pollution is a problem (Hau, Zulauf, and Sohngen, 2004). If this attitude is present in a given project area, it may be the largest constraint to conducting an effective communication program. Consider the following:
   - Identify social influences and attitudes on water quality issues.
   - Identify constraints and barriers to behavior changes. Things to consider may include, but are not limited to: economic barriers, aversion to government programs, antiquated machinery, cultural factors, etc. This information can be gathered from a survey, open house or other method.
   - Identify most and least trusted sources of information.
   - Identify existing attitudes that can be leveraged in crafting a communication strategy.

4. **Develop a Communication Strategy.** Significant planning and evaluation should have occurred during the development of a 9-element Watershed Management Plan, or alternative plan like a Drinking Water Protection Management Plan, prior to beginning the development of a communication strategy. An effective communication strategy will make the objective and tasks of a Management Plan or Project Implementation Plan successful. By following this template, a generalized Communication Strategy can be developed for the Management Plan with a more detailed strategy development in a PIP. At this point, specific activities, delivery methods, and effective messages should be developed. In addition, the following questions should be addressed.
   - What social outcomes need to be achieved to improve water quality?
   - What unique, key or general audiences should be targeted?
   - What messages will be effective at reaching members of the target audiences?
   - How should the messages be delivered to each audience? Does it change for different types of producers? Is there a separate message for community members?
   - Who is the best messenger for each target audience? Who should deliver the messages? Who needs to be recruited?

5. **Implementing the Communication Strategy.** It is essential to invest time and resources *promoting* the messages that support the project.
   - Identify where the target audiences regularly get information about conservation practices and land management, then target this method of communication.
   - Begin promoting any event at least 2 – 3 weeks ahead of the event, preferably more.
   - Promote events multiple times through multiple methods. For example, a newsletter article in the NRD mailing one month ahead of time, a news article in a newspaper two weeks prior to an

event, an email newsletter from local Extension two weeks ahead of time, a reminder postcard sent one week ahead of the event, and personal invitations and phone calls to key stakeholders up to one week ahead of time. Some communities may be served by a relatively local radio station that might promote the event as well.

Implementation of the Nebraska Nonpoint Source Management Plan is dependent on an effective communication strategy (see Chapter 3, Goal 2). The information described in this chapter is meant to serve primarily as a template for developing the communications component of a Management Plan or Project Implementation Plan, but should be reflected in the communication component of subsequent project implementation plans as well. This chapter is intended to encourage the implementation of in-depth information, education, and communication during plan development and implementation beyond the use of single product or single activity strategies such as a standalone brochure or newsletter. The communication component of a plan must be designed as an integrated campaign of products, activities and events that repetitively delivers consistent messages to specific audiences through effective delivery methods. This chapter discusses the process of learning, including factors that influence how people process and respond to information to make conservation decisions and factors that influence permanent adoption of conservation practices. Watershed Management Plans (9-Element Plans) will be reviewed using the suggested template described in this chapter.

Chapter 8 NONPOINT SOURCE MONITORING STRATEGY

The Nebraska Department of Environment and Energy is charged with monitoring, assessing, and to the extent possible, managing the state's water resources. The purpose of this work is not only to provide critical data to the Nonpoint Source Management Program but also to protect and maintain a high quality of water. The water quality monitoring program consists of a variety of different monitoring strategies completed on 17,000 miles of flowing rivers and streams, more than 134,000 acres of surface water in lakes and reservoirs, as well as the vast storage of groundwater in Nebraska's aquifers.

Water quality monitoring is an integral and crucial mechanism for the successful implementation of the Nebraska Nonpoint Source Management Program. Water quality monitoring for nonpoint sources of pollution includes the important element of relating the physical, chemical, and biological characteristics of receiving waters to land use characteristics. A well-planned and implemented water quality monitoring program will provide current information needed to address several key water quality management questions.

Section 319 funding may be used for monitoring in specific waterbodies consistent with the state's Nonpoint Source Management Program to:

(1) identify nonpoint sources of pollution,
(2) support the development of watershed-based management plans or acceptable alternative plans, or
(3) evaluate the effectiveness of nonpoint source pollution management projects in restoring or protecting water resources.

Project funding may be used for water quality monitoring to assess the effectiveness of on-the-ground activities to improve water quality as part of the implementation of a watershed or area management plan.

Each of the following monitoring programs provides support for successful management of nonpoint source pollution in Nebraska. Details of Nebraska's monitoring efforts are described in the Nebraska Water Quality Monitoring Strategy 2016-2022. Environmental monitoring must be conducted under an approved Quality Assurance Project Plan (QAPP) regardless of the entity conducting the monitoring unless specifically exempt. Monitoring conducted solely for educational and outreach purposes are exempt from the QAPP requirement.

Ambient Stream Monitoring

Ambient monitoring is done at 101 fixed monitoring sites designed to collect data monthly within all 13 of Nebraska's major river basins. Samples are collected year-round in the first week of each month from each site.

Nebraska Lake Monitoring

Monitoring is done from May 1 to September 30 (the recreation season) on a monthly basis on publicly owned lakes and reservoirs across the state. Both chemical and biological parameters are measured to determine if water quality supports the lake's designated uses.

Public Beach Monitoring

Samples are taken at 50+ public beaches to measure E. coli bacteria and blue-green algal (cyanobacteria) toxins, (microcystin), to give an indication of the quality of water at Nebraska public swimming beaches. Weekly samples are collected at recreational lakes and reservoirs during the recreation season

Groundwater Quality Monitoring

Samples of groundwater are taken each year from wells across the state by the local Natural Resources Districts. A variety of parameters are tested, the most prominent being nitrate-nitrogen.

Basin Rotation Monitoring

Monitoring is done on a six-year rotation in the 13 major river basins in the state (Figure 8.1). Monitoring in each basin, during its rotation year, is conducted on a weekly basis between May 1 and September 30 at up to 45 sites.

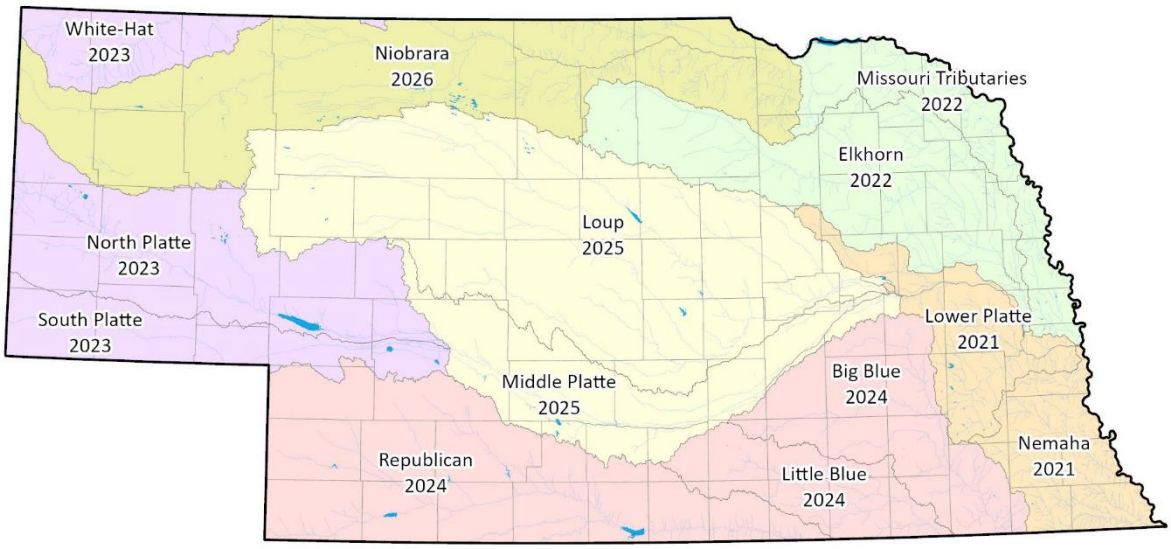

Figure 8.1 Nebraska River Basins Mapped for Basin Rotation Monitoring.

Chapter 9 TECHNICAL AND FINANCIAL ASSISTANCE

Effective management of nonpoint source pollution necessarily requires a cooperative and coordinated effort by many agencies and organizations, both public and private. Various regulatory and non-regulatory programs are administered by federal, state and local agencies that support sustainable management of nonpoint source pollution in Nebraska. Each organization is uniquely equipped to deliver specific services and assistance to the citizens of Nebraska to help reduce the effects of nonpoint source pollution on the state's water resources. The Nebraska Nonpoint Source Management Program seeks to foster strong and effective partnerships that maximize coordination of each entity's efforts to restore and protect the quality of Nebraska's surface and groundwater resources while maximizing ancillary environmental benefits.

Organizations cooperate through both formal and informal arrangements. Informal efforts include inter-organizational committees, advisory groups, program and project consultations, and staff interactions. Formal arrangements include involvement in cooperative agreements, shared liaisons and special work groups. Successful cooperation focuses the separate resources of partner organizations toward common issues while maintaining the integrity of the individual programs.

This chapter identifies the agencies and organizations commonly involved in activities that affect the management of nonpoint source pollution in Nebraska. The primary responsibilities, functions and service of the organizations are described below. Tables at the end of the chapter summarize the descriptions given below. Table 9.1 lists the name and primary functions of individual programs of each organization. Table 9.2 lists the name and primary nonpoint source issues addressed by the individual programs of each organization.

Federal Agencies

FEDERAL HIGHWAY ADMINISTRATION

The Federal Highway Administration (FHWA) oversees construction and maintenance of federally owned and federally funded highways and associated rights-of-way and other federally owned transportation systems. It reviews and approves construction and maintenance work plans to assure that environmental impacts are adequately minimized and permit requirements are fulfilled. FHWA programs:

- Support development of alternative transportation systems.
- Provide technical assistance in designing runoff controls for road construction and maintenance.

US ARMY CORPS OF ENGINEERS

The US Army Corps of Engineers (USACE) has regulatory authority over navigable waters. Its responsibilities include regulating flows on the Missouri River for transportation, managing dams for flood control and generation of hydroelectric power, and protecting water quality and aquatic habitats in its jurisdictional waters. The USACE manages or leases lands adjacent to flood control structures for recreational uses. Programs of the USACE include:

- Regulate dredge and fill activities and alteration in jurisdictional waters.
- Regulate structural and hydrologic alteration of jurisdictional waters.
- Regulate disturbance of aquatic habitat in jurisdictional waters.
- Provide planning and funding to enhance and develop aquatic habitat.

US BUREAU OF RECLAMATION

The US Bureau of Reclamation (USBR) is responsible for management of lands under its administration, either through direct management or through oversight of other entities to which management of USBR lands have been delegated. Several irrigation projects are subject to USBR oversight. Irrigation districts with repayment or water service contracts with USBR are required to develop water conservation plans. The USBR participates with the US

Geological Survey in monitoring and studying nutrient, pesticide and toxic metals contamination of water, soils and biota resulting from irrigation return flows. USBR programs provide:

- Planning and implementation of soil and water conservation practices on USBR lands.
- Technical and financial assistance to rehabilitate irrigation systems.

US Environmental Protection Agency

The US Environmental Protection Agency (EPA) has authority under the Clean Water Act amendments of 1987 to provide federal leadership in helping states assess and manage nonpoint source pollution problems in the states. It has authority for oversight of dredge and fill permits issued by the US Army Corps of Engineers. The National Environmental Policy Act (NEPA) authorizes EPA to review and approve environmental impact statements developed by other federal agencies for actions that may cause environmental harm, including the impacts of nonpoint source pollution. EPA has authority to approve water quality standards developed by the states. EPA programs delegate authority and provide guidance and funding to support state programs that:

- Monitor, assess and restore water resources.
- Regulate handling and application of pesticides.
- Develop and enforce water quality standards.
- Inspect and regulate significant potential pollutant sources.
- Delineate and protect sources of drinking water.
- Plan for protection and restoration of water resources.
- Support implementation of local water quality protection and restoration projects.

US Fish and Wildlife Service

The US Fish and Wildlife Service (FWS) has responsibility under the National Environmental Policy Act, the Migratory Bird Treaty Act, and the Endangered Species Act for conservation and management of fish and wildlife resources. They also and administer the Partners for Fish and Wildlife program to support projects on private lands. FWS have authority to review and impose conditions on land development and management plans that may significantly affect important fish and wildlife species and their habitats. Mitigating conditions for projects may be advanced through the National Environmental Policy Act process with other federal agencies, the 404 permit process with the US Army Corps of Engineers, and through the National Pollutant Discharge Elimination System (NPDES) permit process with NDEE. FWS programs support state programs and activities that:

- Assess, protect, restore and, develop aquatic and upland habitat.
- Protect, restore, and develop wetlands on private lands.
- Construct and enhance access for sport fishing and encounters with wildlife.
- Research and monitor habitat conditions.
- Inform and educate the public about wildlife issues.

US Geological Survey

The U.S. Geological Survey (USGS) collects and analyzes geological and geographic data to identify and monitor natural resources throughout the United States. The survey produces numerous and varied natural resources reports and maps used by other agencies for resource management activities. USGS programs include:

- Maintaining a statewide network of monitoring stations to assess water quality.
- Supporting regional and localized environmental studies.
- Providing for cooperation in localized water quality monitoring and assessment.

USDA – Farm Service Agency

The US Department of Agriculture (USDA) Farm Service Agency (FSA) administers both voluntary and regulatory programs to retire sensitive agricultural lands from cultivation and to discourage the conversion of grasslands, forestlands and wetlands to crop production. The agency also compiles data on land use, agricultural trends, and

conservation compliance that is useful in developing and implementing nonpoint source management activities. Key FSA programs provide:

- Guidance on a suite of practices to reduce erosion, reduce nutrient runoff to surface water and percolation to groundwater, reduce pesticide use, and enhance wildlife habitat.
- Cost share and incentive payments to convert crop land to grassland.
- Rental payments for long term retirement of sensitive agricultural lands.
- Enforcement of conservation compliance on highly erodible lands and wetlands.

USDA – FOREST SERVICE

The US Forest Service (USFS) manages several tracts of rangeland and several tracts of forest land in Nebraska. It has responsibility to assure appropriate nonpoint source management practices are implemented on these lands. The USFS also advises and assists private land owners in using trees for conservation and production of forest products. USFS programs:

- Research land use effects on forest productivity and sustainability.
- Provide technical assistance to private forestland owners.
- Promote multi-use plans for forest production.
- Promote soil and water conservation through forestry.
- Promote wildlife habitat development and protection on private lands.

USDA – NATURAL RESOURCES CONSERVATION SERVICE

The Natural Resources Conservation Service (NRCS) administers both voluntary and regulatory programs to enhance soil, water and wildlife conservation of private lands. The agency conducts soil mapping and interpretation of soils data and provides analysis and interpretation of site-specific resource data relative to planned land uses. Technical assistance, planning assistance, and information also are provided to other agencies to assist in structural and land use planning, land development, and resources conservation. Programs of the NRCS:

- Provide technical and financial assistance to implement conservation practices on agricultural lands.
- Support development and adoption of innovative conservation technology.
- Promote conservation of grasslands and wetlands.
- Assist local governments in prevention and mitigation of flood damage.
- Support restoration and enhancement of wetlands.
- Promote development and maintenance of wildlife habitat in agricultural systems.

State and Local Agencies, Universities, and Associations

NATURAL RESOURCES DISTRICTS

Nebraska's 23 Natural Resources Districts are organized by river basins rather than the traditional county-based Soil and Water Conservation Districts of other states (Figure 9.1). Natural Resources Districts (NRD) are responsible for developing and implementing conservation plans to protect, restore and conserve natural resources, including surface and groundwater quality and quantity, within their District. Unlike Soil and Water Conservation Districts, NRDs have statutory authority to impose property taxes to support conservation work in the District and to regulate certain activities that may impact sound management of natural resources.

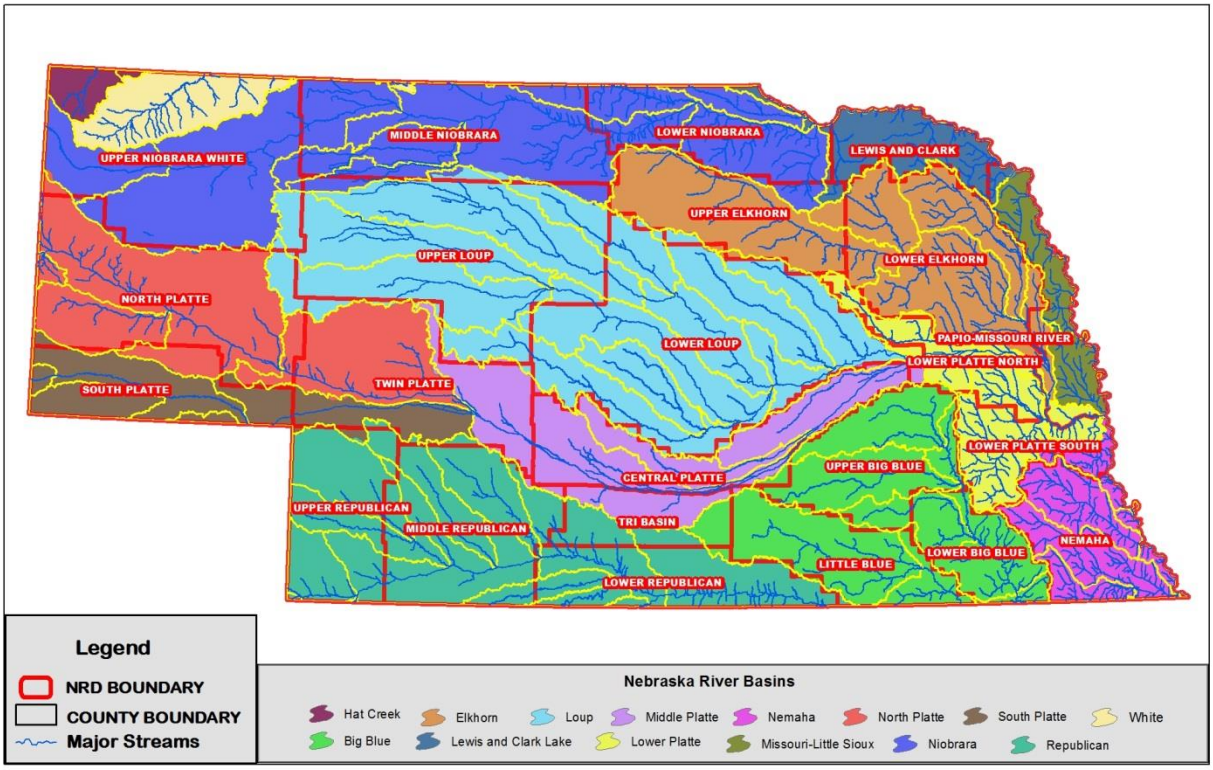

Figure 9.1 Nebraska's Natural Resources Districts

The NRDs are in the process of developing district-wide integrated water management plans to manage the impact of groundwater extraction on stream flows and to comply with Nebraska Department of Natural Resources (NeDNR) regulations regarding the appropriation of stream flows. Recognizing that the inter-connectivity of surface and groundwater often influences both the quantity and quality of each, some NRDs are incorporating water quality planning in their efforts to develop integrated water management plans. These district-wide plans will identify and prioritize areas within the District where water quality and water quantity issues have the greatest impact on human and environmental needs. The plans provide guidance in prioritizing the allocation of District resources to address those needs.

Nebraska is unique among states in that NRCS Field Office management and supervision is aligned along NRD boundaries rather than county boundaries. Another unique aspect is that a formula based on natural resources needs is used to allocate USDA EQIP funds by NRD through NRCS Field Offices. NRDs participate in the Local Work Groups required to advise and assist USDA in targeting programs and resources to address local conservation priorities. This includes identifying "Special Resource Areas" and assigning points for local resource questions on ranking sheets for EQIP and other USDA program applications.

Most state conservation programs administered by the NeDNR, including the Soil and Water Conservation Fund, are distributed to farm operators through the NRDs. These funds are coordinated with District funds generated through fees and property taxes to support implementation of conservation practices in the District. The Districts also seek additional funds through grants and awards (e.g., Section 319, NE Environmental Trust) to supplement other local, state, and federal funds channeled through NRD programs to support priority projects.

The NRDs have expressed frustration with repetitive planning cycles for individual small watersheds. They prefer to incorporate planning for multiple NPS projects within their current efforts to develop comprehensive district-wide water management plans. The Basin Planning Approach described in the NPS Management Plan is meant to better align the NPS program with the priorities and management infrastructure of the NRDs and with the conservation resources already coordinated through NRD programs. This alignment will greatly raise the profile of NPS management among the Districts' priorities and encourages greater focus of resources in protecting high quality waters and restoring impaired waters.

NRDs are governed by a locally elected Board of Directors. The Districts professional staff are trained and experienced in program planning and administration, financial management, natural resources management, project management, and communication. Because of their basin-wide jurisdiction over water issues and their ability to integrate multiple funding sources, the NRDs are the primary sponsors of watershed projects in Nebraska.

NEBRASKA ASSOCIATION OF RESOURCES DISTRICTS

The Nebraska Association of Resources Districts (NARD) is a coordinating organization that provides legal, financial, and management guidance to the state's 23 Natural Resources Districts. The NARD serves as the liaison for the local Natural Resources Districts with the state legislature and state and federal regulatory agencies. The NARD can promote, conduct, and coordinate a variety of educational programs within and on behalf of the Natural Resources Districts. NARD programs:

- Coordinate production of materials and programs jointly sponsored by Natural Resources Districts.
- Support inter-district meetings and training sessions for managers and staff of Natural Resources Districts.
- Support natural resources education for youth.
- Support advocacy for natural resources conservation legislation.

NEBRASKA DEPARTMENT OF AGRICULTURE

The Nebraska Department of Agriculture (NDA) administers programs relating to the production, handling, processing, and marketing of commodity products in the state. The Nebraska Pesticide Act authorizes the NDA to administer EPA's Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) program to regulate labeling, distribution, storage, transportation, use, application, and disposal of pesticides in Nebraska. NDA requires manufacturers to register products annually. The NDA is responsible for development and implementation of a state management plan for the prevention, evaluation, and mitigation of occurrences of pesticides and their breakdown products in groundwater and surface water. NDA programs:

- Regulate handling and use of pesticides.
- Investigate complaints regarding possible misuse of pesticides.
- Provide training and certification of pesticide applicators.
- Assist in collection and disposal of waste pesticides (periodically).
- Support installation and maintenance of vegetated buffer strips.

NEBRASKA DEPARTMENT OF ENVIRONMENT AND ENERGY

The Nebraska Department of Environment and Energy (NDEE) is charged with protecting the air, land, and water resources of the state from pollution. Surface water quality standards developed by NDEE for waters of the state assure attainment of designated beneficial uses (Title 117). Various regulatory and non-regulatory programs allow NDEE to monitor water quality conditions, assess threats to water quality, mediate land and resource uses that affect water quality, and provide planning and implementation of management programs to restore and protect

the quality of the state's surface and groundwater. NDEE is responsible for administering and implementing the state's nonpoint source pollution management program. NDEE programs:

- Regulate the discharge of water pollutants through issuance and administration of permits for -
    - Discharge of wastewater from municipal, business and industrial facilities.
    - Discharge or land application of biosolids (sludge) from wastewater treatment and livestock waste control facilities.
    - Discharge of stormwater from municipalities, industrial facilities and construction sites.
    - Deep-well injection of wastewater from industrial, mining, and agricultural processes.
    - Construction and operation of wastewater treatment facilities.
    - Construction and operation of livestock feeding operations.
    - Construction and operation of hazardous waste management facilities.
    - Construction and operation of solid waste disposal facilities.

- Assure compliance with regulations through issuance and administration of certification for –
    - Inspection, installation, and pumping of on-site wastewater treatment systems.
    - Application of fertilizer or pesticides through irrigation systems (chemigation).
    - Operation of municipal and industrial wastewater treatment facilities.
    - Compliance with federal permits and licenses with state water quality standards.

- Provide operation and design standards for –
    - Bulk fertilizer and pesticide secondary containment and load-out facilities.
    - Installation and maintenance of on-site wastewater treatment systems.

- Evaluate water quality conditions through –
    - Ambient and targeted monitoring of chemical parameters of surface waters.
    - Targeted biological monitoring of streams.
    - Ambient and targeted monitoring of groundwater.
    - Groundwater compliance monitoring at landfill, remediation sites and livestock facilities.
    - Surface water compliance monitoring at municipal, business, and industrial facilities.
    - Assessment of surface water data to identify impaired reservoirs and streams.
    - Assessment of groundwater data to identify threatened and contaminated aquifers.

- Facilitate communication activities that provide –
    - Certification training for wastewater treatment facility operators.
    - Certification training for chemigation operators.
    - Certification training for inspectors, installers and pumpers of on-site wastewater treatment systems.
    - Nutrient and irrigation management education for agricultural producers.
    - Storm water management training for public officials, contractors and consultants.
    - Source water and wellhead protection training for public officials.
    - Promotion of agricultural and urban best management practices.
    - Opportunities for citizen participation in water quality protection.
    - Information on drinking water quality to citizens and public officials.
    - Promotion of efforts and accomplishment in restoring and protecting water quality.

- Provide technical assistance to improve water quality by –
    - Assisting communities in delineating source water protection areas.
    - Assisting communities in identifying contamination threats to drinking water sources.
    - Reviewing design, installation and maintenance plans for on-site wastewater treatment systems.
    - Identifying and delineating areas vulnerable to groundwater pollution.

- Assisting partners in developing management plans for watersheds and groundwater recharge areas.
- Registering on-site wastewater treatment systems.

- Provide financial assistance to improve water quality by providing –
  - Funding to support watershed and groundwater management projects.
  - Funding to support water quality communication activities.
  - Low interest loans to install conservation practices to improve and protect water quality.

- Focus efforts to reduce nonpoint source pollution by –
  - Identifying waters impaired by nonpoint source pollution.
  - Determining the relative contribution of pollutant sources to impaired waters.
  - Assessing watershed conditions and determining the load or contribution of pollutants to water resources.
  - Developing and implementing nonpoint source management strategies.
  - Developing complementary partnerships to implement nonpoint source management projects.
  - Reviewing and evaluating accomplishments of nonpoint source management activities.

NEBRASKA DEPARTMENT OF HEALTH AND HUMAN SERVICES

The Nebraska Department of Health and Human Services (NDHHS) is responsible for assuring the health, safety, and well-being of Nebraska citizens. In cooperation with Nebraska Department of Environment and Energy, NDHHS is the lead agency for administering the Safe Drinking Water Act in Nebraska. Nebraska's safe drinking water regulations are designed to assure that public water systems are built, maintained, and operated in a manner that delivers safe drinking water to Nebraska citizens. The NDHHS has authority to require local governments or system operators to develop and enforce local ordinances and other instruments to protect both the system and the source of its water supply. NDHHS programs provide:

- Standards for regulation of water well construction, maintenance and decommissioning.
- Training and licensure of well installers and drinking water system operators.
- Issuance of health advisories for water-borne threats to human health and safety.
- Inspection of on-site wastewater treatment systems when required for property transfers.

NEBRASKA DEPARTMENT OF NATURAL RESOURCES

The Nebraska Department of Natural Resources (NeDNR) has responsibility for delegation of surface water rights, oversight of impoundment structures, and designation of flood plains in Nebraska. NeDNR has general authority to plan, develop, and promote conservation and utilization of soil and water resources in the state, in cooperation with other federal, state, and local organizations. It may adopt loss limits for state soils and establish a comprehensive sediment and erosion control program. The NeDNR develops and maintains natural resources data bases and provides analysis capabilities to assist other water interests in statewide and area management of soil and water resources. NDNR programs:

- Provide funds to implement soil and water conservation practices.
- Provide funds to develop water resources for the economic and environmental benefit.
- Provide funds to construct impoundments for flood control and recreation.
- Provide funds to construct wetlands and sediment control structures and to protect reservoirs.
- Regulate placement, registration and operation of wells.
- Provide funds to decommission public and private wells.
- Maintain the Agrichemical Contaminant Database of groundwater samples.

NEBRASKA DEPARTMENT OF TRANSPORTATION

The Nebraska Department of Transportation (NDOT) has responsibility for construction and maintenance of state-owned highways, their rights-of-way, and support facilities, and airport regulations. NDOT reviews and approves construction and maintenance workplans to assure that environmental protection requirements are met and

necessary permits are obtained. NDOT activities include erosion control, mechanical and chemical management of vegetation, and application of road maintenance chemicals. The department provides technical advice and assistance to county roads departments as well. NDOT programs provide:

- Compliance with runoff restrictions from construction sites and maintenance facilities.
- Compliance with wetland regulations at construction sites and maintenance facilities.
- Assistance to develop alternative modes of transportation.

NEBRASKA ENVIRONMENTAL TRUST

The Nebraska Environmental Trust (NET) is an independent state board composed of the Directors of key state natural resources agencies and private citizens appointed by the governor. The NET board is charged with management and distribution of a portion of the funds generated by the state lottery for environmental projects that include surface and groundwater protection, wetland restoration and protection, wildlife and habitat enhancement, and solid waste recycling. Many 319 projects utilize NET grants as non-federal matching funds. NET activities:

- Provide funds for environmental improvement and protection projects.
- Promote natural resources conservation through communication and advocacy.

NEBRASKA GAME AND PARKS COMMISSION

The Nebraska Game and Parks Commission (NGPC) is responsible for management of fish and wildlife resources in the state and for development and management of state-owned parks, recreation areas and wildlife management areas. It has authority to review permit applications and land and water development plans for compliance with the state Threatened and Endangered Species Act. NGPC enforces wildlife and recreation regulations. Its activities include management of state-owned lands, private lands programs, enhancement and protection of habitat, and development of recreation facilities. NGPC programs:

- Provide data on wildlife and habitat condition.
- Provide planning assistance for resources development.
- Provide funds and guidance for reservoir and stream restoration.
- Provide funds and guidance to enhance, restore or create wetlands.
- Provide funds to improve the quality of habitat on private and public lands.
- Promote enrollment of marginal lands in a variety of USDA programs.
- Provide incentive payments to allow hunter and fisherman access to private lands.

UNIVERSITY OF NEBRASKA - INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES

The University of Nebraska Institute of Agriculture and Natural Resources (IANR) serves as a coordinating bridge among several natural resources-oriented departments of the University including, the Conservation and Survey Division, UN-Extension, UNL Water Center, Nebraska Forest Service, Nebraska Statewide Arboretum, Agricultural Research Division, Center for Advanced Land Management Information Technologies, and the School of Natural Resources. IANR serves as the focal point, clearinghouse, partner, and facilitator in the development and education functions that support research and educational outreach efforts regarding nonpoint source pollution throughout Nebraska and beyond. Through these departments, IANR:

- Provides educational programming in a diverse range of topics including agricultural, forest and urban land management, pesticide application, nutrient and irrigation management, livestock management, and hands-on youth and adult education for youth and adults on nonpoint source pollution management.
- Provides technical expertise and assistance at local and state levels.
- Conducts research to improve productivity in agriculture and improve the effectiveness and efficiency of agriculture management systems.
- Conducts research to improve efficiency of nutrient and chemical applications and crop utilization, irrigation methods, tillage systems, and livestock management.

- Conducts research studying the processes of water pollution, intensity and location of contamination, and methods or technologies to remediate or prevent contamination.
- Maintains state geological, water, and soil surveys.
- Perform quality assurance assessment of groundwater samples for the Agrichemical Contaminant Database.

Local Governments and Organizations

Counties, Municipalities, and Sanitary Improvement Districts

Counties, Municipalities, and Sanitary and Improvement Districts (SIDs) are organized as subunits of government with limited authority to regulate activities that may affect environmental quality. These subunits of government may:

- Impose zoning ordinances for location of agricultural and industrial facilities.
- Require special use permits to protect environmentally sensitive areas.

Native American Tribes

Reservations for six Native American tribes (Omaha, Santee Sioux, Ponca, Sac and Fox of Missouri, Iowa, and Winnebago) are located in Nebraska. The tribes administer and set policies for land use practices on tribal lands. The Santee Sioux Nation in north-central Nebraska has an authorized Nonpoint Source Management Program. The Santee Sioux, Ponca, Sac and Fox of Missouri, and Winnebago tribes are active in monitoring the quality of tribal waters through other EPA funding programs.

Environmental Advocacy Groups

There are numerous non-governmental organizations active in Nebraska that include water quality management issues among their interests. These include local chapters of larger national organizations and local special interest groups. Their activities relative to nonpoint source pollution management range broadly. These include political activism, promotion, education, and financial assistance through cost share or grant funding. Organizations that have been active participants in the state's Nonpoint Source Management Program to date include: Nebraska Rural Water Association, Nebraska Wildlife Federation, Pheasants Forever, The Groundwater Foundation, and The Nature Conservancy.

Commodity Groups

Major commodity groups in Nebraska are represented by state associations that monitor legislation affecting their members' interests, provide services to their membership and represent the needs and views of their members and their industry through participation on interagency committees and work groups. The commodity groups primarily provide input on nonpoint source pollution management issues through participation on the USDA state technical committee and informal discussions with NDEE and other agencies. In addition, they provide a communication link to their membership. Key groups include Nebraska Cattlemen, Nebraska Corn Growers Association, Nebraska Pork Producers Association, Nebraska Sorghum Growers Association, and Nebraska Soybean Association.

Table 9.1 Conservation Programs Listed by Organization and Function

Organization/Program	Acronym	Technical Assistance	Funding Assistance	Research	Communication	Compliance	Planning	Monitoring
Federal Highway Administration (FHWA) highways.dot.gov								
Transportation Equity Act for the Twenty-first Century	TEA-21		X					
US Army Corps of Engineers (USACE) www.usace.army.mil/								
Dredge and Fill Permits	CWA S404					X		
Aquatic Habitat Improvement	CWA S1113	X	X				X	
US Bureau of Reclamation (USBR) www.usbr.gov/								
Land Resources Management Program	--					X	X	
Soil Moisture and Conservation Program	--					X		
Rehabilitation and Betterment Program	--	X	X					
US Environmental Protection Agency (EPA) www.epa.gov/								
Nonpoint Source Management Program	CWA S319		X					
Federal Insecticide, Fungicide and Rodenticide Act	FIFRA			X	X	X		
Wellhead Protection Program	WHP	X			X			
Source Water Protection Program	SWPP	X			X			
Underground Storage Tank Program	USTP					X		
Environmental Education Grants Program	EEG		X					
404 Wetlands Program	CWA S404	X	X					X
US Fish and Wildlife Service (FWS) www.fws.gov/								
Federal Aid to Fisheries and Wildlife Management Program	Wallop-Breaux	X	X					
Seasonal Habitat Improvement Program	SHIP	X	X					
Partners for Fish and Wildlife Program	--	X	X					
US Geological Survey (USGS) www.usgs.gov/								
National Ambient Water Quality Assessment Program	NAWQA							X
Cooperative Water Quality Monitoring and Assessment Program	CWP	X	X					X

Organization/Program	Acronym	Technical Assistance	Funding Assistance	Research	Communication	Compliance	Planning	Monitoring
USDA Farm Services Agency (FSA) www.fsa.usda.gov/								
Conservation Reserve Program	CRP	X	X			X		
Conservation Reserve Enhancement Program	CREP	X	X					
Highly Erodible Lands and Wetland Compliance*	HELWC					X		
USDA Forest Service (USFS) www.fs.usda.gov								
Forest Stewardship Program	FSP	X	X				X	
Center for Semiarid Agroforestry at UNL Program	CSA	X		X	X		X	
USDA Natural Resources Conservation Service (NRCS) www.nrcs.usda.gov/								
Agricultural Conservation Easement Program	ACEP	X	X				X	
Conservation Innovation Grants	CIG		X					
Conservation Stewardship Program	CSP	X	X				X	
Healthy Forests Reserve Program	HFRP	X	X				X	
Environmental Quality Incentive Program	EQIP	X	X				X	
Regional Conservation Partnership Program	RCPP	X	X					
Small Watershed Rehabilitation Program**	PL-566	X	X				X	
Highly Erodible Lands and Wetland Compliance ^	HELWC	X						
Voluntary Public Access and Habitat Incentive Program ^^	VPA-HIP		X				X	
Natural Resources Districts (NRDs) www.nrdnet.org/								
Erosion and Sediment Control Program	--	X	X					
Chemigation Permitting Program	--	X	X		X	X		X
Technical Assistance and Land Treatment Cost-Share	--	X	X					
Water Quality Monitoring Programs	--	X	X	X				X
Nutrient and Irrigation Certification Programs	--	X	X		X			

Organization/Program	Acronym	Technical Assistance	Funding Assistance	Research	Communication	Compliance	Planning	Monitoring
Nebraska Association of Resources Districts (NARD) www.nrdnet.org/								
Information and Education Programs	--				X			
Nebraska Department of Agriculture (NDA) www.nda.nebraska.gov/								
Pesticide Applicator Training Program	--				X	X		
Pesticide Collection Program					X			
Nebraska Pesticide Act	--				X			
Nebraska State Buffer Strip Program	--		X		X			
Nebraska Department of Environment and Energy (NDEE) www.dee.ne.gov/								
Nonpoint Source Pollution Management Program	CWA S 319	X	X		X	X		
Community Lakes Enhancement and Restoration Program	CLEAR	X	X		X		X	
Total Maximum Daly Load Program	TMDL					X	X	
Water Quality Certification Program	CWA S401					X		
Surface Water Quality Standards Program	--					X		
Livestock Waste Control Program	--					X		
Water Quality Monitoring and Assessment Program	--							X
Groundwater Management Area Program	--				X	X		X
Wellhead Protection Program	--				X			X
Chemigation Certification Program	--					X		
Agricultural Chemical Secondary Containment Program						X		
Combined Sewer Over-flows Program	--				X	X		
Integrated Solid Waste Program	--					X		X
National Pollutant Discharge Elimination Program	NPDES					X		
Stormwater Management Program	--				X	X		
Underground Storage Tank Program	--	X	X					

Organization/Program	Acronym	Technical Assistance	Funding Assistance	Research	Communication	Compliance	Planning	Monitoring
NDEE (Continued)								
Underground Injection Control Program	UIC					X		X
Resource Conservation and Recovery Act	RCRA					X		
On-site Wastewater Treatment Program					X	X		
Source Water Protection Program	--				X	X		X
Wastewater Pre-treatment Program	--					X		X
Wastewater Treatment Sludge Disposal Program	--					X		
Clean Water State Revolving Fund Program	CWSRF		X					
Drinking Water State Revolving Fund Program	DWSRF		X					
Nebraska Department of Health and Human Services (NDHHS) dhhs.ne.gov/								
Septic Tank Inspection Program	--	X	X			X		
Well Licensing and Construction Program	--					X		
Nebraska Department of Natural Resources (NeDNR) www.dnr.nebraska.gov/								
Soil and Water Conservation Fund	--		X					
Natural Resources Development Fund	--		X					
Water Well Decommissioning Program	--	X	X					
Nebraska Department of Transportation (NDOT) www.dot.nebraska.gov/								
Transportation Enhancement Program	--	X	X					
Wetland Compliance Evaluation Program	--					X		
Nebraska Environmental Trust (NET) www.environmentaltrust.nebraska.gov/								
Nebraska Environmental Trust Fund	NETF		X					

Organization/Program	Acronym	Technical Assistance	Funding Assistance	Research	Communication	Compliance	Planning	Monitoring
Nebraska Game and Parks Commission (NGPC) outdoornebraska.gov/								
Federal Aid to Fisheries and Wildlife Management Program	--		X					
Aquatic Habitat Improvement Program	--	X	X					
Open Fields and Waters Access Program	--	X	X					
WILD Nebraska Program	--	X	X					
Nebraska Natural Heritage Program	--	X	X	X	X	X	X	X
University of Nebraska Institute of Agriculture and Natural Resources (IANR) www.ianr.unl.edu/								
IANR - Extension Programs	--			X	X			
Pheasants Forever (PF) www.pheasantsforever.org/								
Corners for Wildlife Program	--		X					

*=Required to participate in USDA Programs

^=Provides Technical Determinations to FSA used to administer the Highly Erodible Lands and Wetland Provisions of the Farm Bill

**=Not a Farm Bill Program but program is funded through the 2014 Farm Bill

^^=Grants provided to States and Tribes to improve habitat on public access areas.

Table 9.2 Conservation Programs Listed by Organization and Nonpoint Source Issue

Organization/Program	Acronym	Surface Water	Groundwater	Drinking Water	Habitat	Wetlands	Compliance	Other Related Programs	Communication	Land Use
Federal Highway Administration (FHWA) highways.dot.gov/										
Transportation Equity Act for the Twenty-first Century	TEA-21							X		X
US Army Corps of Engineers (USACE) www.usace.army.mil/										
Dredge and Fill Permits	CWA S404						X			
Aquatic Habitat Improvement	CWA S1113				X			X		
US Bureau of Reclamation (USBR) www.usbr.gov/										
Land Resources Management Program	--									X
Soil Moisture and Conservation Program	--									X
Rehabilitation and Betterment Program	--				X					X
US Environmental Protection Agency (EPA) www.epa.gov/										
Nonpoint Source Management Program	CWA S319	X	X	X	X	X				
Federal Insecticide, Fungicide and Rodenticide Act	FIFRA						X	X		
Wellhead Protection Program	WPP		X	X					X	
Source Water Protection Program	SWPP	X		X						
Underground Storage Tank Program	USTP		X				X			
Environmental Education Grants Program	EEG								X	
State Revolving Fund Loan Program	SRF	X	X	X	X	X			X	
404 Wetland Program	CWA S404	X			X	X				
US Fish and Wildlife Service (FWS) www.fws.gov/										
Federal Aid to Fisheries and Wildlife Management Program	Wallop-Breaux	X			X					
Seasonal Habitat Improvement Program	SHIP	X			X					
Partners for Fish and Wildlife Program	--	X			X					
US Geological Survey (USGS) www.usgs.gov/										
National Ambient Water Quality Assessment Program	NAWQA	X	X		X					
Cooperative Water Quality Monitoring and Assessment Program	CWP	X	X		X					

Organization/Program	Acronym	Surface Water	Groundwater	Drinking Water	Habitat	Wetlands	Compliance	Other Related Programs	Communication	Land Use
USDA Farm Services Agency (FSA) www.fsa.usda.gov/										
Conservation Reserve Program	CRP	X			X					X
Conservation Reserve Enhancement Program	CREP	X	X		X					X
Highly Erodible Lands and Wetland Compliance*	HELWC	X				X	X			X
USDA Forest Service (USFS) www.fs.usda.gov/										
Forest Stewardship Program	FSP				X					X
Center for Semiarid Agroforestry at UNL Program	CSA									X
USDA Natural Resources Conservation Service (NRCS) www.nrcs.usda.gov/										
Agricultural Conservation Easement Program	ACEP	X			X					X
Conservation Innovation Grants	CIG	X	X	X	X	X		X	X	X
Conservation Stewardship Program	CSP	X	X		X	X		X		X
Healthy Forests Reserve Program	HFRP	X	X		X	X		X	X	X
Environmental Quality Incentive Program	EQIP	X	X		X	X		X		X
Regional Conservation Partnership Program	RCPP	X	X		X	X		X	X	X
Small Watershed Rehabilitation Program**	PL-566							X		X
Highly Erodible Lands and Wetland Compliance ^	HELWC					X	X			X
Voluntary Public Access and Habitat Incentive Program ^^	VPA-HIP				X				X	
Natural Resources Districts (NRDs) www.nrdnet.org/										
Erosion and Sediment Control Program	--	X								X
Chemigation Permitting Program	--	X	X				X			
Technical Assistance and Land Treatment Cost-Share	--	X	X							X
Water Quality Monitoring Programs	--	X	X							
Nutrient and Irrigation Certification Programs	--	X	X				X			

Organization/Program	Acronym	Surface Water	Groundwater	Drinking Water	Habitat	Wetlands	Compliance	Other Related Programs	Communication	Land Use
Nebraska Association of Resources Districts (NARD) www.nrdnet.org/										
Information and Education Programs	--								X	
Nebraska Department of Agriculture (NDA) www.nda.nebraska.gov/										
Pesticide Applicator Training Program	--	X	X	X			X		X	
Pesticide Collection Program		X	X	X			X		X	
Nebraska Pesticide Act	--	X	X				X			
Nebraska State Buffer Strip Program	--	X	X		X					
Nebraska Department of Environment and Energy (NDEE) www.dee.ne.gov/.										
Nonpoint Source Pollution Management Program	CWA S 319	X	X	X	X	X			X	
Community Lakes Enhancement and Restoration Program	CLEAR	X			X				X	
Total Maximum Daly Load Program	TMDL						X			
Water Quality Certification Program	CWA S401	X					X			
Surface Water Quality Standards Program	--	X					X			
Livestock Waste Control Program	--	X	X				X			
Water Quality Monitoring and Assessment Program	--	X	X				X			
Groundwater Management Area Program	--		X							
Wellhead Protection Program	WHP		X	X					X	
Chemigation Certification Program	--	X	X				X		X	
Agricultural Chemical Secondary Containment Program		X	X				X			
Combined Sewer Over-flows Program	--	X								
Integrated Solid Waste Program	--	X	X					X		
National Pollutant Discharge Elimination Program	NPDES	X					X			
Stormwater Management Program	--	X							X	
Underground Storage Tank Program	--		X				X			

Organization/Program	Acronym	Surface Water	Groundwater	Drinking Water	Habitat	Wetlands	Compliance	Other Related Programs	Communication	Land Use
NDEE (Continued)										
Underground Injection Control Program	UIC		X				X			
Resource Conservation and Recovery Act	RCRA	X	X				X			
On-site Wastewater Treatment Program	--	X	X				X		X	
Source Water Protection Program	--	X	X	X					X	
Wastewater Pre-treatment Program	--						X			
Wastewater Treatment Sludge Disposal Program	--						X			
Clean Water State Revolving Fund Program	CWSRF	X								
Drinking Water State Revolving Fund Program	DWSRF		X	X						
Nebraska Department of Health and Human Services (NDHHS) dhhs.ne.gov/										
Septic Tank Inspection Program	--	X	X							
Well Licensing and Construction Program	--		X				X			
Nebraska Department of Natural Resources (NDNR) www.dnr.nebraska.gov/										
Soil and Water Conservation Fund	--	X	X		X					X
Natural Resources Development Fund	--	X	X	X	X			X	X	X
Water Well Decommissioning Program	--		X				X			
Nebraska Department of Transportation (NDOT) www.dot.nebraska.gov/										
Transportation Enhancement Program	--	X			X			X		
Wetland Compliance Evaluation Program	--				X	X	X			
Nebraska Environmental Trust (NET) www.environmentaltrust.nebraska.gov										
Nebraska Environmental Trust Fund	NETF	X	X	X	X	X		X	X	X

Organization/Program	Acronym	Surface Water	Groundwater	Drinking Water	Habitat	Wetlands	Compliance	Other Related Programs	Communication	Land Use
Nebraska Game and Parks Commission (NGPC) outdoornebraska.gov/										
Federal Aid to Fisheries and Wildlife Management Program	--	X			X					
Aquatic Habitat Improvement Program	--	X			X					
Open Fields and Waters Access Program	--	X			X			X		
WILD Nebraska Program	--				X				X	X
Nebraska Natural Heritage Program	--	X			X	X	X	X	X	X
University of Nebraska Institute of Agriculture and Natural Resources (IANR) www.ianr.unl.edu/										
IANR - Extension Programs	--	X	X	X	X	X			X	
Pheasants Forever (PF) www.pheasantsforever.org/										
Corners for Wildlife Program	--	X			X					X

*=Required to participate in USDA Programs

^=Provides Technical Determinations to FSA used to administer the Highly Erodible Lands and Wetland Provisions of the Farm Bill

**=Not a Farm Bill Program but program is funded through the 2014 Farm Bill

^^=Grants provided to States and Tribes to improve habitat on public access areas.

Chapter 10 SELECTION OF CONSERVATION PRACTICES

Landscapes

The landscape of Nebraska varies greatly in climate, precipitation, soils, topography, and vegetation across the length and width of the state. Several entities have mapped the United States including Nebraska, based on these characteristics. Examples include the USDA Plant Hardiness map, the EPA Eco-regions map, and the University of Nebraska-Lincoln Topographic Regions map.

- ***Precipitation.*** Annual precipitation in the state varies from 35 inches in the southeast to 13 inches in the northwest. Higher rainfall areas of the state will have more opportunity for pollutants to be carried by surface runoff to water bodies and streams. The annual distribution of rainfall throughout the year and the local intensity of the rainfall is also important to consider.

- ***Climate.*** Humidity, evaporation, prevailing winds, temperature, and precipitation are important considerations when planning conservation practices to address specific pollutants. Precipitation plays the biggest role, but it is important to consider precipitation in context with other elements of climate.

- ***Soils***. Soil type is a vital consideration in selecting conservation practices, specifically, what rainfall interacts with the soil. Sandy soils have very high infiltrations rates and low runoff potential. In contrast, soils with high clay content have very low infiltration rates and high runoff potential. The Hydrologic Soil Group website from NRCS is a useful tool in evaluating watersheds and how they will respond to rainfall events.

- ***Topography.*** The angle and the length of the land's slope and how it relates to the drainage paths in conjunction with the above factors are important to consider when planning conservation practices to address water quality concerns. Sheet and rill erosion from fields is a primary source of sediment and associated nutrients. Surface runoff after rainfall events transports sediment into streams, lakes, and wetlands. Concentrated flow areas or gullies are also sources of sediments transported into water bodies and streams.

Prior to settlement and development by pioneers from the eastern United States, Nebraska was primarily covered by grassland. In general, tall-grass prairies in the southeast portion of the state transitioned through mixed-grass prairies in the central portion of the state to short-grass prairies in the west as precipitation decreased and elevation increased. Soil organic matter followed a similar trend with typically higher organic matter where rainfall was greater and plant growth was more abundant. Riparian and riverine landscapes typically had higher organic matter than their upland counterparts.

Conversion of grasslands to farmland began in the later part of the 1800s and continues today. Acres of cropland in Nebraska rise and fall with the price of grain. Much of Nebraska was farmed by the 1920s, but many acres were seeded back to grass in the period following the Dust Bowl. Erosion from water and wind caused much of the original topsoil to be lost, leaving soil low in organic matter. Irrigation development from large federal surface water projects began in the 1940s. The ability to drill deep irrigation wells allowed relatively level lands to be farmed and gravity irrigated in the uplands. The development of the center pivot allowed land that was not able to be gravity irrigated to be sprinkler irrigated.

Nebraska producers, in some areas of the state, have readily adopted conservation practices to control soil erosion while other parts of the state have been slower to implement these same practices. In general, the majority of fields in Nebraska are treated with one or more conservation practices that control "visible erosion". It is unusual to see visible and active gullies in cropland fields in most of Nebraska. The major threat to water quality is from the "invisible" components (i.e. nutrients and pesticides) that leave the field where they are applied and enter the surface water or groundwater. Much of this may occur with relatively low amounts of runoff and soil loss.

It is important to recognize other factors impacting water quality in Nebraska. Streams in eastern Nebraska are impacted by the continued deepening of the channel of the Missouri River. Streams flowing into the Missouri River will continue to deepen and widen until the geomorphic processes again reach equilibrium and establish a new stable grade. This will contribute sediment into drainage systems in the form of streambank and channel erosion and may mask results of upland sediment reductions.

As conservation practices are adopted, soil infiltration rates will increase, runoff will decrease and soil organic matter will increase. Runoff patterns will again begin to approach runoff patterns and rates comparable to the time when the landscape was covered with grass.

Selecting Conservation Practices

Appropriate conservation practices, when applied, improve or protect water quality. Many factors must be considered when selecting practices including, but not limited to: the type of impairment or threat, type and source of pollutant, size of the drainage area, amount and distribution of rainfall, topography, type and condition of the soil, and current land management practices. Consideration also must be given to managing pollutants through a systems approach that employs multiple practices. Conservation practices that work synergistically deliver more effective control of pollutants than a single practice can provide.

An effective systems approach must be based on a hierarchy of managing pollutants first at the source and last at the point of delivery. The USDA Natural Resources Conservation Service describes this system by the acronym "ACT" (**A**void, **C**ontrol, **T**rap). This system is based on implementing complementary conservation practices with different modes of action along the flow path to improve the efficiency and effectiveness of pollutant control.

> **Avoid.** It is sometimes feasible to eliminate contamination at the source by discontinuing a potentially harmful activity or use of a particular product. Discontinuing the use of a pesticide, for example, would completely eliminate that product from the runoff stream. Where discontinuing an activity or product is not feasible, altering the activity or application of a product may significantly reduce, but not eliminate, contamination from that source. For example, limiting livestock access to a stream or changing the rate and timing of chemical application can reduce contaminant runoff. Where complete avoidance is not feasible or acceptable, it is important to employ additional complementary conservation practices to further reduce contaminant runoff.
>
> **Control.** Practices that control the direction and rate of runoff can provide additional reduction of contaminants mobilized in the flow stream. These practices allow precipitation, infiltration, absorption, or attenuation of contaminants before they reach a receiving waterbody. Filter strips and porous pavement, for example, facilitate infiltration of runoff water into the soil where natural processes degrade and absorb contaminants.
>
> **Trap.** When avoidance and control of pollutant runoff are unfeasible or inadequate, trapping contaminants before they can discharge to receiving waters may be a necessary last line of defense. The distinction between practices that control contaminants and those that trap contaminants, however, is somewhat ambiguous as the practices function in much the same way: precipitation, infiltration, absorption, or attenuation of contaminants. Many conservation practices provide both functions. A sediment basin or constructed wetland designed to intercept flow and remove contaminants before discharging to a receiving waterbody are the most clear examples of practices employed to trap contaminants.

Selection of conservation practices should consider all available resource information to ensure that the practices are compatible with the landscape, address the source of pollution, and are accepted by the community. Careful consideration should be given to adopting a complete conservation system that consists of multiple complementary conservation practices employed at both the site-specific and watershed scale.

Examples of conservation practices that have proven to be effective in reducing nonpoint source pollution and are commonly employed in Nebraska are listed in Table 10.1. Many of these practices are effective in restoring or protecting both surface water and groundwater resources from the impacts of nonpoint source pollution. This list is not meant to be exclusive of other practices that may be effective for particular sites or situations. It is meant to identify the function of popular conservation practices and to encourage resource managers to employ suites of complementary practices.

Table 10.1 Common Conservation Practices

Common Practices	Practice Mode of Action			Pollutants Addressed			
	Avoid	Control	Trap	Sediment	Nutrients	E. coli	Pesticide
Cropland							
Contour farming		x	x	x	x		x
Cover crop	x	x		x	x		
Crop to grass conversion	x			x	x		x
Crop to habitat conversion	x			x	x		x
Irrigation management	x	x		x	x		
No till		x	x	x	x		
Nutrient management	x	x			x		
Pest management	x	x					x
Terrace		x	x	x	x		
Underground outlet/grass waterway		x	x	x	x		
Livestock							
Alternate water supply	x			x	x	x	
Controlled stream crossing	x			x	x	x	
Exclusion fencing	x			x	x	x	
Manure management	x	x			x	x	
Prescribed grazing	x	x		x	x	x	
Vegetative treatment system		x	x		x	x	
Urban							
Bioswale		x	x	x	x	x	
Detention basin		x	x	x	x	x	
Fertilizer management	x	x			x		
Enhanced infiltration (soil amendment)	x	x	x	x	x		
Irrigation management	x	x			x	x	x
Low impact landscaping	x			x	x		x
Pest management							x
Porous pavement		x	x		x	x	x
Rain garden		x	x	x	x	x	x
Rain water harvesting	x	x		x	x	x	

Common Practices	Practice Mode of Action			Pollutants Addressed			
	Avoid	Control	Trap	Sediment	Nutrients	E. coli	Pesticide
Other							
Alum application		x	x		x		
Filter/buffer strip		x	x	x	x	x	x
Grade stabilization structure		x		x			
Grass seeding	x	x		x	x		
Habitat improvement	x	x		x	x	x	
On-site wastewater system upgrade		x			x	x	
Riparian restoration	x	x	x	x	x	x	x
Sediment control basin		x	x	x	x	x	
Sediment removal		x		x	x		
Shoreline stabilization		x		x	x		
Stream bank stabilization		x		x	x	x	
Water diversion	x	x		x	x		
Water retention basin		x	x	x	x	x	x
Well decommissioning	x				x	x	x
Wetland Restoration/Construction		x	X	X	X	x	x
Practice Facilitation							
Conservation consultant							
Crop production deferment	x	x		x	x		X

* Note: The above table is meant to provide examples of the most commonly accepted practices employed in Nebraska. It is not meant to preclude other practices that that may be appropriate to specific projects or site conditions.

Chapter 11 PROJECT ELIGIBILITY CATEGORIES FOR SECTION 319 FUNDING

The Nebraska Nonpoint Source Management Program is designed to support both local and statewide projects. However, the scope and scale of projects vary greatly, each offering particular value to the state program, but presenting difficulty in comparability. Two subprograms for external project funding are available to capture the uniqueness of these varied projects, to provide timely response to unforeseen opportunities, and to achieve a balance of effective activities within the program. The subprograms are: 1) Small Projects Assistance and 2) Large Projects Assistance.

Sub-units of government, educational institutions, and non-profit organizations (eligible applicants) may apply for project support. Applications for projects are accepted on an on-going basis. A proposal selected for funding must be developed into a project implementation plan (PIP), which must be approved. PIPs direct activities for individual projects and constitute the required work plan for sub-awards of Section 319 funds. The development of a project implementation plan is not eligible for Section 319 funding.

Section 319 funds may be used to support up to 60% of total project costs for nonpoint source pollution management projects. At least 40% of total project costs must be contributed as match from non-federal sources. For the purposes of the Nonpoint Source Pollution Management Program, total project cost is defined as the amount of Section 319 funds plus the amount of required match funds. The nonfederal match may be in the form of cash or services-in-kind. The project sponsor must provide a cash contribution equal to at least 10% of the total project cost as part of the match requirement. The NDEE reserves the right to adjust match requirements where extenuating circumstances dictate.

SMALL PROJECTS ASSISTANCE

The Small Projects Assistance subprogram provides a rapid funding mechanism for small projects of great importance to the state Nonpoint Source Management Program and a mechanism to capture unique opportunities in imminent need of funding. The full range of activities eligible under the Section 319 Program may be implemented on an appropriate scale through a small project. Small projects are especially useful for conducting a local demonstration, activity or event, for initiating a pilot project in preparation for a larger watershed-based or statewide project and for supporting local communication efforts. Funding for projects in the Small Projects Assistance subprogram projects are capped at $15,000 and generally are expected to be completed in one year. Small projects may be state-wide in nature and do not require an accompanying watershed-based management plan.

LARGE PROJECTS ASSISTANCE

The Large Projects Assistance subprogram is available to sponsors within a previously approved 9-element plan, or alternative to a 9-element plan and represents the more prominent and traditional component of the state Nonpoint Source Management Program. It directs efforts to restore and protect water resources within a defined area (watershed or source water protection area). Projects in the Large Project Assistance subprogram should be designed to achieve the measurable objectives of a complete project or to achieve defined milestones of a watershed-based management plan in a phased process. However, individual awards generally will not exceed $300,000 or the amount of funds required to implement the project for two years. Projects exceeding $300,000 Section 319 funds or two years of implementation may be funded in increments.

The Large Projects Assistance subprogram, supports activities to restore or protect water resources, including groundwater and wetland projects. Projects should be designed to provide a holistic treatment of the watershed

or designated area, but must specifically address known sources of pollution that impair or threaten the water resource. Installation of select conservation practices should be targeted to areas where contributions of pollutants is highest and to areas where management of the pollutant is most effective. Particular attention should be given to conditions that threaten human health.

Projects should be developed with appropriate partners to leverage financial and technical resources of other conservation programs. Section 319 funds primarily should complement rather than supplant other conservation programs. Project participants are expected to make reasonable efforts to qualify for cost share assistance from other conservation programs prior to receiving assistance from Section 319 funds.

Individual projects should be designed to achieve measurable results leading to improvement of water quality. This requires concentrated installation of conservation practices in an area of manageable size. However, the extent and the complexity of the problem and local conditions necessarily dictate the size of the area that may require treatment. Large or highly complex treatment areas should be addressed in phases, directing implementation of conservation practices into smaller subareas through phased projects.

It is well understood that a positive environmental response to implementation of conservation practices may lag for an extended period of time as ecological equilibrium is restored between the watershed and the receiving water. Groundwater restoration projects are particularly prone to this difficulty. For some projects, surrogate measures may be necessary to quantify short-term impacts that predict future improvements in water quality from project activities. For example, lower residual nutrient concentration in soils, reduced application of irrigation water, and repopulation of aquatic species or modeled reduction of pollutant loads may indicate a trend toward water quality improvement.

Lake and wetland renovation activities are eligible for Section 319 funding provided the land in the drainage area of the waterbody has been adequately treated. The implementation of Watershed Management Plans should occur in stages, such that modeled NPS pollutant loads meets planned allocations before moving down the watershed to waterbodies. Lake and wetland renovation projects should include installation of structural conservation practices within the waterbody or additional conservation practices in the watershed as part of a watershed management approach to protect the investment in the renovation.

Statewide projects support activities that address universal nonpoint source pollution issues that are best addressed at a regional or statewide level. For example, projects might serve to broadly introduce new management practices through statewide or regional demonstration sites, provide equipment and technological assistance to enhance implementation of conservation practices, enhance collection of environmental data and information to improve management decisions, or remove toxic compounds through a statewide collection and disposal effort. While limited in number, these projects may produce long-term benefits in avoiding future water quality impairments.

Statewide projects also support activities to enhance statewide capacity to provide communication about nonpoint source pollution. Projects must focus on development of delivery systems, programming and materials designed to change attitudes and behaviors of target audiences. Materials and methods also should be designed to be applicable to support local watershed–based projects.

REFERENCES

Abadi Ghadim AK, Pannell DJ (1999) A conceptual framework of adoption of an agricultural innovation. Agricultural Economics.

Barr, N.F., Cary, J.W. (2000) Influencing Improved Natural Resource Management on Farms. Bureau of Rural Sciences.

Clean Water Act 3 U.S.C. §1251 et seq. (1972)

Erickson, D., Ryan, R. and R. De Young (2002) Woodlots in the rural landscape: Landowner motivations and management attitudes in a Michigan case study. Landscape and Urban Planning.

Key Components of an Effective State Nonpoint Source Management Program (2014) US EPA

LaGrange, Ted (2005) Guide to Nebraska Wetlands and their Conservation Needs: Second Edition

LaGrange, Ted (2015) Final Report submitted to EPA for the project entitled: Nebraska's Wetland Condition Assessment: An Intensification Study in Support of the 2011 National Survey (CD# 97714601), and the related project entitled: Nebraska's Supplemental Clean Water Act §106 Funds, as Related to Participation in National Wetland Condition Assessment (I – 97726201).

LaGrange, Ted (2019) Nebraska Wetland Program Plan 2019-2023. US EPA approved Feb 2019.

Marra M, Pannell DJ, Abadi Ghadim A (2003) The economics of risk, uncertainty and learning in the adoption of new agricultural technologies: Where are we on the learning curve? Agricultural Systems.

Nebraska Revised Statute § 81-1501 to 1532 (1971)

Pannell, D.J., Marshall, G.R., Barr, N., Curtis, A., Vanclay, F. and Wilkinson, R. (2006) Understanding and promoting adoption of conservation practices by rural landholders. Australian Journal of Experimental Agriculture.

Title 117, Nebraska Department of Environment and Energy (2019)

Tsur, Y., Sternberg, M., Hochman, E. (1990) Dynamic modelling of innovation process adoption with risk aversion and learning. Oxford Economist.

U.S. Army Corps of Engineers (987) Corps of Engineers Wetlands Delineation Manual. Environmental Laboratory U.S. Army Corps of Engineers, Waterways Experiment Station, Wetlands Research Program Technical Report Y-87-1. Vicksburg, MS.

Appendices

APPENDIX A SCHEDULE/COST ESTIMATES/LOAD ESTIMATES

A time table for completing tasks and activities to implement the Nebraska Nonpoint Source Management Plan over the next 15 years is presented in Table A.1. The tasks and activities identified in the table are based on a projection of tasks and activities required to meet 2014 EPA Guidelines for the program and an estimate of tasks and activities traditionally performed to implement the state program.

The estimated cost for implementing the state program from 2021 through 2036 (Table A.2) is based on the average cost of select tasks and activities over recent years or on projected costs for tasks and activities new to the program.

Estimates of pollutant load reductions over the life of the 2021-2036 are presented in Table A.3. These values are based on average load reductions realized for similar projects in recent years.

Table A.1 State Management Plan – Schedule

Activity	G-O-T[+]	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total Tasks
Administration and Operations																		
Personnel and Operations	G1-O1-T1 G1-O4-T1 G1-O4-T2 G2-O2-T3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
Update Resource Priority Lists (following biennial Nebraska Integrated Report)	G1-O1-T3		1		1		1		1		1		1		1		1	8
Annual Report	G1-O4-T3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
Semi-annual Project Reports (March, Sept)	G1-04-T1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	32
Project Financial Reviews	G1-O4-T1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
Develop Baseline Values for NPS Plan Metrics	G1-O4-T3	1	1															2
Success Stories	G1-O4-T3					2					2					2		6
Revise Nonpoint Source Management Plan	G1-O1-T4					1					1					1		3
Monitoring and Monitoring Supplies	G1-O1-T2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
Outreach																		
Revise Guidance for Watershed Management Planning	G2-O2-T1		1															1
Develop Guidance Drinking Water Protection Management Planning	G2-O2-T1		1															1
Develop Guidance for Project Communication Strategy	G2-O2-T2		1															1
Conduct Workshop for Developing Management Plans	G2-O2-T1		1															1
Project Training Workshops	G2-O2-T2				1			1			1			1			1	5
Special Services																		
Liaisons	G1-O2-T3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
Agrichemical Data Clearinghouse	G1-O1-T2		1		1		1		1		1		1		1		1	8
Planning																		
Watershed Management Plans (new and/or revisions)	G1-O3-T1 G1-O2-T2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
Drinking Water Protection Management Plans (new and/or revisions)	G1-O3-T1 G1-O2-T2	1		1		1		1		1		1		1		1		8

Table cont. on next page

Supported Projects																		
Targeted Studies and Special Initiatives	G1-O3-T2 G2-O1-T1 G2-O1-T2	1			1			1			1			1			1	6
Small Projects	G1-O3-T2	2	3	2	3	2	3	2	3	2	3	2	3	2	3	2	3	40
Watershed Projects	G1-O3-T2	3	4	5	5	4	5	5	4	5	5	4	5	4	4	5	5	72
Drinking Water Protection Projects	G1-O3-T2	1		1			1			1			1			1		6
TOTAL		17	22	17	20	18	19	18	17	17	23	15	19	17	17	20	20	296

+ G–O–T lists the associated Goal (G), Objective (O) and Task (T) as given in Chapter 3.

Table A.2 State Management Plan – Estimated Costs

Activity	Units	Unit Cost	Total Cost	Section 319 Funds	NRCS Funds	NET Funds	NGPC Funds	Local Funds	SRF Funds
Administration and Operations									
Personnel and Operations	16	$820,000	$13,120,000	$13,120,000	$0	$0	$0	$0	$0
Update Resource Priority Lists	9	$0	$0	$0	$0	$0	$0	$0	$0
Annual Report	16	$0	$0	$0	$0	$0	$0	$0	$0
Success Stories	8	$0	$0	$0	$0	$0	$0	$0	$0
Revise Nonpoint Source Management Plan	3	$0	$0	$0	$0	$0	$0	$0	$0
Monitoring and Monitoring Supplies	16	$350,000	$5,600,000	$4,480,000	$0	$280,000	$0	$840,000	$0
Outreach									
Guidance Documents	4	$1,000	$4,000	$4,000	$0	$0	$0	$0	$0
Project Training Workshop	6	$1,000	$6,000	$6,000	$0	$0	$0	$0	$0
Special Services									
Liaisons	16	$210,000	$3,360,000	$3,192,000	$0	$0	$0	$168,000	$0
Wellhead Protection Network	8	$30,000	$240,000	$240,000	$0	$0	$0	$0	$0
Agrichemical Data Clearinghouse	8	$70,000	$560,000	$560,000	$0	$0	$0	$0	$0
Planning									
Watershed Management Plans	15	$200,000	$3,000,000	$750,000	$1,000,000	$0	$0	$1,250,000	$0
Drinking Water Protection Management Plans	15	$100,000	$1,500,000	$0	$0	$0	$0	$750,000	$750,000
Supported Projects									
Targeted Studies and Special Initiatives	6	$150,000	$900,000	$540,000	$0	$0	$0	$360,000	$0
Small Projects	40	$25,000	$1,000,000	$600,000	$0	$0	$0	$400,000	$0
Large Projects	103	$562,961	$57,985,000	$14,200,500	$18,000,000	$12,100,500	$8,100,000	$5,584,000	$0
Drinking Water Protection Projects	6	$500,000	$3,000,000	$750,000	$1,500,000	$450,000	$0	$300,000	$0
TOTAL			$90,275,000	$38,442,500	$20,500,000	$12,830,500	$8,100,000	$9,652,000	$750,000

Table A.3 State Management Plan – Estimated Load Reductions

Activity	Units	Average Nitrogen	Average Phosphorus	Average Sediment	Nitrogen (pounds)	Phosphorus (pounds)	Sediment (tons)
Supported Projects					0	0	0
Large Projects	97	19,879	4,683	11,269	1,928,299	454,280	1,093,106
Groundwater Projects	6	764	882	2,706	4,582	5,294	16,238
TOTAL	103				1,932,881	459,574	1,109,344

APPENDIX B STREAMS IDENTIFIED FOR RESTORATIVE OR PROTECTIVE MANAGEMENT ACTIONS

The process for identifying streams for restorative or protective management actions is described in "Identification of Waters for Management Actions" in Chapter 2. Streams identified for restorative management actions are listed in Table B.1. Streams identified for protective management actions are listed in Table B.2. Projects regarding restoration or protection of streams should be implemented as part of a watershed management approach.

The list of Impaired Streams Identified for Restorative Management Actions (Table B.1), which is based on the 2018 Integrated Report, is not intended to be exclusive. Rather, it is meant to encourage development of projects to restore streams where nonpoint source impairments are known to exceed water quality standards. The Integrated Report is updated biennially and newly impaired streams may also be considered for restorative management actions. Other stream restoration projects may be considered where supporting data justify the project.

The list of High-Quality Streams Identified for Protective Management Actions (Table B.2), which is based on the 2018 Integrated Report, is not intended to be exclusive. Rather, it is meant to encourage development of projects to protect streams threatened, but not yet impaired, by nonpoint source pollution. The Integrated Report is updated biennially and newly unimpaired streams may also be considered for protective management actions. Other stream protection projects may be considered where supporting data justify the project.

Table B.1 Impaired Streams Identified for Restorative Management Actions

Waterbody ID	Waterbody Name	Class[1]	Impairment		
			E. Coli	Atrazine	Aquatic Life
BB1-10100	Mission Creek	WA	x	x	x
BB1-10800	Big Indian Creek	WA	x	x	x
BB1-10900	Big Indian Creek	WB		x	x
BB2-10000	Turkey Creek	WA	x	x	x
BB2-20000	Turkey Creek	WA	x	x	x
BB3-10000	West Fork Big Blue River	WA	x	x	x
BB3-10200	Walnut Creek	WB			x
BB3-10300	Beaver Creek	WB		x	x
BB3-10400	Beaver Creek	WB			x
BB3-20000	West Fork Big Blue River	WA	x	x	x
BB3-20100	School Creek	WB		x	x
BB4-20900	Lincoln Creek	WB			x
EL1-10700	Bell Creek	WB			x
EL1-10900	Maple Creek	WA	x	x	x
EL1-10932	Dry Creek	WB			x
EL1-10940	West Fork Maple Creek	WB			x
EL1-20100	Pebble Creek	WA	x		x
EL1-20121	Unnamed Creek	WB			x
EL1-21000	Rock Creek	WA	x		x
EL1-21900	Union Creek	WA	x		
EL1-22000	Union Creek	WA	x		
EL1-22100	Union Creek	WA			x
EL2-10000	Logan Creek	WB	x		
EL2-20000	Logan Creek	WA	x		
EL2-20400	Rattlesnake Creek	WB			x
EL2-20700	Coon Creek	WB			x
EL2-20800	South Logan Creek	WA	x		
EL2-40100	Baker Creek	WB			x
EL2-40200	Middle Logan Creek	WA			x
EL3-20200	Willow Creek	WA	x		
EL3-20400	Dry Creek	WB	x		
EL3-SXXX1	Yankton Slough				x
EL4-10400	Battle Creek	WA	x		
EL4-11300	Cedar Creek	WA	x		
EL4-20300	Clearwater Creek	WA	x		

Waterbody ID	Waterbody Name	Class[1]	Impairment		
			E. Coli	Atrazine	Aquatic Life
LB1-10200	Rock Creek	WA	x		
LB2-10100	Big Sandy Creek	WB	x	x	x
LB2-10500	Spring Creek	WB			x
LB2-10600	Spring Creek	WB			x
LO1-10600	Beaver Creek	WA	x		
LO1-10700	Beaver Creek	WA	x		x
LO1-30311	South Branch Timber Creek	WB			x
LO1-30400	Cedar River	WA	x		
LO2-10200	Munson Creek	WB			x
LO2-11300	Calamus River	CB	x		
LO2-11400	Calamus River	CB	x		
LO3-10200	Turkey Creek	WB		x	
LO3-50200	Dismal River	WB	x		
LO3-50300	Dismal River	CB	x		
LO3-50310	South Fork Dismal River	CB	x		
LO3-50330	North Fork Dismal River	CB	x		
LO4-10100	Mud Creek	WB	x	x	x
LO4-10200	Mud Creek	WB	x		x
LP1-11200	Decker Creek		x		
LP1-20600	Shell Creek	WA	x		
LP1-20800	Shell Creek	WB			x
LP1-SXXX1	Unnamed Creek				x
LP2-10100	Wahoo Creek	WA	x		
LP2-10110	Clear Creek	WA	x		
LP2-10120	Clear Creek	WB			x
LP2-10121	Johnson Creek	WB		x	x
LP2-10140	Silver Creek	WB		x	x
LP2-10160	Sand Creek	WB		x	x
LP2-10210	Cottonwood Creek	WB			x
LP2-20300	Little Salt Creek	WB			x
LP2-20400	Dead Man's Run	WB	x		
LP2-20500	Oak Creek	WA	x		
LP2-20600	Oak Creek	WB	x		x
LP2-20710	Middle Oak Creek	WB		x	x
LP2-20800	Oak Creek	WB		x	x
LP2-20900	Antelope Creek	WB			x
LP2-21100	Middle Creek	WB		x	x
LP2-21500	Beal Slough	WB	x		

Waterbody ID	Waterbody Name	Class[1]	Impairment		
			E. Coli	Atrazine	Aquatic Life
LP2-30100	Cardwell Branch	WB	x		
LP2-40300	Olive Branch	WB			x
MP1-10100	Clear Creek	CB	x		
MP1-20100	Prairie Creek	WB			x
MP2-10300	Wood River	WB			x
MP2-20300	Spring Creek	WA	x		
MP2-20400	Plum Creek				x
MT1-10100	Papillion Creek	WA	x		
MT1-10110	Big Papillion Creek	WA	x		
MT1-10111	Little Papillion Creek	WB	x		
MT1-10111.1	Cole Creek	WB	x		
MT1-10111.2	Thomas Creek	WB			x
MT1-10120	Big Papillion Creek	WA	x		
MT1-10200	Papillion Creek	WA	x		
MT1-10210	Walnut Creek	WB			x
MT1-10240	South Papillion Creek	WB			x
MT1-10252	North Branch West Papillion Creek	WB			x
MT1-10300	Ponca Creek	WB			x
MT1-11510	Silver Creek	WB			x
MT1-12000	Omaha Creek	WA	x		
MT1-12150	North Omaha Creek	WB			x
MT2-10100	Elk Creek	WA	x		
MT2-10400	Elk Creek	WB			x
MT2-10500	Aowa Creek	WA	x		
MT2-10520	South Creek	WA	x		x
MT2-10521	Daily Branch	WB	x		
MT2-10530	South Creek	WB	x		
MT2-10540	South Creek	WB			x
MT2-10700	Aowa Creek	WB			x
MT2-11300	Bow Creek	WA	x		
MT2-11310	West Bow Creek	WB	x		
MT2-11400	Bow Creek	WA	x		
MT2-11410	East Bow Creek	WB	x		
MT2-11800	Antelope Creek	WB			x
MT2-12400	Bazile Creek	WB	x		
MT2-12500	Bazile Creek	WA	x		
NE1-10200	Winnebago Creek	WB			x

Waterbody ID	Waterbody Name	Class[1]	Impairment		
			E. Coli	Atrazine	Aquatic Life
NE1-12310	Unnamed Creek	WB	x		
NE1-13000	Weeping Water Creek	WB	x		
NE2-10600	Muddy Creek	WA	x		x
NE2-10750	Little Muddy Creek	WB	x		
NE2-11200	Pony Creek	WA	x		
NE2-12130	Turkey Creek	WA	x		
NE2-12330	Long Branch Creek	WA	x		x
NE3-10000	Little Nemaha River	WA	x		
NE3-20400	South Fork Little Nemaha River	WA		x	x
NI1-10100	Ponca Creek	WA	x		
NI2-10100	Verdigre Creek	WA	x		x
NI2-10140	North Branch Verdigre Creek	CB	x		x
NI2-10200	Verdigre Creek	WB	x		
NI2-10230	Middle Branch Verdigre Creek	CB	x		x
NI2-10270	Merriman Creek	CB	x		x
NI2-10300	South Branch Verdigre Creek	CB	x		
NI2-10320	East Branch Verdigre Creek	CA	x		
NI2-10800	Steel Creek	CA	x		
NI2-11400	Redbird Creek	CB	x		x
NI2-11700	Eagle Creek	CB	x		
NI2-11780	Middle Branch Eagle Creek	CB	x		
NI2-11781	North Branch Eagle Creek	CB	x		
NI3-10100	Keya Paha River	WA	x		
NI3-12200	Long Pine Creek	CB	x		
NI3-12220	Bone Creek	CB	x		
NI3-12221	Sand Draw	CB	x		x
NI3-12400	Long Pine Creek	CA	x		
NI3-13000	Plum Creek	CB	x		
NI3-21900	Minnechaduza Creek	CB	x		
NI3-22200	Gordon Greek	CB			x
NI3-22500	Snake River	CB	x		
NI3-22510	Boardman Creek	CA	x		
NI4-10100	Bear Creek	WA	x		
NI4-10800	Pine Creek	CB	x		
NP1-30900	Whitetail Creek	CB	x		
NP2-12100	Lower Dugout Creek	CB			x
NP3-10600	Upper Dugout Creek	WB			x
NP3-10900	Red Willow Creek	CB	x		

Waterbody ID	Waterbody Name	Class[1]	Impairment		
			E. Coli	Atrazine	Aquatic Life
NP3-11700	Ninemile Creek	CB	x		
NP3-12000	Ninemile Creek	CA			x
NP3-12400	Gering Drain	CA	x		
NP3-12600	Winters Creek	CA	x		
NP3-13000	Tub Springs Drain	CA	x		
NP3-30600	Horse Creek	CB	x		
RE1-10200	Lost Creek	WB	x		
RE1-31200	Thompson Creek	CB	x		
RE2-10100	Methodist Creek	WB	x		
RE2-10200	Cook Creek	WB	x		
RE2-10300	Prairie Dog Creek	WB	x		
RE2-10610	Beaver Creek	WB	x		
RE2-10900	Spring Creek	WB			x
RE3-10200	Medicine Creek	WA	x		
RE3-10300	Medicine Creek	WA	x		
RE3-10400	Medicine Creek	WA	x		
RE3-10500	Red Willow Creek	WB	x		
RE3-10600	Red Willow Creek	WA	x		x
RE3-20200	Frenchman Creek	CB	x		
RE3-20220	Stinking Water Creek	CB	x		
RE3-20300	Frenchman Creek	CB	x		
RE3-20400	Frenchman Creek	CB	x		
RE3-50400	Arikaree River	WB	x		
WH1-10420	Larabee Creek	CB			x
WH1-11300	Chadron Creek	CA	x		
WH1-11820	West Ash Creek	CB	x		
WH1-20100	White Clay Creek	CB	x		

[1] Stream classes include:
CA – Cold Water Class A stream.
CB – Cold Water Class B Stream.
WA – Warm Water Class A Stream.
WB – Warm Water Class B Stream.

Table B.2 High-Quality Streams Identified for Protective Management Actions

Waterbody ID	Waterbody Name	Class[1]
BB1-11110	Bloody Run	WB
BB1-11400	Bear Creek	WA
BB1-11600	Indian Creek	WB
BB1-11900	Cub Creek	WA
BB4-20800	Lincoln Creek	WB
BB4-30000	Big Blue River	WB
EL1-10600	Bell Creek	WA
EL1-10920	East Fork Maple Creek	WB
EL2-10200	Little Logan Creek	WB
EL3-30000	North Fork Elkhorn River	WA
EL4-30200	Dry Creek	WB
LB1-10400	Rose Creek	WA
LO1-30310	Timber Creek	WB
LO2-10000	North Loup River	WA
LO2-10400	Mira Creek	WB
LO2-10400	South Branch Mira Creek	WB
LO3-30000	Middle Loup River	WA
LO3-40000	Middle Loup River	WA
LO3-50000	Middle Loup River	WA
LO3-70210	Middle Branch Middle Loup River	CB
LP1-10100	Fourmile Creek	WB
LP1-20400	Skull Creek	WB
LP1-20700	Shell Creek	WB
LP2-10161	Duck Creek	WB
LP2-10170	Sand Creek	WB
LP2-10220	Miller Branch	WB
LP2-21000	Middle Creek	WB
LP2-21210	Holmes Creek	WB
MP2-20400	Plum Creek	WA
MT1-10112	Little Papillion Creek	WB
MT1-10251	Boxelder Creek	WB
MT1-12100	Omaha Creek	WB
MT2-12420	Howe Creek	WA
MT2-12600	Bazile Creek	WB
NE1-11610	Duck Creek	WB
NE1-11700	Buck Creek	WB
NE1-12800	Weeping Water Creek	WA
NE2-10800	Muddy Creek	WA

Waterbody ID	Waterbody Name	Class[1]
NE2-11900	South Fork Big Nemaha River	WA
NE2-12132	Johnson Creek	WA
NE2-12135	West Branch Turkey Creek	WB
NE2-12135.1	Balls Branch	WB
NE2-12140	Turkey Creek	WB
NE2-12150	Turkey Creek	WB
NI2-11300	Louse Creek	CA
NI3-10190	Spring Creek	CB
NI3-10220	Burton Creek	CB
NI3-12230	Bone Creek	CB
NI3-13100	Plum Creek	CA
NI3-20000	Niobrara	CA
NI3-22400	Snake River	CA
NP1-20000	North Platte River	CB
NP1-20500	Birdwood Creek	CB
NP2-10000	North Platte River	CB
NP2-10300	Otter Creek	CA
NP3-10100	Pumpkin Creek	CB
NP3-11200	Red Willow Creek	CA
NP3-11900	Ninemile Creek	CA
NP3-12700	Winters Creek	CA
NP3-30400	Sheep Creek	CB
NP3-50000	North Platte River	CB
RE1-10000	Republican River	WA
RE2-10600	Sappa Creek	WB
RE2-11100	Turkey Creek	WB
RE2-11400	Muddy Creek	WA
RE3-10800	Driftwood Creek	WB
RE3-50100	Buffalo Creek	WA
SP1-70000	South Platte River	WA
WH1-10000	White River	WA
WH1-11120	Big Bordeaux Creek	CB
WH1-20300	Soldier Creek	CA
WH2-10240	White River	CA
WH2-10240	Monroe Creek	CA
WH2-30000	Hat Creek	CB

[1] Stream classes include:
CA – Cold Water Class A stream.
CB – Cold Water Class B Stream.
WA – Warm Water Class A Stream.
WB – Warm Water Class B Stream.

APPENDIX C LAKES IDENTIFIED FOR RESTORATIVE OR PROTECTIVE MANAGEMENT ACTIONS

The process for identifying lakes for restorative or protective management actions is described in "Identification of Waters for Management Actions" in Chapter 2. Lakes identified for restorative management actions are listed in Table C.1. Lakes identified for protective management actions are listed in Table C.2. Projects regarding restoration or protection of lakes should be implemented as part of a watershed management approach.

The list of Impaired Lakes Identified for Restorative Management Actions (Table C.1), which is based on the 2018 Integrated Report, is not intended to be exclusive. Rather, it is meant to encourage development of projects to restore lakes where nonpoint source impairments are known to exceed water quality standards. The Integrated Report is updated biennially and newly impaired lakes may also be considered for restorative management actions. Other lake restoration projects may be considered where supporting data justify the project.

The list of High-Quality Lakes Identified for Protective Management Actions (Table C.2), which is based on the 2018 Integrated Report, is not intended to be exclusive. Rather, it is meant to encourage development of projects to protect lakes threatened, but not yet impaired, by nonpoint source pollution. The Integrated Report is updated biennially and newly unimpaired lakes may also be considered for protective management actions. Other lake protection projects may be considered where supporting data justify the project.

Table C.1 Impaired Lakes Identified for Restorative Actions

Waterbody ID	Lake Name	Impairment			
		Phosphorus	Nitrogen	Sediment	E. coli
BB1-L0010	Donald Whitney Memorial Lake	x	x		
BB1-L0020	Diamond Lake South	x	x		
BB1-L0030	Big Indian 11A	x	x		
BB1-L0040	Arrowhead Lake	x	x		
BB1-L0060	Rockford Lake	x	x		
BB1-L0080	Cub Creek Lake	x	x		x
BB1-L0100	Walnut Creek Lake 2A	x	x		
BB2-L0005	Swanton Lake	x	x		
BB2-L0020	Swan Creek Lake 5A	x	x		
BB3-L0030	Waco Basin	x	x		
BB3-L0030	Henderson Pond	x	x		
BB3-L0050	Lake Hastings	x	x	x	
BB3-L0060	Hastings Northwest Dam Lake	x	x		
BB3-L0080	Recharge Lake	x	x		
BB4-L0010	David City Park Lake	x	x		
BB4-L0035	Oxbow Trail Reservoir	x	x		
EL1-L0060	West Point City Lake (Neligh Park Lake)	x	x		
EL1-L0080	Maskenthine Reservoir	x	x		
EL3-L0010	Willow Creek Reservoir	x	x		
EL4-L0025	Horseshoe Bend (Tilden City Lake)				x
LB1-L0010	Buckley Reservoir 3F	x	x		
LB1-L0020	Crystal Springs Northwest Lake	x	x		
LB1-L0030	Crystal Springs Center Lake	x	x		
LB1-L0040	Crystal Springs East Lake	x	x		x
LB1-L0050	Lone Star Reservoir (Little Sandy Creek Reservoir)	x	x		
LB2-L0030	Alexandria Lake No. 3	x	x		
LB2-L0070	Crystal Lake, SRA	x	x		
LO1-L0130	Pibel Lake	x	x		
LO2-L0015	Davis Creek Reservoir	x	x		
LO2-L0050	Calamus Reservoir	x			
LO3-L0020	Sherman Reservoir	x			
LO4-L0030	Ansley City Lake		x		
LP1-L0060	Jenny Newman Lake (Platte River State Park)	x			
LP1-L0180	Fremont Lake No. 12, SRA	x	x		
LP1-L0200	Fremont Lake No. 15, (Victory) SRA	x	x		
LP1-L0220	Fremont Lake No. 18E, SRA	x	x		

Waterbody ID	Lake Name	Impairment			
		Phosphorus	Nitrogen	Sediment	E. coli
LP1-L0230	Fremont Lake No. 17, SRA	x	x		
LP1- L0240	Fremont Lake No. 10, SRA	x	x		
LP1-L0250	Fremont Lake No. 20, SRA	x	x		
LP1-L0270	Fremont Lake No. 16, SRA	x	x		
LP1-L0270	Fremont Lake No. 9, SRA	x	x		
LP1-L0290	Fremont Lake No. 1, SRA	x	x		
LP1-L0300	Fremont Lake No. 2, SRA	x	x		
LP1-L0310	Fremont Lake No. 3, SRA	x	x		
LP1-L0320	Fremont Lake No. 5, SRA	x	x		
LP1-L0330	Fremont Lake No. 4, SRA	x	x		
LP1-L0350	Fremont Lake No. 7 and 8, SRA	x	x		
LP1-L0355	Homestead Lake	x	x		
LP1-L0350	Lake North	x			
LP1-L0355	Lake Babcock				x
LP2-L0030	Wagon Train Lake	x	x		
LP2-L0040	Holmes Lake	x	x		
LP2-L0050	Stagecoach Lake	x	x	x	
LP2-L0090	Yankee Hill Lake	x	x		
LP2-L0100	Bowling Lake	x	x		
LP2-L0110	Bluestem Lake	x	x	x	
LP2-L0120	Wildwood Lake	x	x		
LP2-L0130	Conestoga Lake	x	x	x	
LP2-L0140	Olive Creek Lake	x	x		
LP2-L0150	Branched Oak Lake	x	x		
LP2-L0160	Pawnee Lake	x	x	x	
LP2-L0220	Meadow Lark Lake	x	x		
LP2-L0240	East Twin Lake	x	x		
LP2-L0260	West Twin Lake	x	x		
LP2-L0270	Czechland Lake	x	x		
LP2-L0280	Redtail Lake	x			
MP2-L0040	Sucks Lake (Grand Island)	x	x		
MP2-L0410	Blue Hole East Lake, WMA	x			
MP2-L0520	Johnson Lake	x	x		
MP2-L0570	Gallagher Canyon Reservoir	x			
MP2-L0650	Lake Helen	x	x		
MT1-L0025	Walnut Creek Lake	x	x		x
MT1-L0030	Wehrspann Lake, Site No. 20	x	x		
MT1-L0050	Ed Zorinsky Lake, Site No. 18	x	x		
MT1-L0090	Carter Lake	x	x		

Waterbody ID	Lake Name	Impairment			
		Phosphorus	Nitrogen	Sediment	E. coli
MT1-L0100	Standing Bear Lake, Site No. 16	x	x	x	
MT1-L0120	Glenn Cunningham Lake, Site No. 11	x	x		
MT1-L0150	Summit Lake	x	x		
MT1-LXXX1	Candlewood Lake			x	
MT2-L0005	Powder Creek Lake	x	x		
MT2-L0010	Buckskin Hills Lake	x			
MT2-L0020	Chalkrock Lake	x	x		
MT2-L0060	Plainview Country Club Lake				x
MT2-L0040	Lewis and Clark Lake				x
NE2-L0040	Kirkman's Cove Lake	x	x	x	x
NE2-L0090	Iron Horse Trail Lake	x	x	x	
NE2-L0100	Pawnee City Lake	x	x		
NE2-L0120	Burchard Lake, WMA	x	x		
NE3-L0030	Prairie Owl Lake	x			
NI2-L0090	Grove Lake, WMA	x	x		
NI3-L0070	Cub Creek Lake	x	x		
NI3-L0170	Valentine Mill Pond	x	x		
NI3-L0220	Big Alkali Lake, WMA	x	x		
NI3-L0330	Merritt Reservoir	x	x		
NP1-L0030	Lake Ogallala	x	x		
RE2-L0010	Harlan County Reservoir	x	x		
RE3-L0010	Harry Strunk Lake (Medicine Creek Reservoir)	x	x		
RE3-L0020	Bartley Diversion Dam Lake, WMA				x
RE3-L0030	Curtis City Pond	x	x		
RE3-L0060	Hugh Butler Lake (Red Willow Reservoir)	x			
RE3-L0090	Swanson Reservoir	x	x		
RE3-L0100	Enders Reservoir	x			
SP2-L0030	Oliver Reservoir	x	x		
WH2-L0030	Meng Lake	x	x		
Statewide	Community Lake				

Table C.2 High-Quality Lakes Identified for Protective Actions List

Waterbody ID	Waterbody Name
BB4-L0020	Seward City Park Pond (Independence Landing Pond)
BB4-L0045	Aurora Leadership Center Lake
MP2-L0090	Alda Rest Area Lake (I-80 mile 306 N)
MP2-L0680	West Gothenburg Lake, WMA
MT1-L0200	Crystal Cove Lake (South Sioux City)
NP3-L0050	Bridgeport Northwest Lake, SRA
NP3-L0060	Lake Minatare, North Platte NWR
RE3-L0110	Champion Mills Pond, SRA
WH1-L0020	Chadron City Reservoir South
WH1-L0030	Chadron City Reservoir North
Statewide	New Lakes to be Built

APPENDIX D GROUNDWATER RECHARGE AREAS AND WETLANDS IDENTIFIED FOR RESTORATIVE OR PROTECTIVE MANAGEMENT ACTIONS

The process for identifying groundwater recharge areas and wetlands for restorative or protective management actions is described in "Identification of Waters for Management Actions" in Chapter 2. Criteria for identifying groundwater areas and wetlands identified for management actions are listed in Table D.1. Projects regarding restoration or protection of groundwater or wetlands should be implemented as part of a watershed or area management approach.

The list of Groundwater Recharge Areas and Wetlands Identified for Restorative or Protective Management Actions (Table D.1) is not intended to be exclusive. Rather, it is meant to encourage development of projects to restore these water resources where degradation by nonpoint source pollution has occurred or to protect these water resources where they are threatened, but not yet degraded, by nonpoint source pollution. Other groundwater and wetland projects may be considered where supporting data justify the project.

Table D.1 Groundwater Recharge Areas and Wetlands Identified for Restorative or Protective Management Actions

Resource	Restore	Protect
Groundwater Recharge Areas		
Groundwater Management Area (≥ Phase 2) that Includes Wellhead Protection Areas	X	
Wellhead Protection Area in a Groundwater Management Area (≥ Phase 2)	X	
Wellhead Protection Area with ≤ 5ppm NO_3		X
Drinking Water Protection Management Plan Area	X	X
Wetlands		
Eastern Saline Wetland	X	X
Rainwater Basin Wetland	X	X
Central Platte River Wet Meadow	X	X
Rare and Unusual Wetlands	X	X

APPENDIX E PROJECT SELECTION AND UTILIZATION OF SECTION 319 FUNDS

The Nebraska Nonpoint Source Management Plan is designed to provide a balanced approach in engaging citizens in learning about and taking action to reduce the impact of nonpoint source pollution on Nebraska's water resources. The process involves planning, communicating and implementing activities that reduce pollution threats or mitigate impairment of water resources by nonpoint source pollution. Efforts are targeted at both local and statewide levels.

Both the scope and scale of potential projects present challenges in comparability and in competitiveness for funding. To achieve a balance among varied project types, the management plan defines two subprograms to support external projects that advance the goals of the program in key areas and provide assistance to key audiences. The subprograms are described in Chapter 11. Proposals for both Large Projects and Small Projects are accepted on an ongoing basis and reviewed by NDEE staff for eligibility and importance in advancing the goals of the nonpoint source program. Some proposals may be sent to other outside reviewers when additional expertise is desired. Selected proposals must be developed into project implementation plans for final approval by EPA for Large Projects. Project implementation plans funded under the Small Projects Assistance subprogram are approved at the state level.

PROPOSAL REVIEW PROCESS

Proposals are initially screened for eligibility. Project sponsors must be a sub-unit of government, an educational institution or a nonprofit organization. Sponsors may not be debarred or suspended from eligibility to receive federal funds. Proposals must be responsive in submitting the required materials and information in the format prescribed in the request for proposals or in the guidelines of the appropriate subprogram. Projects must address one of the eligibility categories as described in Chapter 11 and include appropriate activities that advance the objectives of the Nonpoint Source Management Program. Mandated, regulatory, and research activities are not eligible for funding.

Consideration is given to the sponsor's technical and financial ability to support the project. Past performance in implementing projects also is considered in approving or conditioning approval of a project. Considerations regarding the quality of the project include: ecological and public value of the water resources, local interest and support, partnerships, degree of impairment or threat, and the probability of success. Watershed-based projects should address waters identified for restorative or protective actions and should be designed to implement components of a governing watershed-based management plan. Projects must address priority areas within the approved watershed plan

Projects outside the usual eligibility and priority guidelines may be considered with EPA concurrence if funding is available. These alternative projects must be of exceptional quality and provide an important opportunity to advance the goals of the Nonpoint Source Management Program. Alternative projects must meet the requirements described in similar project eligibility categories. Additional requirements appropriate to the project may be imposed.

COMPONENTS OF A PROJECT IMPLEMENTATION PLAN

All projects require a project implementation plan that details the work to be performed under a sub-award of Section 319 funds. The level of detail should reflect the scope and scale of the project, but must be specific enough for program managers to understand the project and to evaluate the sponsor's performance in

implementing effective activities. The project implementation plan must include, at least, the components described below.

Background. The background should describe the purpose of the project, its geographic area, current water quality conditions, characteristics of the watershed, and past or current efforts to address water quality issues. Additional information that assists in understanding the context of the project and the actions proposed should be included in the background section.

Map. A map of the project area should be included, where applicable, to assist project participants and program managers in identifying the location and characteristics of the treatment area relative to the receiving water to be restored or protected.

Goals, Objectives, and Tasks. Measurable goals and objective must be clearly stated for the project and for Large Projects, should mirror those in the 9-element watershed management plan. Quantifiable tasks related to the stated goals and objectives must be described.

Best Management Practices. For Large Projects, the type and estimated quantity of Best Management Practices expected to be installed must be described and should mirror those described in the 9-element watershed management plan. Methods for implementing tasks should be described as well.

Communication. Every project must include a communication component to inform and engage the key audiences in the project and to share information about the project with partners, program managers and other interested parties. The communication component must identify key audiences, issues to be addressed, and methods for reaching key audiences. Specific communication activities and products must be described and quantified. Methods for disseminating those activities and products must be described.

Pollutant Load Reduction. Large Projects must estimate the reduction in pollutant loads to the water resource that the project is expected to yield. These must be specific to the immediate implementation project, not the cumulative loads of the governing management plan or sequential projects.

Partnerships. Partners assisting in implementing the project must be identified and their specific contributions described.

Evaluation/Monitoring. A process and methods for evaluating progress in implementing the project and measuring the impact of the project must be described. When environmental monitoring is involved, a Quality Assurance Project Plan (QAPP) must be developed and approved by NDEE prior to project initiation.

Schedule. The project implementation plan must include a schedule for implementing key activities of the project. The schedule must be sufficient to evaluate orderly progress in completing described tasks and to allow program mangers the opportunity to observe and evaluate activities.

Budget. The project budget must break out major expenditures in sufficient detail for program managers to evaluate appropriateness and to track expenditures for specific tasks. Sources of funds also should be identified. Budget categories must be grouped per EPA guidelines as follows: Personnel, Fringe Benefits, Travel, Equipment, Supplies, Contractual, and Other.

PROJECT FUNDING

Projects will be considered for competitive or directed funding as federal funds are available. Projects are evaluated for their quality and contribution to advancing the goals of the Nonpoint Source Management Program.

UTILIZATION OF SECTION 319 FUNDS

The Nonpoint Source Management Program is meant to complement, not to supplant, other conservation programs. Therefore, project sponsors are expected to utilize other existing conservation programs to fund project activities (in whole or in part) before utilizing Section 319 funds to supplement those activities. Section 319 funds are best utilized to bridge the gaps among other conservation programs by supporting complementary activities that may not be eligible under those programs. Utilizing Section 319 funds to enhance the cost-share benefits of other programs may help encourage greater participation by land managers in implementing conservation practices. The use of Section 319 funds for installation of conservation practices should be guided by the principles presented below.

1. Project sponsors and partners should make other existing conservation programs available to land managers within the project watershed. Project sponsors and partners are encouraged to offer priority consideration (e.g., bonus points, set aside) within their other programs for cost-share applicants from the project watershed or area.

2. Priority should be given to cost-share applications that integrate funding from other conservation programs. Some contribution from the individual landowner is encouraged and should be considered in selecting applications for cost-share or incentives. Certain practices may require a contribution from the land manager.

3. Land managers should make reasonable efforts to qualify and apply for cost-share assistance from other existing conservation programs before utilizing Section 319 funds. This includes revising the cost-share application to improve its competitiveness reapplying to those conservation programs in a subsequent application period.

4. Priority should be given to cost-share applications that integrate complementary practices. Project sponsors and partners are encouraged to offer priority consideration (e.g., bonus point, set aside) for cost-share applications that include complementary practices that address multiple modes of action to reduce runoff pollution.