

**FINAL**  
**Programmatic Environmental Assessment**  
**Nebraska Platte-Republican Resources Area**  
**Conservation Reserve Enhancement Program (CREP)**



**Farm Service Agency**  
**United States Department of Agriculture**



**March 2005**



## Cover Sheet

**Mandated Action:** The United States Department of Agriculture, Commodity Credit Corporation (USDA/CCC) and the State of Nebraska have agreed to implement the Nebraska Platte-Republican Resources Area (NPRRA) Conservation Reserve Enhancement Program (CREP), a component of the Conservation Reserve Program (CRP).

USDA is provided the statutory authority by the provisions of the Food Security Act of 1985, as amended (16 U.S.C. 3830 et seq.), and the regulations at 7 CFR 1410. In accordance with the 1985 Act, USDA/CCC is authorized to enroll lands through December 31, 2007.

The Farm Service Agency (FSA) of USDA proposes to enter into a CREP agreement with the State of Nebraska. CREP is a voluntary land conservation program for State agricultural landowners.

**Type of Document:** Programmatic Environmental Assessment (PEA)

**Lead Agency:** United States Department of Agriculture, Farm Service Agency

**Sponsoring Agencies:** Nebraska State Department of Agriculture and Markets; Nebraska State Department of Environmental Conservation; Nebraska State Soil and Water Conservation Committee

**Cooperating Agencies:** United States Department of Agriculture, Natural Resource Conservation Service (NRCS); Soil & Water Conservation Districts in Nebraska State; Cornell Cooperative Extension Associations

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**Comments:**

This Final PEA was prepared in accordance with the United States Department of Agriculture FSA National Environmental Policy Act Implementation Procedures found in 7 CFR 799, as well as the National Environmental Policy Act of 1969, Public Law 91-190, 42 U.S.C. 4321-4347, 1 January 1970, as amended. A Notice of Availability for the Finding of No Significant Impact (FONSI) is being published in local newspapers and is posted on the FSA website (<http://www.fsa.usda.gov/dafp/cepd/epb/assessments.htm>) concurrent with this Final PEA.

Any written comments regarding this assessment shall be submitted to:

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## Executive Summary

### Purpose of and Need for the Programmatic Environmental Assessment

The purpose of this Programmatic Environmental Assessment (PEA) is to provide to the general public an analysis of the environmental, social, and economic effects of implementing the Nebraska Platte-Republican Resource Areas (NPRRA) Conservation Reserve Enhancement Program (CREP). This PEA specifically addresses the consequences of implementing two alternatives: a no action alternative and a proposed action alternative.

The Farm Service Agency (FSA) has prepared this PEA in accordance with its National Environmental Policy Act Implementation regulations found in 7 CFR 799, as well as the National Environmental Policy Act of 1969, Public Law 91-190, 42 U.S.C. 4321-4347, 1 January 1970, as amended.

### Purpose and Need for the Proposed Action

The purpose of the NPRRA CREP is to enhance the water quality and quantity of three major Nebraska watersheds (North Platte, Platte, and Republican River basins) by reducing the amount of nutrients, sediments, and chemical runoff from agriculture sources while increasing wildlife and wetland habitat for birds, migrating waterfowl, and other aquatic organisms.

The NRPPA plays a uniquely important water quality function in the United States because of the large number of separate rivers, streams, and lakes of national priority that receive water from Nebraska's watersheds.

### Description of Alternatives

The alternatives that will be discussed in the PEA include two possible actions: Alternative A (No Action)—Continue Current Agricultural Practices and Alternative B (Proposed Action)—Implement the NPRRA CREP. No other alternatives are being developed at this time.

#### Alternative A (No Action)—Continue Current Agricultural Practices

Under Alternative A current agricultural practices would continue and modes of agricultural production would remain as they have for decades. Land development, irrigation water use rates, and agricultural chemical application rates would most likely remain at current levels.

#### Alternative B (Proposed Action)— Implement the NPRRA CREP

Alternative B is the preferred alternative and targets 100,000 acres (0.22 percent of the State's agricultural land and 2.9 percent of the proposed CREP project area) for the installation and maintenance of selected conservation practices (CPs). In order to maximize benefits, acreage will be split equally between the Republican and Platte River (including the North Platte) basins (50,000 acres each). Land placed under CREP contracts would be retired from crop production and irrigation for 10-15 years. CREP would provide the financial and technical assistance necessary to assist eligible Nebraska farmers and ranchers in establishing CPs that would conserve soil and water; filter nutrients and pesticides; and enhance and restore wildlife habitat.

A summary comparison of the two alternatives can be found in Tables 2.4 and 2.5 on pages 2-9 and 2-12 respectively.

## How to Read this Programmatic Environmental Assessment

The PEA is organized into the following three chapters:

- Chapter 1 (Purpose and Need for Action);
- Chapter 2 (Alternatives Including the Proposed Action); and
- Chapter 3 (Affected Environment and Environmental Consequences)

Chapter 1 is an introductory chapter that outlines the purpose and need for preparing a document of this type as well as the purpose and need for CREP. Chapter 1 also briefly introduces the resource issues and also discusses the resource issues that were eliminated and the reasons they were eliminated from further analysis.

Chapter 2 describes the actions proposed in the PEA including the two alternatives described above. Alternatives are compared in summary tables in terms of their individual environmental impacts and their achievement of objectives.

Chapter 3 provides a general description of the resource area including a summary of ecological regions, climate, history of irrigation practices, profile of agricultural activities (baseline conditions), soil, and land use and ownership. Following the background information is a more detailed analysis of each of the resources most likely to receive impacts from the alternatives including:

- Surface Water
- Groundwater
- Drinking Water
- Wetlands
- Floodplains
- Critical Habitat or Threatened/Endangered Species
- Cultural/Tribal Resources
- Human Health, Social, and Economic Issues
- Cumulative Effects

Each resource is discussed in a separate section which has combined the analyses of the Affected Environment (or Existing Conditions) and Environmental Consequences (Effects of Alternative A and B). Each section, in general, is organized as follows:

- Introduction
- Existing Conditions
- Impacts
- Effects of Alternative A
- Effects of Alternative B

## **How the Draft PEA was Prepared**

This document was prepared with the cooperation of State of Nebraska personnel including personnel from the Nebraska Games and Park Commission and the Nebraska Department of Agriculture. The best available information was used in the development of this document with the majority of information being obtained from State and Federal agency reports. The majority of these reports came from the following agencies:

- Nebraska Games and Park Commission
- Nebraska Agricultural Statistics Service
- Nebraska Department of Environmental Quality
- Nebraska Department of Natural Resources
- U.S. Fish and Wildlife Service
- U.S. Environmental Protection Agency
- USDA, National Agricultural Statistics Services
- USDA, Farm Service Agency
- Bureau of Reclamation
- U.S. Geologic Survey

## **Public Comments**

A Notice of Availability is being published in the *Lincoln Journal Star*, the *North Platte Telegraph*, the *Scottsbluff Star Herald*, and the *Kearney Hub* concurrent with this PEA. Any written comments concerning this PEA should be submitted to:

Brian Wolford, State Executive Director  
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## Acronyms and Abbreviations

ACHP	Advisory Council on Historic Preservation
BA	Biological Assessment
CCAA	Candidate Conservation Agreement with Assurances
CCC	Commodity Credit Corporation
CEQ	Council on Environmental Quality Regulations
CFR	Code of Federal Regulations
CNPPID	Central Nebraska Public Power and Irrigation District
COE	Army Corps of Engineers
CP	Conservation Practice
CREP	Conservation Reserve Enhancement Program
CRP	Conservation Reserve Program
CWA	Clean Water Act
Cwt.	Hundredweight
DEQ	Nebraska State Department of Environmental Quality
DNR	Nebraska Department of Natural Resources
DO	Dissolved Oxygen
EA	Environmental Assessment
EE	Environmental Evaluation
EFH	Essential Fish Habitat
EO	Executive Order
EPA	United States Environmental Protection Agency
EPF	Environmental Protection Fund
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
FOTG	Field Office Technical Guide
FR	Federal Register
FSA	Farm Service Agency
FWS	United States Fish and Wildlife Service
GWMA	Groundwater Management Area
GWMPA	Ground Water Management and Protection Act
HHS	Nebraska Department of Health and Human Services
HUC	Hydrologic Unit Code
Lbs.	Pounds
LB	Nebraska Legislative Bill
MCL	Maximum Contaminant Level
MSFW	Migrant and Seasonal Farm Workers
N	Nitrogen
NASS	National Agricultural Statistics Service
NAWQA	National Water Quality Assessment
NDA	Nebraska Department of Agriculture

NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NGPC	Nebraska Game and Parks Commission
NGO	Non-government Organization
NMFS	National Marine Fisheries Service
NPNRD	North Platte Natural Resource District
NRCS	Natural Resources Conservation Service
NRD	Nebraska Natural Resource Districts
P	Phosphorus
PEA	Programmatic Environmental Assessment
PEIS	Programmatic Environmental Impact Statement
PIP	Practice Incentive Payment
PWS	Public Water System
RAPS	Remedial Action Plans
ROD	Record of Decision
SDWA	Safe Drinking Water Act
SFHA	Special Flood Hazard Area
SHPO	State Historic Preservation Office
SIP	Signing Incentive Payment
SSA	Sole Source Aquifer
SWAP	Source Water Assessment Program
SWCC	Soil and Water Conservation Committee
T&E	Threatened and Endangered
TCP	Traditional Cultural Property
THPO	Tribal Historic Preservation Office
TMDL	Total Maximum Daily Load
USDA	United States Department of Agriculture
USGS	United States Geological Survey
UWA	Unified Watershed Assessment
WHP	Wellhead Protection Program

## Chapter 1.0 Purpose of and Need for Action

### 1.1 Introduction

#### 1.1.1 Conservation Reserve Enhancement Program Overview

The U.S. Department of Agriculture (USDA)/Commodity Credit Corporation (CCC) and the State of Nebraska propose to implement the Nebraska Platte-Republican Resource Areas Conservation Reserve Enhancement Program (CREP), administered by USDA's Farm Service Agency (FSA). The CREP enrollment period would be continuous from the agreement signing in 2005 until the maximum number of acres are enrolled.

CREP is a component of FSA's Conservation Reserve Program (CRP), which targets the specific environmental needs of each State. CRP was established under subtitle D of the Food Security Act of 1985. The purpose of CRP is to cost effectively assist owners and operators in conserving and improving soil, water, and wildlife resources on their farms and ranches. Highly erodible and other environmentally sensitive acreage, normally devoted to the production of agricultural commodities, is converted to a long-term resource conservation cover. CRP participants enter into contracts for periods of 10 to 15 years in exchange for annual rental payments and cost-share assistance for installing certain conservation practices.



Central-pivot irrigation systems along central Platte River.  
Source: Photograph by W.L. Graf, May 2003 (NRC 2004).

Subsequent amendments of the CRP statute have made certain cropland and pastureland eligible for CRP based on its benefits to erosion, water quality, and wildlife habitat. The environmental impact of this program was studied in the 2002 Programmatic Environmental Impact Statement (PEIS). The Farm Security and Rural Investment Act of 2002 authorized CRP through 2007 and raised the overall enrollment cap to 39.2 million acres.

In 1997, the Secretary of Agriculture initiated CREP as a joint Federal-State partnership that provides agricultural producers with financial incentives to install approved conservation practices (CPs). CREP is authorized pursuant to the

1996 Federal Agriculture Improvement and Reform Act. CREP agreements are done as partnerships between USDA, State and/or tribal governments, other Federal and State agencies, environmental groups, wildlife groups, and other non-government organizations (NGOs). This voluntary program uses financial incentives to encourage farmers and ranchers to enroll in contracts of 10 to 15 years in duration to remove lands from agricultural production. Through CREP, farmers can receive annual rental payments and cost-share assistance to establish long term, resource conserving covers on eligible land. The two primary objectives of CREP are to:

- Coordinate Federal and non-Federal resources to address specific conservation objectives of a State (or tribal) government and the nation in a cost effective manner.



- Improve water quality, erosion control, and wildlife habitat related to agricultural use in specific geographic areas.

This Final PEA has been conducted in accordance with the National Environmental Policy Act of 1969 (NEPA), as amended 42 USC 4321 – 4347, the NEPA implementing regulations of the Department of Agriculture, 7 CFR Part Ib, and the FSA NEPA implementation procedures found in 7 CFR Part 799. This PEA does not address individual site specific impacts which will be addressed at the time when an offer is received and the conservation plan is prepared.

CRP and CREP are administered by FSA in cooperation with the Natural Resource Conservation Service (NRCS), Cooperative State Research and Education Extension Service, State forestry agencies, and local Soil and Water Conservation Districts. FSA is the lead agency developing this PEA.

### **1.1.2 Purpose of Using a Programmatic Environmental Assessment to Analyze this Action**

FSA's regulations for NEPA are found at 7 CFR Part 799. These environmental regulations classify the Agency's actions into levels of environmental review such as categorical exclusions, environmental assessments, and environmental impact statements. The National Historic Preservation Act (NHPA) compliance and other cultural resource considerations also are incorporated into FSA's NEPA process.

FSA prepared this PEA to address the implementation of CREP to comply with NEPA, Council on Environmental Quality Regulations (CEQ), and 7 CFR Part 799: Environmental Quality and Related Environmental Concerns—Compliance with the National Environmental Policy Act.

FSA has a framework in place to ensure NEPA compliance at the field level, where site specific NEPA evaluations will take place prior to approving a CREP contract. The review will consist of completing a site specific environmental evaluation (EE) which may require consultation with applicable governmental agencies.

A PEA allows FSA to reduce paperwork and identify potential impacts at a State level to be aware of at a site specific level. Regulations promulgated by the CEQ state the following:

Sec. 1500.4 Reducing paperwork:

- (i) Using program, policy, or plan environmental impact statements and tiering from statements of broad scope to those of narrower scope, to eliminate repetitive discussions of the same issues (Secs. 1502.4 and 1502.20).

Sec. 1502.4 Major Federal actions requiring the preparation of environmental impact statements:

- (b) Environmental impact statements may be prepared, and are sometimes required, for broad Federal actions such as the adoption of new agency programs or regulations (Sec. 1508.18). Agencies shall prepare statements on broad actions so that they are relevant to policy and are timed to coincide with meaningful points in agency planning and decision-making.

- (c) When preparing statements on broad actions (including proposals by more than one agency), agencies may find it useful to evaluate the proposal(s) in one of the following ways:

1. Geographically, including actions occurring in the same general location, such as body of water, region, or metropolitan area.

2. Generically, including actions that have relevant similarities, such as common timing, impacts, alternatives, methods of implementation, media, or subject matter.
3. By stage of technological development including Federal or federally assisted research, development or demonstration programs for new technologies, which, if applied, could significantly affect the quality of the human environment. Statements shall be prepared on such programs and shall be available before the program has reached a stage of investment or commitment to implementation likely to determine subsequent development or restrict later alternatives.

## 1.2 Purpose of the Proposed Action

The purpose of the Nebraska Platte-Republican Resource Areas CREP (NPRRA CREP) Agreement is to enhance the water quality and quantity of three major watersheds in the State by reducing the amount of nutrients, sediments, and chemical runoff from agriculture sources while increasing wildlife and wetland habit for birds, migrating waterfowl, and other aquatic organisms. Implementation of approved FSA conservation practices (CPs) is designed to improve the water quality of discharges coming from agricultural land and increase the amount of water available to wildlife in the project area. The major watershed areas that would be included are (Proposal 2004):

- North Platte River Basin
- Platte River Basin
- Republican River Basin

The primary goal of the NPRRA CREP Agreement is to provide an opportunity, through financial and technical assistance within these targeted watersheds, for eligible producers in Nebraska to voluntarily establish buffers, filter strips, wildlife habitat, wetlands, and other approved CPs that increase the amount of available water and improve water quality and quantity in the project area. In addition, according to the 2004 Proposal implementing the NPRRA CREP Agreement would:



**Channel of Platte River showing its broad, shallow, braided nature. Source: Photograph by W.L. Graf, May 2003 (NRC 2004).**

- Improve drinking water supplies for local communities;
- Protect and conserve the diversity of aquatic life including threatened and endangered (T&E) species;
- Protect and conserve the diversity of terrestrial wildlife including T&E species;
- Improve water-based recreation;
- Improve soil quality; and
- Provide economic benefits to the producer.

### 1.3 Need for the Proposed Action

The proposed project area has been suffering from extreme drought conditions since 1999. The drought has stressed the availability of water supplies and accentuated the fact that a number of interests important to the State are competing for the same finite resources. This situation is exacerbated further by the application of additional water to irrigated cropland to offset precipitation shortfall. This additional application of water has decreased the quantity of water available to sustain aquatic habitats for important fish species and waterfowl. Many of these wildlife species are important to the outdoor recreation industry. Drought conditions are costing the region millions of dollars in agricultural and recreational revenues and without concentrated efforts, the environment, communities, and industries of the proposed project area could be devastated over the next few years (Proposal 2004).



**Snow geese on a Rainwater Basin Waterfowl Production Area after shallow water was pumped to the wetland (FWS 2004).**

In addition, over 90 percent of the proposed project area has been converted to agricultural production. The result has been the fragmentation and substantial reduction of native vegetative communities and wetland complexes. Many wildlife and plant species have responded negatively to these habitat changes, and 30 different species in the project priority area currently receive some form of Federal or State designation of concern (Proposal 2004). Species of concern are listed in Tables 1.1 and 1.2.

**Table 1.1 – Nebraska Federal and State T & E plant species.**

Scientific Name	Common Name	Federal Status	State Status
<i>Penstemon haydenii</i>	Blowout Penstemon	E	E
<i>Platanthera praeclara</i>	Western Prairie Fringed Orchid	T	T
<i>Gaura neomexicana</i> var. <i>coloradensis</i>	Colorado Butterfly Plant	T	E
<i>Spiranthes diluvialis</i>	Ute Ladies'-tresses	T	T
<i>Salicornia rubra</i>	Saltwort		E
<i>Panax quinquefolium</i>	Ginseng		T
<i>Cypripedium candidum</i>	Small White Lady's Slipper		T

Source: FWS 2005; NGPC 2004a T=Threatened E=Endangered C=Candidate

**Table 1.2 – Nebraska Federal and State T&E wildlife species.**

Scientific Name	Common Name	Federal Status	State Status
<b>BIRDS – 6 Species</b>			
<i>Haliaeetus leucocephalus</i>	Bald Eagle	T	T
<i>Grus americana</i>	Whooping Crane	E	E
<i>Charadrius melodus</i>	Piping Plover	T	T
<i>Charadrius montanus</i>	Mountain Plover	C	T
<i>Numenius borealis</i>	Eskimo Curlew	E	E
<i>Sterna antillarum athalossos</i>	Interior Least Tern	E	E
<b>FISH – 7 Species</b>			
<i>Acipenser fulvescens</i>	Lake Sturgeon		T
<i>Scaphirhynchus albus</i>	Pallid Sturgeon	E	E
<i>Notropis heterolepis</i>	Blacknose Shiner		E
<i>Phoxinus eos</i>	Northern Redbelly Dace		T
<i>Phoxinus neogaeus</i>	Finescale Dace		T
<i>Notropis Topeka (=tristis)</i>	Topeka Shiner	E	E
<i>Macrhybopsis gelida</i>	Sturgeon Chub		E
<b>MAMMALS – 6 Species</b>			
<i>Glaucomys volans</i>	Southern Flying Squirrel		T
<i>Vulpes velox</i>	Swift Fox		E
<i>Mustela nigripes</i>	Black-footed Ferret	E	E
<i>Lutra Canadensis</i>	River Otter		T
<i>Cynomys ludovicianus</i>	Black-tailed Prairie Dog		C
<i>Canis lupus</i>	Gray Wolf, E Distinct Population	T	
<b>INSECTS – 2 Species</b>			
<i>Nicrophorus americanus</i>	American Burying Beetle	E	E
<i>Cincindela nevadica lincolniana</i>	Salt Creek Tiger Beetle	C	E
<b>REPTILES – 1 Species</b>			
<i>Sistrurus catenatus</i>	Massasauga	T	T
<b>MUSSELS – 1 Species</b>			
<i>Leptodea leptodon</i>	Scaleshell Mussel	E	E

Source: FWS 2005; NGPC 2004a. T=Threatened E=Endangered C=Candidate

Many unique features are located within the proposed project area and include:

- Crescent Lake/ North Platte Wildlife Refuge Complex
- Rainwater Basin Wetland Management District
- Scotts Bluff National Monument
- Chimney Rock National Historic Site
- Fort McPherson National Cemetery
- Gothenburg Pony Express Station
- Lewis and Clark National Historic Trail
- Pony Express National Historic Trail
- Mormon Pioneer National Historic Trail
- Oregon National Historic Trail
- Fort Kearny State Park
- Republican River
- North Platte River
- Central Platte River
- Enders Reservoir State Recreation Area
- Swanson Reservoir State Recreation Area
- Red Willow Reservoir State Recreation Area
- Harry Strunk Reservoir
- Harlan County Reservoir

- Lake McConaughy
- Crescent Lake
- Johnson Lake
- Ash Hollow State Historic Park
- Buffalo Bill Ranch State Historic Park
- Champion Mill State Historic Park
- Dissected Loess Plains National Natural Landmark
- Ash Hollow Cave National Historic Landmark
- Willa Cather House National Historic Landmark
- George Norris House National Historic Landmark
- Pike Pawnee Village National Historic Landmark
- Robidoux Pass National Historic Landmark

The area is of tremendous economic importance internationally, nationally, regionally, and for the State of Nebraska (Proposal 2004).

## 1.4 Objectives of the NPRRA CREP

The primary goal of the NPRRA CREP is to enhance surface and ground water availability and improve and enhance wildlife habitat by providing financial and technical assistance to eligible producers within targeted areas of Nebraska. This assistance will help to establish native grasses, filter strips, buffers, wildlife habitat, wetland areas, and/or other approved CPs that reduce the amount of water used for irrigated agriculture, improve the water quality, and increase the amount of available water to area wildlife (Proposal 2004).



Mitchell Pass at Scotts Bluff, Nebraska is located on the Mormon Pioneer and Oregon National Historic Trails. Photo Courtesy of National Park

The primary objectives of this agreement are to achieve, to the extent practicable, the following (Proposal 2004):

### 1.4.1 Objective #1: Reduce application of water for irrigation in the priority area by 125,000 acre-feet (over 40 billion gallons) annually.

#### Indicators:

- Enrollment of up to 100,000 acres in the Nebraska Platte-Republican Resource Area.
- Retire 8.3 percent (100,000 acres) of the irrigated cropland from production. Average application of irrigation water on crops in the priority area is approximately 15 inches/acre or 1.25 feet/acre.
- Implementation of FSA CP2, CP21, CP23, CP23A, CP4D, CP22, and CP25. Appendix D of this PEA contains the full description and requirements of each practice from the FSA Handbook 2-CRP.

### 1.4.2 Objective #2: Increase annual water storage of area reservoirs.

#### Indicators:

- Enrollment of up to 100,000 acres in the Nebraska Platte-Republican Resource Area.
- Conserve 100,000 acre-feet of water annually within priority area reservoirs.
- Implementation of FSA CP2, CP21, CP23, CP23A, CP4D, CP22, and CP25. Appendix D of this PEA contains the full description and requirements of each practice from the FSA Handbook 2-CRP.

### 1.4.3 Objective #3: Increase flows in priority area rivers to augment seasonal flows.

#### Indicators:

- Enrollment of up to 100,000 acres in the Nebraska Platte-Republican Resource Area.
- Increase flows in project area rivers by 50,000 acre-feet annually.
- Implementation of FSA CP2, CP21, CP23, CP23A, CP4D, CP22, and CP25. Appendix D of this PEA contains the full description and requirements of each practice from the FSA Handbook 2-CRP.



Fall on the Platte River. Photo © by Stanley Galas, All Rights Reserved (NGPC 2004c)

### 1.4.4 Objective #4: Improve wildlife habitat and increase wildlife populations within the resource area.

#### Indicators:

- Enrollment of up to 100,000 acres in the Nebraska Platte-Republican Resource Area.
- Provide 85,000 additional acres of native grassland habitat for wildlife in the priority area to increase populations of pheasants and other ground nesting birds by 25 percent in the area. The Nebraska Game and Parks Commission's (NGPC) existing spring crow counts, mail carrier roadside counts, and August brood counts will be used for population base numbers.
- Implementation of FSA CP2, CP21, CP23, CP23A, CP4D, CP22, and CP25. Appendix D of this PEA contains the full description and requirements of each practice from the FSA Handbook 2-CRP.

### 1.4.5 Objective #5: Reduce application of agricultural pesticides to improve water quality in the project area.

#### Indicators:

- Enrollment of up to 100,000 acres in the Nebraska Platte-Republican Resource Area.
- Reduce the application of triazine products by 8.3 percent (130,000 pounds) annually in the priority area. This goal will be accomplished by retiring 8.3 percent of the irrigated cropland in the priority area (Proposal 2004).

- Additional reduction of triazine products in agriculture run-off will be accomplished with the use of 10,000 acres of filter strips.
- Educational campaign to share appropriate use of these products.
- Implementation of FSA CP21, CP23, CP23A, and CP22. Appendix D of this PEA contains the full description and requirements of each practice from the FSA Handbook 2-CRP.

**1.4.6 Objective #6: Reduce application of agricultural fertilizers to improve water quality in the project area.**

**Indicators:**

- Enrollment of up to 100,000 acres in the Nebraska Platte-Republican Resource Area.
- Reduce the application of nitrogen and phosphorous by 8.3 percent (20 million pounds and 2 million pounds, respectively) annually in the priority area. This goal will be accomplished by retiring 8.3 percent of the irrigated cropland in the priority area (Proposal 2004).
- Additional reduction in leaching of nitrate and phosphate is anticipated through educational efforts to improve the efficiency of water and chemical use in the project area.
- Implementation of FSA CP2, CP21, CP23, CP23A, CP4D, CP22, and CP25. Appendix D of this PEA contains the full description and requirements of each practice from the FSA Handbook 2-CRP.



Nebraska Agribusiness Association collection of unwanted pesticides. Photo courtesy of Natural Nebraska.org.

**1.5 Area Covered by the NPRRA CREP**

The NPRRA CREP project area covers 3,805,212 acres, which is approximately eight percent of the total land area of Nebraska. The proposed area includes portions of 23 counties and seven Natural Resources Districts (NRDs). The counties with portions in the NPRRA CREP project area are (Proposal 2004):

Buffalo	Frontier	Hayes	Morrill	Scotts Bluff
Chase	Furnas	Hitchcock	Nuckolls	Sioux
Dawson	Garden	Kearney	Perkins	Webster
Dundy	Gosper	Keith	Phelps	
Franklin	Harlan	Lincoln	Red Willow	

The NRDs with portions in the NPRRA CREP project are (Proposal 2004):

North Platte	Tribasin
Twin Platte	Middle Republican
Central Platte	Lower Republican
Upper Republican	

The proposed project boundaries include areas within the Republican River, North Platte River, and Platte River watersheds (Figure 1.1). The project boundaries are defined by irrigated Nebraska cropland that is:

- Designated as quick response acres in the Republican River above the Guide Rock Diversion;
- Within two miles of the North Platte River and Platte River from the Wyoming border down to the Kearney Canal diversion;
- Within one mile of the Pumpkin Creek tributary through the Morrill County line; and
- Receiving surface irrigation water from these defined rivers (Proposal 2004).



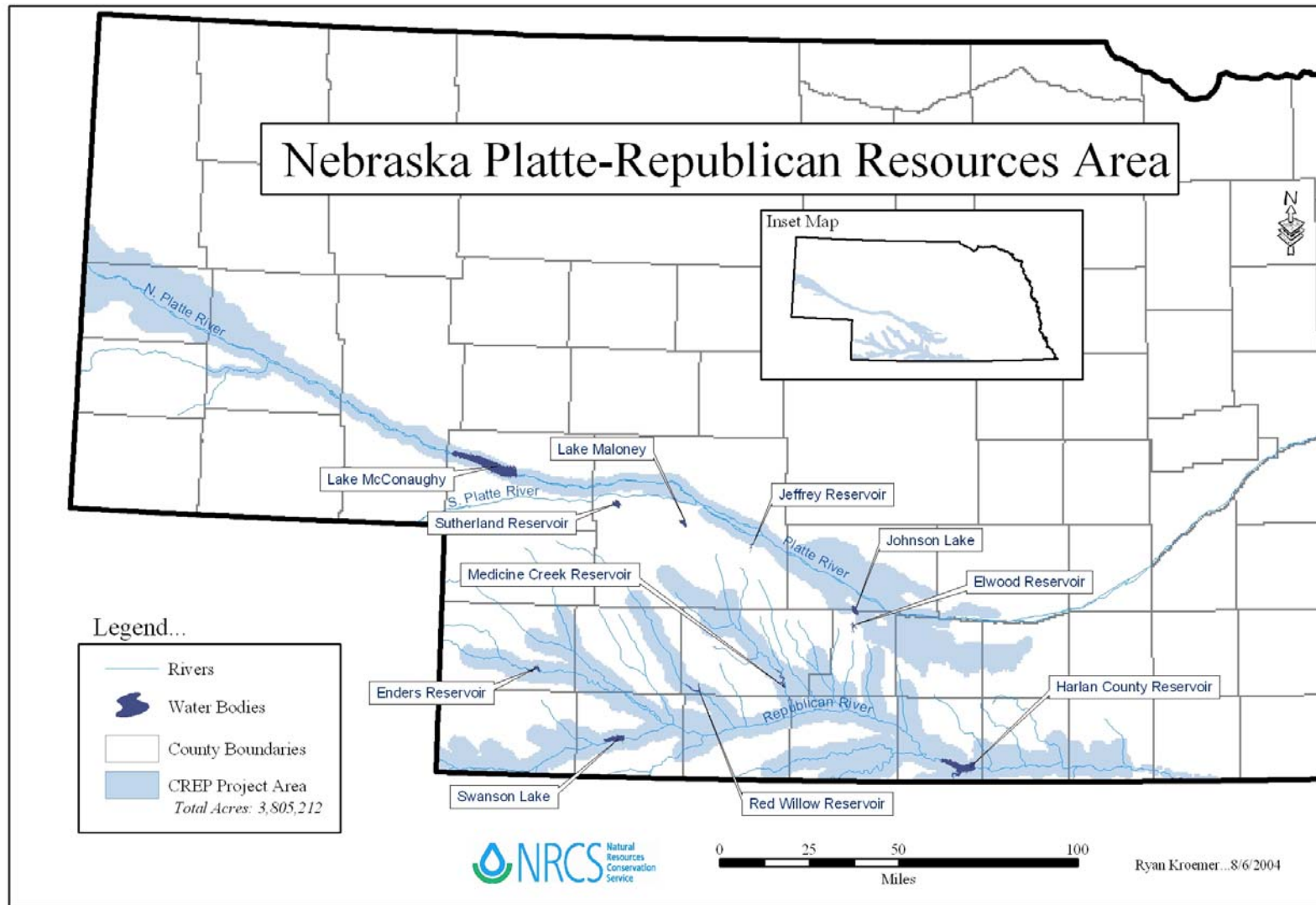


Figure 1.1 – Project area for the proposed NPRRA CREP. Source: Proposal 2004.

## **1.6 Relevant Laws, Regulations, and Other Documents**

CREP would need to be compliant with a wide range of laws, regulation, and Executive Orders and this section includes a list of Federal and State laws and regulations, and Executive Orders that may be applicable to CREP. A more detailed description of Federal laws and regulations is included in Appendix A.

It is anticipated that implementation of CREP would complement existing conservation programs and a description of existing Federal and State conservation programs is also included.

### **1.6.1 Federal Laws, Regulations, and Other Documents**

Relevant Federal laws and regulations that may be applicable to implementation of CREP include the following:

- Clean Water Act (CWA) of 1972
- Endangered Species Act (ESA) of 1973
- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) of 1947
- Food Security Act (FSA) of 1985
- National Environmental Policy Act of 1969
- National Historic Preservation Act (NHPA) of 1966
- Safe Drinking Water Act (SDWA) of 1974
- Sustainable Fisheries Act (SFA) of 1996
- Executive Order (EO) 11988: Floodplain Management (g) Floodplains and Wetlands
- Executive Order 11990: Protection of Wetlands
- Comprehensive State Groundwater Protection Program
- CRP Programmatic Environmental Impact Statement

### **1.6.2 Nebraska State Laws Affecting Agriculture**

The majority of this information was derived from a 1997 report published by the National Association of State Departments of Agriculture (NASDA 1997).

- Nebraska Environmental Protection Act [NEB. REV. STAT. § 81-1501 et seq. (1994 & Supp. 1996).]
- Nebraska Integrated Solid Waste Management Act [NEB. REV. STAT. § 13-2001 et seq. (Supp. 1996).]
- Nebraska Petroleum Products and Hazardous Substances Storage and Handling Act [NEB. REV. STAT. § 81-15,117 et seq. (1994 and Supp. 1996).]
- Nebraska State Erosion and Sediment Control Act [NEB. REV. STAT. § 2-4601 et seq. (1991 and Supp. 1996).]

- Nebraska Best Management Practices for Livestock Facilities [NEB. ADMIN. R. & REGS. tit. 130, ch. 12 (1992).]
- Nebraska Pesticide Act [NEB. REV. STAT. § 2-2622 et seq. (Supp. 1996).]
- Nebraska Chemigation Act [NEB. REV. STAT. § 46-1101 et seq. (1993 & Supp. 1996).]
- Nebraska State Ground Water Management and Protection Act, as amended [NEB. REV. STAT. § 46-656.02 et seq. (Supp. 1996).]
- Nebraska Nongame and Endangered Species Conservation Act [NEB. REV. STAT. § 37-430 et seq. (1993 and Supp. 1996).]
- Nebraska Right-to-Farm Act [NEB. REV. STAT. § 2-4401 et seq. (1991).]

### **1.6.3 Existing Federal and State Conservation Programs**

Counties associated with the proposed CREP project priority area have been active in other Federal conservation programs (Table 1.3) and have taken many other water savings actions, such as moratoriums on the granting of new surface water rights, construction of new wells, and development of new irrigated acres (Proposal 2004).

Conservation programs that are administered by NRCS include the wetland reserve program (WRP) and the environmental quality incentives program (EQIP) (Proposal 2004). These programs may be implemented within the area covered by the CREP Agreement but cannot be used on the same acreage that will be enrolled in CREP.

The State has many recently initiated and ongoing water quality improvement programs that would enhance and complement CREP implementation (Proposal 2004). They include:

- Nebraska nonpoint source surface water quality monitoring program
- Rock Creek Lake State Recreation Area Wetland Restoration Project in the Republican watershed
- Nebraska Soil and Water Conservation Fund
- WILD Nebraska Private Lands Program
- Nebraska State NPDES Program
- Comprehensive State Ground Water Protection Program
- NGPC habitat development for pheasants and ground nesting birds at Harlan County Reservoir.

## **1.7 Decisions that Must be Made**

FSA must determine if the selected alternative would or would not constitute a major Federal action that would significantly affect the quality of the human environment. If FSA determines that it would not significantly affect the quality of the human environment, then a Finding of No Significant Impact (FONSI) would be prepared and signed. Pending CREP offers would then go through the environmental evaluation as part of the approval process.

**Table 1.3 – Total current enrollment in major Federal conservation programs for counties that have land within the proposed CREP priority area.**

County	CRP Acres	WRP Acres	EQIP Acres	Total Acres In Conservation Programs	Total Acres of Land
Buffalo	6,968.4	544.0	23,116.0	30,628.4	619,520.0
Chase	9,647.2	0	64,151.0	73,798.2	572,480.0
Dawson	1,673.9	51.0	46,227.0	47,951.9	648,256.0
Dundy	10,938.6	0	69,087.0	80,025.6	588,736.0
Franklin	5,797.4	82.0	6,044.0	11,923.4	368,576.0
Frontier	1,142.5	0	27,082.0	28,224.5	623,744.0
Furnas	15,094.2	0	36,089.0	51,183.2	459,584.0
Garden	10,712.8	0	135,827.0	146,539.8	1,090,816.0
Gosper	2,125.5	0	26,282.0	28,407.5	293,248.0
Harlan	2,888.3	0	8,667.0	11,555.3	353,792.0
Hayes	14,686.2	0	17,004.0	31,690.2	456,384.0
Hitchcock	6,081.9	0	25,681.0	31,762.9	454,400.0
Kearney	1,071.7	226.0	7,574.0	8,871.7	330,240.0
Keith	14,118.7	0	83,885.0	98,003.7	679,232.0
Lincoln	10,120.7	0	65,347.0	75,467.7	1,640,960.0
Morrill	23,450.2	1,485.0	51,520.0	76,455.2	911,232.0
Nuckolls	2,593.4	0	15,195.0	17,788.4	368,192.0
Perkins	39,205.6	84.0	26,010.0	65,299.6	565,248.0
Phelps	726.9	1,149.0	6,147.0	8,022.9	345,600.0
Red Willow	2,978.1	0	17,475.0	20,453.1	458,688.0
Scotts Bluff	22,937.5	731.0	37,843.0	61,511.5	473,152.0
Sioux	4,189.6	160.0	0.0	4,349.6	1,322,624.0
Webster	15,810.1	0	32,628.0	48,438.1	367,936.0
<b>Total in CREP Project Area Counties</b>	<b>224,959.4</b>	<b>4,512.0</b>	<b>828,881.0</b>	<b>1,058,357.4</b>	<b>13,992,640.0</b>

Source: Proposal 2004, NDED 2004.

## 1.8 Scoping and Resource Issues

### 1.8.1 Scoping

CREP uses authorities of CRP in combination with Nebraska State resources to target specific conservation and environmental objectives of Nebraska and the nation.

FSA personnel performed scoping internally. The following organizations have been consulted and participated in the development of this project. Most of these organizations will also be integral to post-proposal implementation of this project.

- USDA Nebraska Natural Resources Conservation Service
- USDA Nebraska Farm Service Agency
- Nebraska Game and Parks Commission
- Nebraska Department of Natural Resources
- Nebraska Department of Environmental Quality
- Nebraska Department of Agriculture
- Nebraska Association of Resources Districts
- Central Platte Natural Resource District
- North Platte Natural Resource District
- Tri-Basin Natural Resource District
- Upper Republican Natural Resource District
- Middle Republican Natural Resource District
- Lower Republican Natural Resource District
- The Central Nebraska Public Power and Irrigation District
- State FSA Committee



Nebraska farmer planting crops (NRCS 2004).

Several organizations have written letters of support for the NPRRA CREP. These letters are included in Appendix H. Letters of support have been written by the following organizations:

- Nebraska Department of Natural Resources
- Nebraska Chapter of The Wildlife Society
- Middle Republican Natural Resources District
- Nebraska Association of Resource Districts
- Natural Resources Conservation Service, Nebraska State Office
- Tri-Basin Natural Resources District
- Nebraska Department of Agriculture
- Lower Republican Natural Resources District
- Nebraska Game and Parks Commission
- Upper Republican Natural Resource District

Consultation with the U.S. Fish and Wildlife Service (FWS) occurred during the development of the proposal and the PEA to comply with Section 7 of the ESA. Due to the programmatic and general nature of the PEA, FWS will not offer a biological opinion; however, future coordination will be required on all site specific actions implemented under CREP when FSA determines that an action “may affect” a listed T&E species.

In addition, two outreach meetings were held in 2004 to receive input on the proposal. Groups represented in those meetings included several surface water irrigation districts, a general agriculture organization, three agriculture commodity groups, a wildlife organization and an organization representing environmental interests.

### 1.8.2 Relevant Resource Issues

The following resources were studied and would be affected by the NPRRA CREP Agreement: water quality, wetlands, floodplains, groundwater, critical habitat or T&E species, cultural/tribal resources, and socioeconomic issues. Chapter 3 discusses each of the issues in more detail. Affected resources issues are introduced below.

### **Issue #1: Surface water resources susceptibility to agricultural practices**

Water quality of streams, lakes, and reservoirs throughout the proposed CREP project area are impacted by agricultural practices. Currently, 14 stream segments and 14 lakes/reservoirs are unable to meet State water quality standards for a variety of uses, including aquatic life and primary contact recreation. Additionally, all three river basins either have a total maximum daily load (TMDL) (or a “pollution budget”) established or in the process of being established for bacteria.

Drought conditions have also caused water quantity issues in the CREP project area and many stream segments in the NPRRA CREP project area have been dewatered. Reservoirs and lakes have also been affected by the drought and reservoir levels are in decline in all three river basins.

Current issues affecting surface water resources are discussed in Section 3.5.

### **Issue #2: Groundwater resources susceptibility to agricultural practices**

Current agricultural practices have affected groundwater quality and quantity in the CREP project area. Nutrients and pesticides have been detected in groundwater wells throughout the proposed CREP project area. Major sources of groundwater contamination in Nebraska include agricultural activities, leaking underground storage tanks, septic systems, waste disposal, and industrial facilities (DEQ 2000). Throughout Nebraska, groundwater contamination from non-point sources is most prevalent in areas that are heavily irrigated or cropped to corn (DEQ 2000).

The current drought has increased groundwater pumping to meet irrigation demands and a decline in groundwater levels has been observed in many areas throughout the North Platte River, Platte River, and Republican River basins.

Current issues affecting groundwater resources are discussed in Section 3.6.

### **Issue #3: Drinking water resources susceptibility to agricultural practices**

Groundwater is the drinking water source of nearly 100 percent of Nebraska’s rural population. Groundwater contamination from non-point sources such as irrigation return flow, urban stormwater runoff, residential lawn care, septic tank, and golf courses can also impact public drinking water supplies in the NPRRA CREP project area and high nitrate levels in public water supplies have been problematic in both the Platte and Republican River basins (Proposal 2004).

Current issues affecting drinking water resources are discussed in Section 3.7.

### **Issue #4: Wetland susceptibility to agricultural practices**

Significant portions of wetlands have been lost to agricultural and urban development within the NPRRA CREP project area. Wetland loss has adversely impacted wildlife populations and water quality.

Current issues affecting wetlands are discussed in Section 3.8.

### **Issue #5: Floodplain susceptibility to agricultural practices**

Floodplains are of concern to agricultural practices throughout the State. The prevention of flooding in sensitive areas or utilizing floodwater retention to mitigate nutrient and sediment inflows to watersheds should be addressed. Construction activities (e.g., constructed wetlands) have the potential to modify flowage and storage capacity and should be analyzed. Issues affecting floodplains are discussed in Section 3.9.

### **Issue #6: Critical Habitat or Threatened and Endangered Species susceptibility to agricultural practices**

Sixteen Federal T&E species and 25 State protected species in the State of Nebraska all potentially occur in the NPRRA CREP watersheds (FWS 2005, NGPC 2004a). Habitat degradation from human population growth, habitat fragmentation, and pollution continue to threaten species populations (Proposal 2004). Current trends and issues affecting critical habitat and T&E species are discussed in Section 3.10.

### **Issue #7: Cultural / Tribal Resource susceptibility to agricultural practices**

Nebraska's long history of American Indian culture and European settlement has endowed the State with a remarkably diverse collection of historic and cultural resources worthy of preservation (NESPRHP 2004). A broad and generalized evaluation of potential impacts from project activities is contained in this PEA. Site specific cultural reviews and tribal consultations will ensure protection of these vital resources. A discussion of cultural resources within the project area is found in Section 3.11.

### **Issue #8: Human Health, Social, and Economic impacts from agricultural practices**

The NPRRA CREP Agreement proposes the potential enrollment of up to 100,000 acres across the North Platte River, Platte River, and Republican River basins. These 100,000 acres represent 2.9 percent of the total acres of cropland that are harvested each year in the proposed CREP project area. Current issues affecting human health, social, and economic concerns are discussed in Section 3.12.

## **1.8.3 Resources / Issues Eliminated from Detailed Study**

Implementation of the NPRRA CREP Agreement would not affect the following resources:

### **Air Quality**

CREP would have no discernable effect on Nebraska's air quality. While the potential exists for minor localized improvements of air quality due some of the proposed conservation practices, the potential benefits would be so minor and unquantifiable that it would not be practicable to analyze them within this PEA. Since the implementation of the CREP program would not result in impacts to the attainment, non-attainment, or maintenance status of any of the State's airsheds, this issue has been eliminated from further study in this PEA.

### **Noise**

There would be no perceptible impacts from noise as a result of CREP implementation. Following the short-term construction noise, as the conservation practices are installed, there would be no continual impacts on the local soundscape. With the permanent easements and long-term nature of the conservation practices, which will result in decreased agricultural activities on CREP lands, noise level can be expected to decrease slightly. As a result, FSA eliminated noise from further analysis as part of this PEA.

### **Protected Rivers**

There are no federally protected rivers within the NPRRA CREP area, and this issue was eliminated from further analysis.

### **Wilderness Areas**

There are no designated wilderness areas located within the targeted watersheds of the affected environment. Therefore, wilderness areas were eliminated from further analysis in this PEA.

### **Sole Source Aquifers**

There are no sole source aquifers located within the project area. Therefore, sole source aquifers were eliminated from detailed study in this PEA.

Existing conditions and an evaluation of the effects of CREP are discussed in Sections 3.5 – 3.1



## Chapter 2.0 Alternatives Including the Proposed Action

### 2.1 Introduction

This chapter describes the actions proposed in the PEA including the No Action Alternative—Continue Current Agricultural Practices and the Preferred Action Alternative—Implement Nebraska Platte-Republican Resources Area CREP. Alternatives will be compared in terms of their individual environmental impacts and their achievement of objectives. The main source of information for Alternative B is the Proposal (2004).

### 2.2 Description of Alternatives

#### 2.2.1 Alternative A (No Action)—Continue Current Agricultural Practices

Alternative A would allow the continued degradation currently occurring within the North Platte, Platte River and Republican River basins. There are approximately 6,500 farms in the project area and the average size of these farms is 242 acres. During the past 40 years land use has changed and intensified and over 90 percent of the land within the proposed project area has been converted to agricultural uses. Within the priority area there are 1,576,219 acres of cropland of which 1,128,832 acres (72 percent) are irrigated. The major crops produced in this area are corn (766,070 acres) and soybeans (178,712 acres). Other crops that are produced are wheat (181,809 acres), and alfalfa (172,273 acres) (Proposal 2004).

Since 1999, the project area has suffered from above normal temperatures and below normal precipitation. Consequently, agricultural producers in the area have been applying additional irrigation water to existing cropland. This additional application of irrigation water reduces the amount of water available for natural stream flow; fisheries and wildlife habitat; and drinking water. Portions of the North Platte River, Platte River, and Republican River are dry or have significantly reduced instream flow, which has resulted in numerous negative effects including fish kills and loss of wildlife habitat (Proposal 2004).



Effects of drought on fields in southwestern Nebraska. Image © K. Dewey, High Plains Regional Climate Center

Nonpoint source pollution of surface water quality and groundwater quality is a widespread problem in Nebraska. Common pollutants of nonpoint sources include excessive nutrients, sediments, pesticides, and bacteria. Nonpoint sources include but are not limited to agricultural activities, highway maintenance, urban and road construction, urban stormwater runoff, residential and commercial landscaping activities, sewers and septic tanks, landfills, and streamside dumping. Major sources of groundwater contamination in Nebraska include agricultural activities, leaking underground storage tanks, septic systems, waste disposal, and industrial facilities (DEQ 2000). The following is a more thorough discussion concerning agricultural nonpoint source pollutants.

Agricultural nonpoint source pollutants are the primary cause of stream water quality degradation in Nebraska and standard farming practices in the CREP area utilize pesticides and nutrients in the form of fertilizers and manure (DEQ 2000, Proposal 2004). A summary of agricultural chemical use in counties located in the CREP project area can be found in Table 2.1.

**Table 2.1. Agricultural chemical use summary of 2002 of Nebraska and CREP counties.**

	Farmland Acres Treated with Commercial Fertilizers, Lime, and Soil Conditioners	Farmland Acres Treated with Manure	Farmland Acres Treated with Chemicals to Control Insects	Farmland Acres Treated with Chemicals to Control Weeds, Grass, or Brush	Total Acres of Land
<b>Nebraska</b>	13,335,071	614,740	4,108,341	11,351,476	49,506,368
<b>Buffalo</b>	281,142	10,093	144,699	240,383	624,192
<b>Chase</b>	204,074	3,378	84,079	132,547	574,464
<b>Dawson</b>	215,925	16,164	138,403	199,521	652,352
<b>Dundy</b>	152,071	1,489	45,233	97,604	589,312
<b>Franklin</b>	120,626	1,730	25,081	94,893	368,704
<b>Frontier</b>	138,475	3,305	32,707	107,905	627,264
<b>Furnas</b>	209,743	7,212	56,987	169,524	461,120
<b>Garden</b>	103,716	2,406	14,263	47,658	1,107,840
<b>Gosper</b>	94,645	2,512	35,229	72,746	296,128
<b>Harlan</b>	127,121	4,129	13,867	98,912	367,488
<b>Hayes</b>	117,845	2,588	28,693	68,659	456,512
<b>Hitchcock</b>	159,379	847	22,898	109,907	459,904
<b>Kearney</b>	22,910	7,371	94,455	195,351	330,304
<b>Keith</b>	161,735	1,312	64,394	123,258	710,272
<b>Lincoln</b>	223,833	8,745	110,814	175,806	1,648,064
<b>Morrill</b>	119,598	5,148	35,633	84,358	915,072
<b>Nuckolls</b>	187,899	N/A	35,655	164,299	368,640
<b>Perkins</b>	317,007	2,904	79,257	203,709	565,952
<b>Phelps</b>	221,892	7,333	79,201	176,973	345,984
<b>Red Willow</b>	164,325	2,930	19,188	97,126	459,584
<b>Scotts Bluff</b>	146,265	13,371	38,710	122,408	477,120
<b>Sioux</b>	25,189	2,572	4,697	16,335	1,323,072
<b>Webster</b>	106,740	4,805	29,560	84,207	368,000
<b>CREP County Total Acres/ Percentage of State Total Acres</b>	3,622,155 27%	112,344 18%	1,233,703 30%	2,884,089 25%	14,097,344 28%

Source: NDED 2004, USDA 2002b. N/A= Not Applicable

Triazine herbicides, such as atrazine, simazine, and cyanazine, are important to corn and sorghum producers and are used throughout the CREP project area for control of weeds, grasses, and broadleaf plants. Triazine herbicides are restricted-use pesticides with specific application guidelines. Despite these strict guidelines, concentrations of triazine herbicides in surface water have been increasing.

Triazine herbicides are toxic to aquatic invertebrates and can disrupt the aquatic food chain (Proposal 2004). A more thorough discussion of pesticide use can be found in Sections 3.5 and 3.6.

The region is well-known for its agricultural production (200 bushel/acre corn harvest); however, this production requires the use of soil fertility augmentation. On average, 200 pounds/acre of nitrogen and 20 pounds/acre of phosphorous are applied in the priority area yearly. Nitrogen as nitrate is highly water soluble and susceptible to leaching into ground and surface waters. Nitrates in drinking water can be hazardous to human health. High nitrate levels in public water supplies have been problematic in both the Platte and Republican River basins. In addition, these compounds stimulate excessive growth of algae and emergent vegetation. Aquatic habitat is lost through over-crowding and loss of open water. Death and decay of the excess vegetation stresses the oxygen balance and can lead to fish kills. The result is a loss of aesthetic value, loss of open water, and declining fisheries (Proposal 2004).

With the selection of the No Action Alternative, modes of agricultural production would remain as they have for decades. There would be no incentives to implement approved CPs. The installation of filter strips, buffers, and other CPs that reduce pollutant loading would not be funded. High levels of pesticides and nutrients would continue to accumulate and pollute watersheds, furthering the degree of negative ecological impacts. The potential for negative economic impacts resulting from reduced water quality and quantity would remain and possibly increase.

## 2.2.2 Alternative B—Implement Nebraska Platte-Republican Resources Area CREP

Implementation of Alternative B would target 100,000 acres for the installation and maintenance of selected CPs. Land enrolled in CREP would be retired from crop production and irrigation for 10-15 years. CREP would provide the financial and technical assistance necessary to assist eligible Nebraska farmers and ranchers in voluntarily establishing CPs that would conserve soil and water; filter nutrients and pesticides; and enhance and restore wildlife habitat.

The proposed 100,000 acres to be installed in CREP CPs would affect 0.2 percent of the State’s land area; 0.22 percent of the State’s agricultural land; and 2.9 percent of the proposed CREP project area. In order to maximize benefits, acreage will be split equally between the Republican and Platte River (including the North Platte) basins (50,000 acres each).

### Conservation Practices

Seven approved CPs have been selected as the best options for achieving the objectives of the NPRRA CREP. These CPs have been divided into three categories which are summarized in Table 2.2.

**Table 2.2 – Summary of CP Categories and Goals.**

Practice Category	Proposed Acreage Allocation	Selected Conservation Practices
Natural Resource Areas	85,000	CP2, CP4D, CP25
Vegetative Cover	10,000	CP21, CP22
Wetland Restoration	5,000	CP23, CP23A

Source: Proposal (2004)

CPs must meet the minimum specifications outlined in the NRCS field office technical guide (FOTG) as well as all other applicable Federal, State, and local requirements. Detailed rental and incentive payments, cost-share and maintenance payments, technical requirements, and operating procedures for each practice are outlined in the FSA Handbook 2-CRP and are included in Appendix D of this PEA. The following is a brief summary of the selected approved CPs:

**USDA FSA National Practice CP2 (Establishment of Permanent Native Grasses):** This practice establishes a permanent vegetative cover of native grasses on eligible cropland that would enhance environmental benefits. It is used to reduce soil erosion and sedimentation, improve water quality and create or enhance wildlife habitat.

**USDA FSA National Practice CP4D (Permanent Wildlife Habitat—Noneasement):** This practice creates permanent wildlife habitat cover enhancing environmental benefits for the wildlife of the designated or surrounding areas. Habitat components may include seeding, including shrubs and trees, establishing permanent water sources for wildlife, providing temporary cover, and the addition of minerals. This CP also requires the control of noxious weeds and other undesirable plants, insects, and pests.

**USDA FSA National Practice CP21 (Filter Strips):** Filter strips are narrow bands of grass or other permanent vegetation used to filter water and reduce sediment, nutrients, pesticides, and other contaminants to waters, wetlands, and other water bodies as defined in FSA Handbook 2-CRP.. Filter strips are located on cropland immediately adjacent and parallel to streams, lakes, and rivers.

**USDA FSA National Practice CP22 (Riparian Buffer):** Riparian buffers are primarily trees, or shrubs established adjacent to streams, rivers, wetlands, or other water bodies as defined in FSA Handbook 2-CRP. Riparian buffers reduce pollution and protect surface and subsurface water quality while enhancing the aquatic ecosystem.

**USDA FSA National Practice CP23 (Wetland Restoration):** This practice restores the functions and values of wetland ecosystems devoted to agricultural use. Wetlands provide benefits in terms of water quality (sediment and nutrient filtering and cycling), floodwater storage, and wildlife habitat. These benefits would contribute to meeting CREP objectives and improving conditions in the CREP project areas.

**USDA FSA National Practice CP23A (Wetland Restoration—Non-Floodplain):** This practice restores the functions and values of wetland ecosystems devoted to agricultural use. The soils, hydrology, vegetative community, and biological habitat of degraded wetlands are rehabilitated to the extent possible.

**USDA FSA National Practice CP25 (Rare and Declining Habitat):** The purpose of this practice is to restore the functions and values of critically endangered, endangered, and threatened habitats. This practice targets land or aquatic habitats that have been degraded by human activities. It is intended to provide habitat for rare and declining wildlife species by restoring and conserving native plant communities. Restoration and conservation of native plant communities serves to increase native plant community diversity. Additionally improvements in vegetative cover would serve to reduce soil erosion from lands degraded by human activities.

### **Cropland Eligible for Enrollment in CREP**

Participants eligible for enrollment include individuals, associations, trusts, local and State governments, Indian tribes, corporations, joint stock companies and operations, estates, and other legal entities. Eligible producers enroll in 10- to 15-year CRP contracts with FSA. Applicants must be able to offer eligible



**Filter Strips in Nebraska. Photo Courtesy of NRCS USDA.**

acreage and satisfy the basic eligibility criteria for CRP. Eligibility criteria that must be met for land parcels to qualify for the NPRRA CREP include:

- Cropland must have been irrigated 4 of the last 6 years (1996-2001) at not less than ½ acre foot per acre
- Cropland must have been cropped 4 of the last 6 years (1996-2001)
- Over half of each land parcel enrolled must fall within the project boundaries
- Surface irrigated acres that are supplemented by groundwater pumps do qualify
- Land must currently be legally and capable of being irrigated in the years offered

If basic eligibility requirements are met, enrollment would then be determined by a ranking system. This ranking system is designed to ensure that retirement of land enrolled in CREP would lead to beneficial water savings. A ranking system has been developed for the Republican River basin, and a ranking system for the Platte River basin is in the process of being developed.



Playa wetlands in Nebraska. Photo Courtesy of Elaine Nowick, University of Nebraska, Lincoln.

### CREP Funding

Total estimated costs of implementing the NPRRA CREP Agreement are \$158,215,000 over 10 years. Federal funding would provide 80 percent (\$126,572,000) of the total cost; the State would provide the remaining 20 percent of the total cost. During initial sign-up, an additional \$10,000,000 program cost share would be needed. Fifty percent of the funding for this additional cost would come from Federal sources and 50 percent would be provided by State and local sources. Attachment E of Appendix D provides additional information on the methods used to determine total estimated costs and the weighted mean cost for each county and river basin.

### Payments in CREP

There are several payments and cost share incentives that are available to eligible CREP participants. These incentives include:

- Irrigated Rental Payments — Federal annual rental payments approved for irrigated cropland.
- Signing Incentive Payments (SIPs) — one-time payments of \$10/acre for each eligible acre enrolled for CP21 and CP22 consistent with FSA Handbook 2-CRP.
- Practice Incentive Payments (PIPs) — one-time payments that are equal to 40 percent of the total eligible cost of practice installation for CP21 and CP22 consistent with FSA Handbook 2-CRP
- Lost-Share --- Up to 50 percent of the eligible reimbursable costs of establishment of approved conservation practices.
- Dryland Rental Payments ---- Federal annual rental payments based on the three predominant soils.
- Cost share assistance — up to 25 percent of cost share for seeding may be available through participating NRDs, Pheasants Forever, and/or Nebraska Game and Parks Commission, pending availability of funds.

Table 2.3 provides a summary of the incentives available for each CP.

**Table 2.3 – Summary of available incentives.**

<b>PRACTICE</b>	<b>Rental Incentive Payment</b>	<b>Cost Share Assistance</b>	<b>SIP</b>	<b>PIP</b>
CP2 - Native Grasses	Yes	Up to 25%	No	No
CP4D - Wildlife Habitat	Yes	Up to 25%	No	No
CP21 — Filter Strips	Yes		Yes	Yes
CP22 — Riparian Buffers	Yes		Yes	Yes
CP23, CP23A — Wetland Restoration	Yes	Up to 25%, not to exceed \$100/acre	No	No
CP25 - Rare and Declining Habitat	Yes	Up to 25%	No	No

### **Monitoring Program**

The Nebraska Department of Natural Resources (DNR) and participating NRDs and irrigation districts would monitor water savings. These entities would undertake additional efforts to improve water use efficiency. The total savings in consumptive use would be delineated by river basin and include a separate assessment of surface and groundwater conserved.

The NGPC and participating NRDs and irrigation districts would monitor aquatic and terrestrial populations for select species, as well as recreational participation associated with the project area and would monitor and address problems associated with low water conditions. Additional efforts would be undertaken to improve aquatic habitat, control invasive plant species, and sustain recreational access.

The Nebraska Department of Environmental Quality (DEQ) would collect water quality data at selected project area points, and the United States Geological (USGS) and University of Nebraska-Lincoln would collect supplemental data. The DEQ and NGPC would monitor watersheds associated with reservoirs targeted for aquatic habitat improvement. All water quality monitoring would be done using standard methods.

The DNR and NGPC would cooperatively compile and submit an annual report to FSA by the first of April each year. The program would be evaluated each year to ensure that project objectives are being met. If the results of the evaluation indicate that a substantial difference exists between the objectives and the results, practices and the program would be modified, with FSA concurrence, to ensure that they are reached.

### **Public Outreach and Support**

A multi-media public outreach campaign would be initiated using all of the public relations resources available to the partners in the proposal. Specific emphasis would be placed on an educational campaign that would promote water conservation and resource utilization within the project area. All supporting agencies and entities would assist with the public outreach and educational campaign by applying their full resources. Additional funding would be sought through grants.

### **Training of Staff**

A team of Federal and State staff would coordinate the necessary training sessions to reach persons involved with the sign-up, promotion, maintenance, and monitoring of the accepted CREP. Specific

details and procedures would be shared during this training, as well as contact information for future support.

### **Communication Plan**

A detailed communication plan would be developed upon acceptance of the NPRRA CREP Agreement. The communication plan would share project goals, objectives, criteria, and most recent updates on project accomplishments. All available resources would be used to disseminate information including organizational newsletters, brochures, displays, magazine articles, agency internet pages, and TV/radio spots if funds are available. Sign-up would be monitored annually and barriers to enrollment identified via a non-user survey.

### **State Commitments**

In addition to implementation of CPs, the State of Nebraska would fulfill the following commitments:

- Commitment #1: Assist communities whose public water supplies are affected by nitrogen and phosphorous contamination issues.
- Commitment #2: Provide educational assistance to project priority area irrigators to develop a more efficient use of applied water, nutrients, and herbicides.
- Commitment #3: Monitor the aquatic communities and associated habitat parameters in project priority area reservoirs and rivers to determine biological relationships.

Funding to support these commitments would be sought through grants.

## **2.3 Comparison of Alternatives**

The two alternatives both respond to project objectives in varying degrees. Implementing either alternative also has specific environmental implications for the Republican and Platte River basins. Tables 2.4 and 2.5 provide a summary comparison of the alternatives. To provide consistency, the following impact terminology will be used in the comparison table below and throughout the document.

- No Effect – A change to a resource’s condition, use, or value that is not measurable or perceptible.
- Beneficial Effect – An action that would improve the resource’s condition, use, or value compared to its current condition, use, or value.
- Minor Adverse Effect – A measurable or perceptible, minor, localized degradation of a resource’s condition, use, or value that is of little consequence.
- Moderate Adverse Effect – A localized degradation of a resource’s condition, use, or value that is measurable and of consequence.
- High Adverse Effect – A measurable degradation of a resource’s condition, use, or value that is large and/or widespread and could have permanent consequences for the resource.
- Short term Effect – An effect that would result in the change of a resource’s condition, use, or value lasting less than one year.
- Long term Effect – An effect that would result in the change of a resource’s condition, use, or value lasting more than one year and probably much longer.

**Table 2.4 – Summary comparison of project objective achievement under Alternatives A and B.**

Objectives	Indicators	Alternative A: No Action	Alternative B: Implement CREP
<p>Objective #1: Reduce application of water for irrigation in the project area by 125,000 acre-feet (over 40 billion gallons) annually.</p>	<p>Enrollment of up to 100,000 acres. Retire 8.3 percent (100,000 acres) of the irrigated cropland from production. Average application of irrigation water on crops in the priority area is approximately 15 inches/acre or 1.25 feet/acre. Implementation of FSA CPs.</p>	<p>Current agricultural practices would continue. Irrigated cropland would not be retired. Over 125,000 acre-feet of water would continue to be used for irrigation within the project area. Reduction would need to come through other State and Federal programs.</p>	<p>CREP implementation would retire approximately 100,000 acres (8.3%) of irrigated cropland, and 125,000 acre-feet of water would annually be returned to the system.</p>
<p>Objective #2: Increase water delivered and available to area reservoirs.</p>	<p>Enrollment of up to 100,000 acres. Conserve 100,000 acre-feet of water annually within priority area reservoirs. Implementation of FSA CPs.</p>	<p>Current agricultural practices would continue. Irrigated cropland would not be retired. Over 125,000 acre-feet of water would continue to be used for irrigation within the project area. Water available for reservoirs would remain at current levels. Any increases in reservoir water levels would need to come through other State and Federal programs.</p>	<p>Approximately 100,000 acres (8.3%) of irrigated cropland would be retired from production, and 100,000 additional acre-feet of water would be delivered annually to project area reservoirs.</p>
<p>Objective #3: Increase flows in priority area rivers to augment seasonal flows.</p>	<p>Enrollment of up to 100,000 acres. Increase flows in project area rivers by 50,000 acre-feet annually. Implementation of FSA CPs.</p>	<p>Current agricultural practices would continue. Irrigated cropland would not be retired. Over 125,000 acre-feet of water would continue to be used for irrigation within the project area. Seasonal river flows would remain at current levels.</p>	<p>CREP implementation would deliver 50,000 additional acre-feet of water to project area rivers. This additional available water would help to augment low seasonal flows cause by prolonged drought.</p>



Objectives	Indicators	Alternative A: No Action	Alternative B: Implement CREP
<p>Objective #4: Improve wildlife habitat and increase wildlife populations within the resource area.</p>	<p>Enrollment of up to 100,000 acres. Provide 85,000 additional acres of native grassland habitat for wildlife in the priority area to increase populations of pheasants and other ground nesting birds by 25 percent in the area. Implementation of FSA CPs.</p>	<p>Current wildlife habitat would continue to degrade and fragment in response to ongoing environmental stressors. Any improvements to wildlife habitat would need to come through other State and Federal programs.</p>	<p>CREP implementation would improve and create habitat for a variety of species. Protected riparian areas would improve aquatic habitat and provide corridors for terrestrial species. A total of 85,000 acres of native grassland habitat would be restored for wildlife in the project area to increase populations of pheasants and other ground nesting birds by 25% in the area.</p>
<p>Objective #5: Reduce application of agricultural pesticides to improve water quality in the project area.</p>	<p>Enrollment of up to 100,000 acres. Reduce the application of triazine products by 8.3 percent (130,000 pounds) annually in the priority area. This goal will be accomplished by retiring 8.3 percent of the irrigated cropland in the priority area. Additional reduction of triazine products in agriculture run-off will be accomplished with the use of 10,000 acres of filter strips. State initiated educational campaign about the appropriate use of these products. Implementation of FSA CPs.</p>	<p>Current agricultural practices would continue. High levels of nutrients, chemicals, pathogens, and sediments would continue to discharge into watersheds. Any reductions would need to be realized through other State and Federal programs.</p>	<p>CREP implementation would retire 100,000 acres (8.3%) of irrigated cropland. This would reduce the application of triazine products by 8.3% (130,000 pounds) annually. Educational campaigns would be launched to share appropriate use of these products.</p>

Objectives	Indicators	Alternative A: No Action	Alternative B: Implement CREP
<p>Objective #6: Reduce application of agricultural fertilizers to improve water quality in the project area.</p>	<p>Enrollment of up to 100,000 acres.</p> <p>Reduce the application of nitrogen and phosphorous by 8.3 percent (20 million pounds and 2 million pounds, respectively) annually in the priority area. This goal will be accomplished by retiring 8.3 percent of the irrigated cropland in the priority area.</p> <p>Additional reduction in leaching of nitrate and phosphate is anticipated through educational efforts to improve the efficiency of water and chemical use in the project area.</p> <p>Implementation of FSA CPs.</p>	<p>Current agricultural practices would continue.</p> <p>High levels of nutrients, chemicals, pathogens, and sediments would continue to discharge into waterbodies.</p> <p>Any reductions would need to be realized through other State and Federal programs.</p>	<p>CREP implementation would retire 8.3% of the irrigated cropland to reduce the application of nitrogen and phosphorous by 8.3% (20 million pounds and 2 million pounds, respectively) annually.</p> <p>Educational efforts would instruct producers on how to improve the efficiency of water and chemical application.</p>

**Table 2.5 – Summary comparison of the effects of Alternatives A and B on resource issues.**

Issues	Alternative A: No Action	Alternative B: Implement CREP
<p><b>Issue #1:</b> Surface water susceptibility to agricultural practices</p>	<p>Long term, moderate adverse effect – Surface water quality would continue to decline from pollutant loads in agricultural runoff. Demand for irrigation water would remain at current levels or possibly increase if drought conditions continue, resulting in less surface water in the project area.</p>	<p>Long term, moderate to high beneficial effects – Significant localized improvements to water quality would help waterbodies achieve and continue to meet State water quality standards. Fewer pesticides and fertilizers would be applied to cropland, and acres retired from irrigation would increase water quantity and decrease the amount of water lost to evapotranspiration.</p> <p>CP implementation would help filter pesticides and fertilizers, returning higher quality water to surface waters.</p> <p>Short-term minor adverse effects may occur during the installation of CPs, but these effects are expected to only last 1-3 years until CPs are permanently established.</p>
<p><b>Issue #2:</b> Groundwater susceptibility to agricultural practices</p>	<p>Long term, moderate adverse effect – Current agricultural practices would continue, and groundwater quality and quantity would continue to decline. Polluted agricultural runoff would continue to degrade groundwater quality, and current irrigation practices would continue to deplete groundwater resources.</p>	<p>Long term, moderate to high beneficial effect – The retirement of 100,000 acres of land from active agricultural practices would decrease groundwater pumping for irrigation, would decrease the pesticides and fertilizers in the project area that would impact groundwater regeneration, and would filter the surface water that does regenerate the groundwater.</p> <p>Short-term minor adverse effects may occur during the installation of CPs, but these effects are expected to only last 1-3 years until CPs are permanently established.</p>

Issues	Alternative A: No Action	Alternative B: Implement CREP
<b>Issue #3:</b> Drinking water susceptibility to agricultural practices	Long term, minor adverse effect – Drinking water quality would continue to decline. State and Federal laws would continue to prevent major discharges that would significantly degrade drinking water resources, but incremental negative impacts from agricultural and industrial activities would continue.	Long term, minor to moderate beneficial effect – CREP implementation would reduce contamination of wellheads and drinking water sources by filtering agricultural runoff. Retiring 100,000 acres of actively cropped agricultural land would reduce application of agricultural pesticides and fertilizers, would reduce amount of groundwater used for irrigation, and would improve the quality of aquifer and wellhead recharge.
<b>Issue #4:</b> Wetland susceptibility to agricultural practices	Long term, moderate adverse effect – Wetland values would continue to slowly decline as a result of existing and projected agricultural runoff. Total wetland acres will likely be stable or slightly reduced.	Long term, moderate beneficial effect – Through implementation of CP23 and CP23A, wetland acreage would likely increase and help create new wildlife habitat for traditional species in the combined watersheds.  Short-term minor adverse effects may occur during the installation of CPs, but these effects are expected to only last 1-3 years until CPs are permanently established.
<b>Issue #5:</b> Floodplain susceptibility to agricultural practices	No effect – Since floodplains are routinely used for agricultural production, which normally has little adverse effect on flowage areas or floodways, these effects are considered to be negligible.	Minor, long term improvements would be made to floodplains and stream values. CPs would assist in controlling flood events.
<b>Issue #6:</b> Critical Habitat or Threatened and Endangered Species susceptibility to agricultural practices	Long term, minor adverse effect – Wildlife and habitat values would continue to decline from reduced water quality and quantity.	Long term, moderate beneficial effect – CPs would improve habitat values. Improvements to water quality and quantity alone would have beneficial effects for all wildlife as well as potential increases in critical habitat (up to 100,000 acres).

Issues	Alternative A: No Action	Alternative B: Implement CREP
<p><b>Issue #7:</b> Cultural / Tribal Resource susceptibility to agricultural practices</p>	<p>Without a mandated assessment process, minor to moderate adverse impacts would continue to occur on cultural resources. These include disturbance and destruction of prehistoric and historic sites and structures, either through ongoing land conversion for development or agricultural use.</p>	<p>Minimal to no adverse impacts – If cultural resources are discovered on enrolled lands, coordination with the SHPO and/or THPO, including appropriate tribes, would occur to minimize impacts. Some CPs may serve to protect inappropriate access to cultural resources.</p> <p>Installation of CPs may require earth moving activities, which may disturb deeply buried sites or artifacts. Site specific cultural resources surveys would minimize any impacts to cultural resources.</p>
<p><b>Issue #8:</b> Human Health, Social, and Economic Impacts from agricultural practices</p>	<p>Long term, minor adverse effect – No FSA actions are required or necessary to address existing or ongoing issues with environmental justice. Poor water quality and quantity could eventually lead to significant financial losses from recreation in this region of the State.</p>	<p>Long term, minor beneficial effect – By enrolling marginal, less productive agricultural lands, landowners should be able to reduce overall input costs for farming operations and maintain or increase production by being able to concentrate resources on the remaining farmland. Disproportionate effects on minority or underrepresented groups are unlikely. Increased opportunities for hunting and fishing in these areas may lead to localized increases in the sale of hunting and fishing equipment, licenses, and/or other local resource-based recreation industries. Replenished water supplies (125,000 acre feet) would increase opportunities for recreation on both rivers and lakes/reservoirs.</p>

## Chapter 3.0 Affected Environment and Environmental Consequences

### 3.1 Introduction

The analyses of Affected Environment and Environmental Consequences have been combined in this section to simplify the document. Relevant resource issues related to the NPRRA CREP Agreement are discussed below in Sections 3.5 through 3.12. This section will explore the environmental resources affected by the No Action Alternative and the Proposed Action Alternative (Implementation of the NPRRA CREP).

This chapter discusses the resources most likely to receive impacts from the alternatives, and compares the impacts of the alternatives on the resource issue. Resources discussed in this chapter include:

- Surface Water (3.5)
- Groundwater (3.6)
- Drinking Water (3.7)
- Wetlands (3.8)
- Floodplains (3.9)
- Critical Habitat or Threatened/Endangered Species (3.10)
- Cultural/Tribal Resources (3.11)
- Human Health, Social, and Economics (3.12)

This chapter also discusses mandatory impact considerations including:

- Cumulative Effects (3.13)
- Unavoidable adverse impacts (3.14)
- Relationship of short-term uses and long-term productivity (3.15)
- Irreversible and irretrievable commitments of resources (3.16)

The general nature of this PEA limits discussion of the resources to a wide scale. An in depth, site specific EE would be completed by FSA for each farm contract as part of the conservation planning process. As impacts become clear at each site, the appropriate steps would be taken to ensure compliance with NEPA and related environmental and cultural resource laws and regulations. Consultations will be initiated as appropriate depending on the resources potentially affected by the proposed action.

### 3.2 General Description

#### 3.2.1 Ecoregions

For purposes of analysis and discussion, the project area can be divided into several ecological regions as shown in Figure 3.1 (EPA 2001).



Crane in wetland. Photo courtesy of Nebraska DEQ.

## NEBRASKA SAND HILLS

The Nebraska Sand Hills comprises one of the most distinct and homogeneous ecoregions in North America. Annual precipitation of the Sandhills ranges from a yearly total of 23 inches in the east to slightly less than 17 inches in the west. One of the largest areas of grass-stabilized sand dunes in the world, this region is generally devoid of cropland agriculture, and except for some riparian areas in the north and east, the region is treeless. The area is very sparsely populated, but large ranches are found throughout the region. The fragile, sandy rangeland must be managed cautiously to minimize wind erosion, overgrazing, and vegetation loss. Numerous lakes and wetlands dot the region and parts of the region are without streams. The Nebraska Sand Hills ecoregion contains the Alkaline Lakes Area, Lakes Area, and Sand Hills regions (EPA 2001, UNL 2005).

## WESTERN HIGH PLAINS

In the rain shadow of the Rocky Mountains, the Western High Plains ecoregion is characterized by a semi-arid to arid climate, with annual precipitation ranging from 13 to 20 inches. Higher and drier than the Central Great Plains to the east, much of the Western High Plains comprises a smooth to slightly irregular plain having a high percentage of dryland agriculture. Potential natural vegetation is dominated by drought tolerant short grass prairie and large areas of mixed grass prairie. Center pivot irrigation, relying on ground water from the High Plains Aquifer, has increased dramatically in recent decades. The Western High Plains ecoregion contains the Flat to Rolling Cropland, Moderate Relief Rangeland, Scotts Bluff and Wildcat Hills, Sandy and Silty Tablelands, North and South Platte Valley and Terraces, and Rolling Sand Plains regions (EPA 2001).

## CENTRAL GREAT PLAINS

The Central Great Plains are slightly lower, receive more precipitation, and are somewhat more irregular than the Western High Plains. Once a grassland, dominated by mixed grass prairie with scattered low trees and shrubs in the south, much of this region is now in cropland. Subsurface salt deposits and leaching contribute to the high salinity found in some streams. The Central Great Plains ecoregion contains the Central Nebraska Loess Plains, Rainwater Basin Plains, Platte River Valley, and Rolling Plains and Breaks regions (EPA 2001).

### 3.2.2 History of Irrigation Projects on the Platte and Republican Rivers

The project that would become the Central Nebraska Public Power and Irrigation District began in 1913 with a proposal to divert water from the Platte River during the spring and fall to irrigate area farms. Final approval for the project was granted in 1935, which created a reliable source of surface water for crop production and hydroelectric power. Construction began in 1936 on Kingsley Dam (which forms Lake McConaughy), the Diversion Dam by North Platte, the Supply Canal with more than 20 small lakes along its 75-mile route, three hydroelectric plants, and other necessary infrastructure. Kingsley Dam was completed in 1941, and Lake McConaughy began filling a basin 21 miles in length and up to 4 miles in width. At full capacity this reservoir covers more than 35,700 surface acres and offers some 105 miles of public shoreline. Figure 3.2 depicts the intricate water



**Kingsley Dam on North Platte River, completed in 1941, directly controls flows downstream through central Platte River. Photo by W.L. Graf, May 2003 (NRC 2004).**

delivery system stemming from stored water in Lake McConaughy, including several of the notable public access lakes within this system (Proposal 2004).

The Republican River has a history of flooding, which hampered settlement and agricultural development of the area. In 1935 a major flood claimed over 100 lives and prompted the development of a reservoir



Republican River Flood in 1935. Photo Courtesy of DNR.

storage system for the primary benefits of flood control and irrigation. Harlan County Dam is the second-largest reservoir in Nebraska and was completed in 1952. Swanson Reservoir and Harlan County Reservoir are main-stem reservoirs and Enders Reservoir, Red Willow Reservoir, Medicine Creek Reservoir were built on major tributaries. Additionally, flow rates have also decreased over time due to irrigation and other upstream uses. As a result, damaging floods have not occurred after 1960 (DNR 2005, Proposal 2004).

### 3.2.3 Climate

The climate of the project area is typical of the Great Plains of North America. Marked seasonal variations in precipitation characterize the region. Mean annual precipitation varies from 15-26 inches on the western to eastern edge of the project area, respectively. The majority of precipitation (75 to 80 percent) falls during the growing season (April through September). Summer precipitation usually arrives in the form of thunderstorms. Mean evaporation rates frequently exceed mean precipitation rates (Proposal 2004).

The project area has been experiencing persistent above normal temperatures and below normal precipitation since 1999. Because of this on-going climate pattern, the U.S. Drought Monitor has classified much of the NPRRA CREP area in the “extreme” or “exceptional” drought category for the last few years. The duration and severity of the current climate rivals the conditions reported during the “Dust Bowl” of the 1930s (Proposal 2004).

### 3.2.4 Soil

Several different soil associations are found in the Republican and Platte River basins. Soils in the eastern priority area are typically very deep, gently sloping to steep, well-drained, silty soils formed in loess and alluvium. The western edge of the priority area has shallower, nearly level to moderately steep, excessively drained; sandy soils formed in eolian sand. Irrigation throughout the area (Figure 3.3) has maximized the fertility and productivity of these soils (Proposal 2004).

### 3.2.5 Land Use and Land Ownership

The majority of land is privately owned and devoted to agricultural production. Less than 10 percent of the project area is devoted to urban areas, water, and public lands. Public lands comprise 3 percent of the area (Figure 3.4) (Proposal 2004).

Land use in the CREP project area has changed and intensified greatly in the past 40 years, and current land use is more than 90 percent agricultural (Proposal 2004). In the North Platte River basin, about 95 percent of the land is agricultural with approximately 75 percent in rangeland and 20 percent in cropland



(DEQ 2003a). In the Republican River basin, approximately 45 percent of the basin is rangeland and pastureland and 50 percent is cultivated cropland (DEQ 2004d). In the Central Platte River basin, agriculture dominates land use with row crops being grown in the valleys and bottomlands and range being predominant in the upland and Sandhills region (DEQ 2003b). Percentages for the Central Platte River were unavailable.

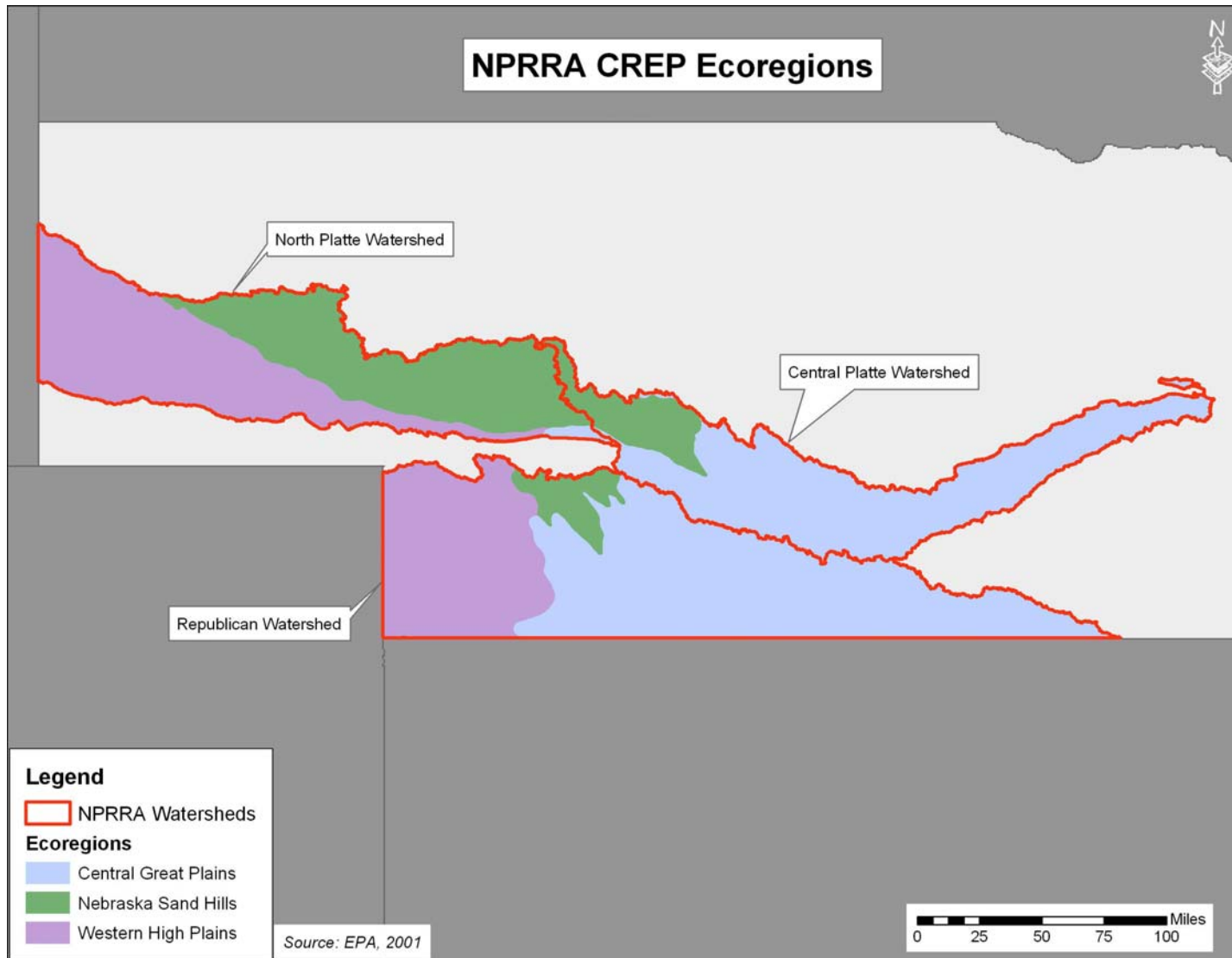


Figure 3.1 – Ecoregions of the NPRRA CREP Project Area.

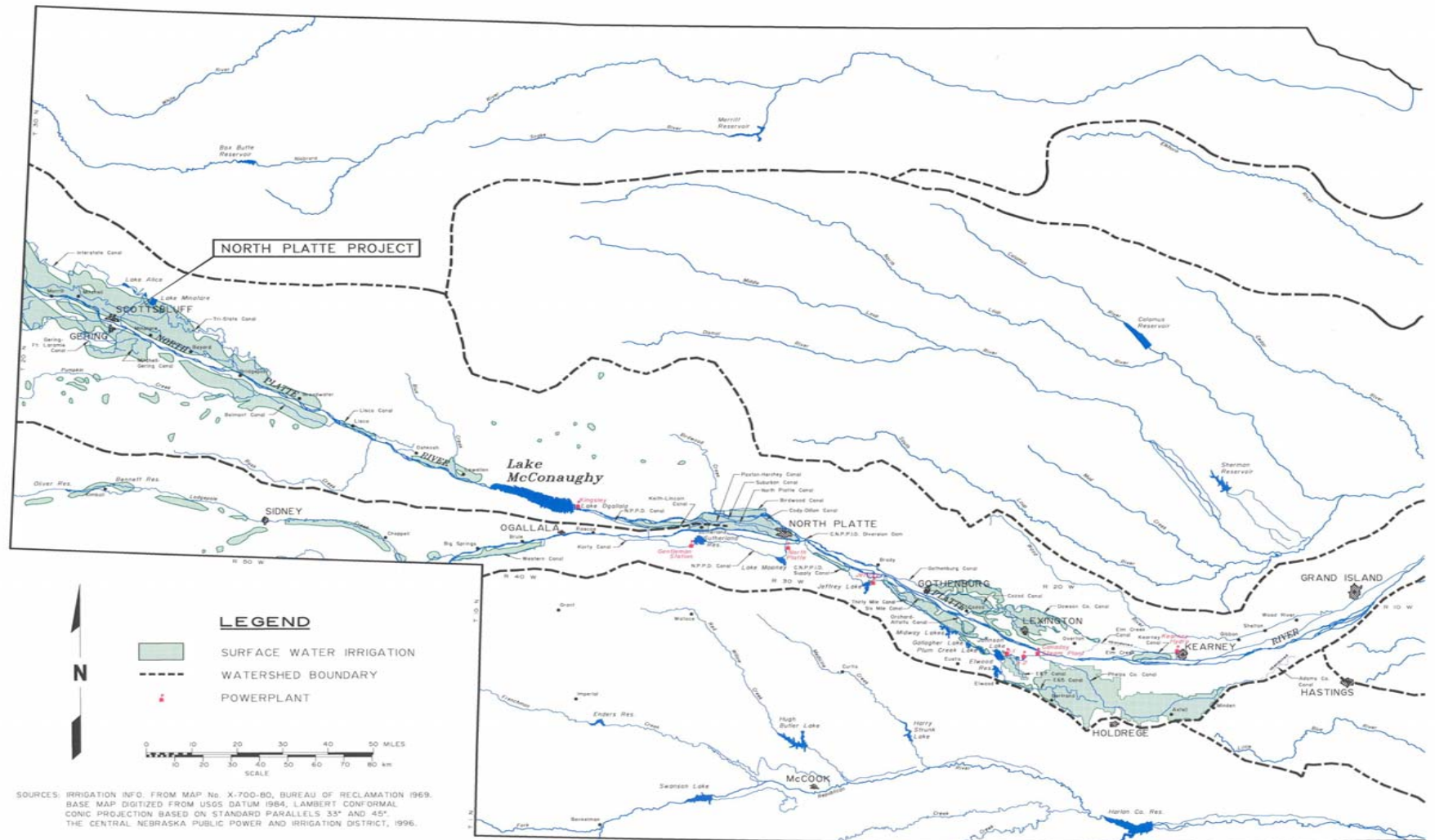


Figure 3.2 – Delivery system for The Central Nebraska Public Power and Irrigation District.

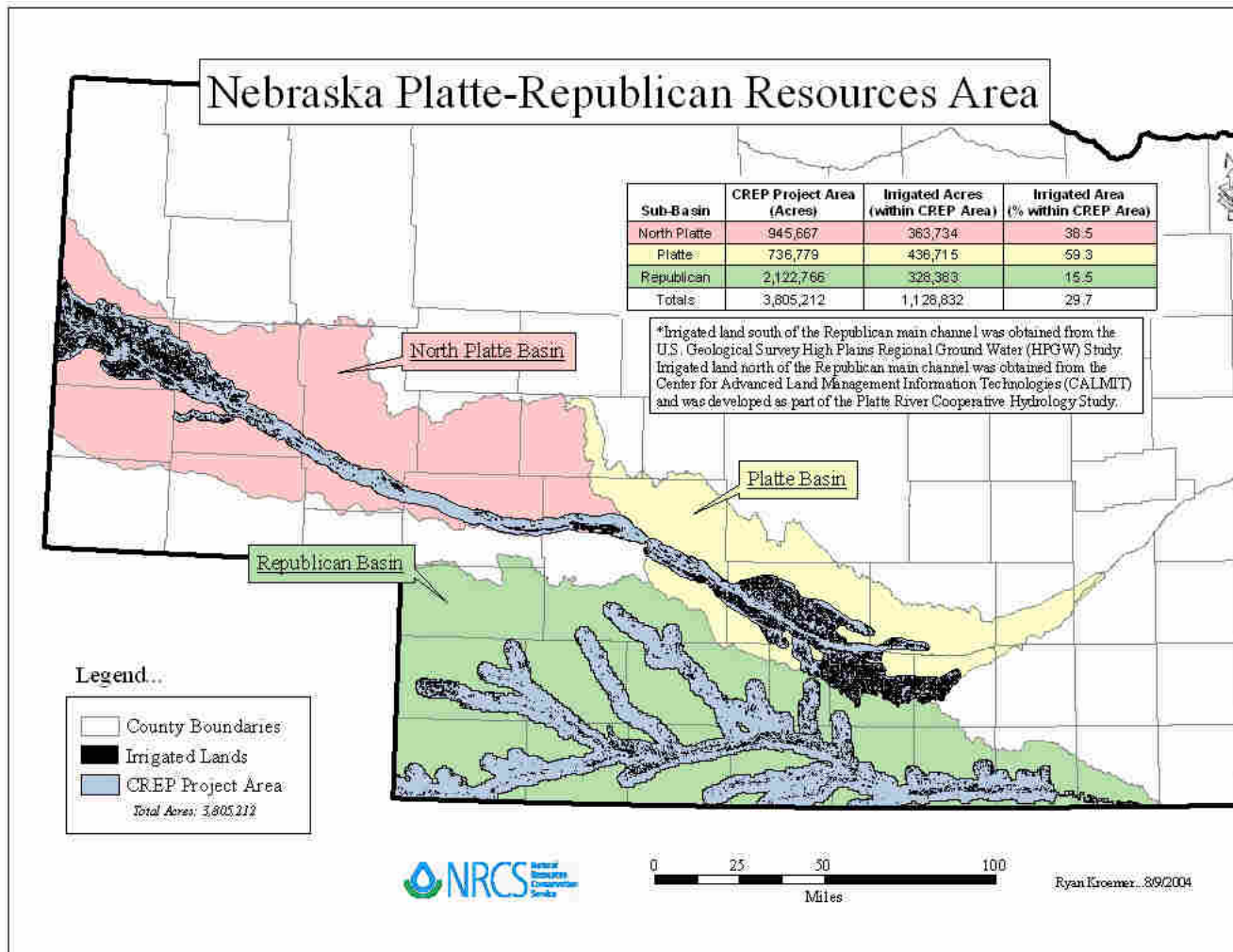


Figure 3.3 – Irrigated acres within the project area for the proposed NPRRA CREP.

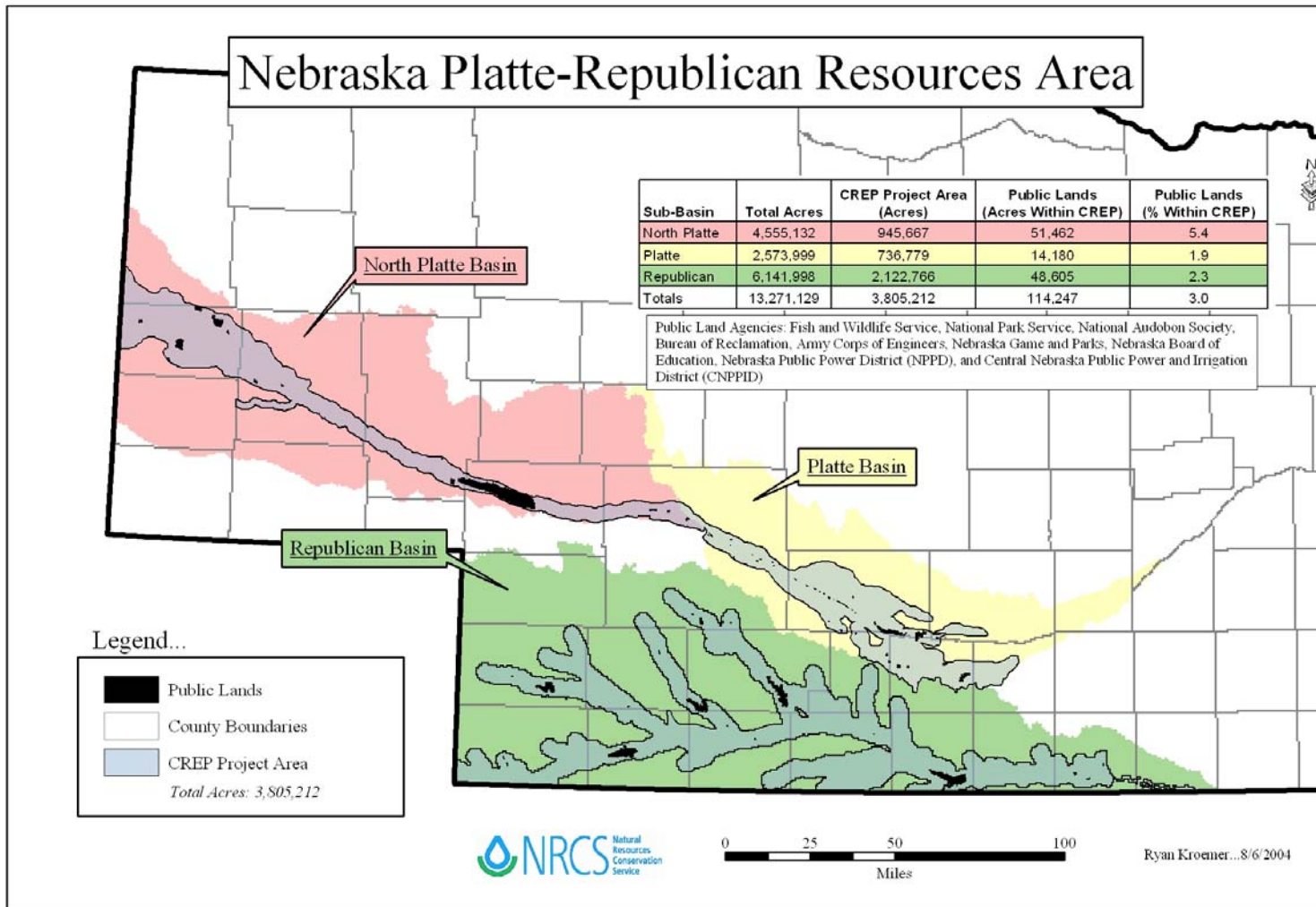


Figure 3.4 – Location of public lands within the project area for the proposed NPRRA CREP..Profile of Agricultural Activities (Baseline Conditions).

### 3.3 Profile of Agricultural Activities (Baseline Conditions)

Following is a table listing some of Nebraska's agricultural products and the national ranking of their production.

**Table 3.1 – Nebraska State Agricultural Products (FY 2002).**

Crop	Nationwide Standing	Production	Dollar Amount Generated
Corn, Grain	Third	1,139.3 million bushels	\$1,950 million
Sorghum, Grain	Third	35.7 million bushels	\$66 million
Oats	Tenth	3.7 million bushels	\$5.7 million
Winter Wheat	Seventh	59.2 million bushels	\$165.8 million
Soybeans	Fifth	223 million bushels	\$799.9 million
All Sunflowers	Sixth	83.4 million pounds	\$7.8 million
All Hay	Sixth	7.6 million tons	\$538 million
Alfalfa Hay	Third	5.1 million tons	\$381 million
All Other Hay	Ninth	2.4 million tons	\$156.7 million
Dry Edible Beans	Second	3.2 million cwt.	\$56.7 million
Sugar Beets	Eighth	0.8 million tons	\$36.9 million
All Cattle and Calves	Third	6,400 thousand head	\$4,948 million
All Hogs and Pigs	Seventh	2,900 thousand head	\$683.5 million
Egg Production	Tenth	3,001 million	\$95.5 million

Source: Nebraska Agricultural Statistics Service. 2002. Annual Bulletin.

Table 3.2 below provides insight into the high agricultural productivity of several counties within the NPRRA CREP area. In 2003, 16 of the 23 counties within the NPRRA CREP project area were in the top 10 agricultural producers for several commodities. Those counties are highlighted in bold in Table 3.2.

**Table 3.2 – Nebraska's Top Ten Producing Counties, Selected Commodities, 2003**

Rank	Corn for Grain County	Soybeans County	Winter Wheat County	Sorghum for Grain County
1	York	Saunders	Cheyenne	<b>Nuckolls</b>
2	Hamilton	Platte	<b>Perkins</b>	Thayer
3	Hall	<b>Phelps</b>	Box Butte	Saline
4	<b>Dawson</b>	Antelope	<b>Furnas</b>	Gage
5	<b>Buffalo</b>	Cuming	Deuel	Jefferson
6	<b>Phelps</b>	Fillmore	Red Willow	<b>Furnas</b>
7	Custer	Seward	Kimball	Fillmore
8	<b>Lincoln</b>	Dodge	<b>Chase</b>	<b>Webster</b>
9	Adams	York	<b>Hitchcock</b>	<b>Harlan</b>
10	Holt	Madison	<b>Nuckolls</b>	Clay

Rank	Oats for Grain County	Sunflowers County	All Cattle and Calves* County	Beef Cows* County
1	Knox	<b>Perkins</b>	Cherry	Cherry
2	Cedar	Kimball	Custer	Custer
3	Thurston	Sheridan	<b>Dawson</b>	Holt
4	Holt	Cheyenne	Cuming	Sheridan
5	Boyd	<b>Red Willow</b>	Holt	<b>Lincoln</b>
6	Dixon	Box Butte	<b>Lincoln</b>	<b>Dawson</b>
7	Sheridan	<b>Frontier</b>	<b>Phelps</b>	Knox
8	<b>Frontier</b>	Deuel	<b>Scotts Bluff</b>	Rock
9	Wayne	<b>Keith</b>	Sheridan	<b>Buffalo</b>
10	Custer	Banner	<b>Morrill</b>	<b>Frontier</b>

\*January 1, 2003 Source: NASS, NE Agri-Facts Special Edition, May 2004

### 3.4 Leveraged Benefits

An understanding of the planned effect of the 100,000 acres proposed for the NPRRA CREP is essential to the discussion of resource impacts. CREP implementation is designed to leverage and multiply effect. Adding one acre through CREP benefits more than that one acre in the watershed. Each acre enrolled in CREP could potentially benefit many acres outside of the CREP contract areas. For example, if 10 acres were enrolled in CREP and CP23 (wetland restoration) was implemented, the new wetland could intercept agricultural runoff from hundreds or thousands of acres and reduce nutrient and pesticide loads significantly. Wetlands can maintain good water quality and improve degraded water quality conditions by intercepting and treating surface runoff. Suspended sediments and contaminants in the water are trapped, retained, and/or transformed through a variety of biological and chemical processes before they reach downstream water bodies. Forested riparian wetland areas in predominantly agricultural watersheds have been shown to remove approximately 80 percent of the phosphorous and 90 percent of the nitrogen from water runoff (EPA 1995). Streams in a Wisconsin basin, which was comprised of 40 percent wetlands, had sediment loads that were 90 percent lower than a comparable basin with no wetlands (USGS 1997). Implementing such CPs allows the relatively small footprint of CREP acreage to leverage much greater benefits for the watershed downstream.

In another example, a producer can enroll three or four acres of agricultural land bordering a stream or wetland in CREP and provide restorative and retention properties that may filter discharges and regulate water flow from several hundred acres. Small enrollments in CREP can have large impacts on watersheds.

Specific impacts and the degree to which the CPs can be effective will depend on site specific analysis of each CREP contract. Acreage is limited for some of the CPs, yet the overall benefits are measured as impacts to larger acreage.

## 3.5 Surface Water

### 3.5.1 Introduction

Surface water resources in the NPRRA CREP project area are important for a number of uses including agriculture, recreation, and fish and wildlife. Recent drought conditions in the NPRRA CREP project area has stressed the availability of water supplies and accentuated that a number of interests important to the State are competing for the same finite resources. This section will discuss surface water quality and quantity and how they are affected by current agricultural practices in the proposed CREP project area.



Dry bed of the Republican River. Image © K. Dewey, High Plains Regional Climate Center.

### Surface Water Quality

The DEQ is responsible for administering Federal and State laws pertaining to water quality. The Clean Water Act (CWA) of 1972 requires States to report on water quality of waterbodies located within the states and their attainment of beneficial uses. Under Section 303(d), states are required to identify and establish a priority ranking of all waterbodies that are not meeting State water quality standards and to biennially develop a Water Quality Limited Segments List (commonly called a 303(d) List). Section 303(d) requires a TMDL for waters that do not meet state water quality standards. A TMDL is described as a “pollution budget” for a specific river, lake, or stream, and is an established wasteload allocation for point and non-point sources (DEQ 2004c).

Section 305(b) of the CWA directs states to prepare a report biennially that describes the status and trends of existing water quality, the extent to which designated uses are supported, pollution problems and sources, and the effectiveness of the water pollution control programs (DEQ 2004c).

In 2003, the EPA issued guidance for the 2004 waterbody assessments and reporting requirements for Section 303(d) and Section 305(b) of the CWA and allowed states to combine these reports into one product. The final product is referred to as an “integrated report” and fulfills EPA’s goal to provide the general public with a comprehensive summary of State and national water quality. The DEQ, following EPA guidelines, prepared an integrated water quality report in March 2004 titled: *2004 Surface Water Quality Integrated Report* (DEQ 2004c).

### Surface Water Quantity

The Nebraska DNR administers surface water provisions in State and Federal law. In addition to competing interests within the State of Nebraska, an interstate compact has been in effect since 1943 between the states of Colorado, Kansas, and Nebraska. The compact provides an allocation of flow from the Republican and tributaries and provides beneficial consumption of 11 percent for Colorado, 40 percent for Kansas, and 49 percent for Nebraska (DEQ 2004d).



Another interstate compact regulating water quantity is also in place for the Middle Platte (or Central Platte), North Platte, and South Platte Rivers. In 1997, a cooperative agreement was entered into by the States of Colorado, Nebraska, and Wyoming, and the FWS. The agreement stipulates “sufficient water” will be provided to support and sustain four targeted threatened or endangered species – Piping Plover, Interior Least Tern, Whooping Crane, and Pallid Sturgeon. Water allocated for these species is maintained in Lake McConaughy in an environmental account and released at the request of the account manager (DEQ 2003a).

### Integrated Surface Water–Groundwater Management

Surface water and groundwater are hydrologically connected in many parts of the NPRRA CREP project area, and integrated use of surface water and groundwater is of special concern. Recent legislation in Nebraska regulates the management of areas with connected surface water and groundwater.

Legislative Bill 108 (LB108) amended the Nebraska Ground Water Management and Protection Act (GWMMPA) in 1996 and legally recognized that surface water and groundwater are connected. LB108 provided integrated water-management authority to NRDs and the DNR. NRDs administer and enforce the groundwater provisions in Nebraska law, and the DNR administers surface water provisions in State law (NPNRD 2004, NRC 2004, NASDA 1997).

The most recent amendment to the GWMMPA was effective on July 16, 2004 and is known as Legislative Bill 962 (LB962). LB962 concerns the integrated management of surface water and groundwater and directs the DNR to every year make a determination of which river basins, subbasins, or reaches are considered to be fully-appropriated or over-appropriated. Once an area has been determined to be fully-appropriated, the process to develop an integrated surface water–groundwater management plan is initiated by the DNR, affected NRDs, and appropriate stakeholders. Additionally a moratorium is issued on new surface water and groundwater uses (DNR 2004a). Nebraska defines fully-appropriated and over-appropriated basins as the following:

- A fully-appropriated basin is one where water supplies and water uses are in balance.
- An over-appropriated basin is one where the extent of development is not sustainable over the long term. In other words, the already permitted uses are in excess of what can be supported by the water supply (NPNRD 2004).

### **3.5.2 Existing Conditions**

The NPRRA CREP project area encompasses three major river basins: the North Platte River Basin, Middle (or Central) Platte River Basin, and the Republican River Basin. Surface water uses in the three basins includes recreation, fish and wildlife, agriculture, and aesthetics. None of the waterbodies in the basin have been designated for industrial water supply or for public water supply (DEQ 2004c).

#### **North Platte River Basin**

The North Platte River Basin covers approximately 7,117 square miles and extends from the Wyoming-Nebraska border to the confluence of the North and South Platte Rivers, where the basin gives way to the Middle Platte River Basin. Major tributaries of the North Platte River basin include:

- Birdwood Creek
- Blue Creek
- Pumpkin Creek
- Horse Creek
- Red Willow Creek
- Ninemile Creek

Seasonal flow of the North Platte River basin varies significantly based on snowmelt in the Rocky Mountains. Additionally, stream flow in the North Platte River Basin is heavily controlled by irrigation withdrawals, returns, and reservoirs. Impoundments offering control in the North Platte Basin include the State's largest, Lake McConaughy, as well as five reservoirs (Guernsey, Grayrocks, Glendo, Pathfinder and Seminole) in Wyoming (DEQ 2003a).

### **Middle (or Central) Platte River Basin**

The Middle Platte River Basin covers approximately 5,130 square miles and occupies a narrow strip in central Nebraska. The Middle Platte River Basin extends from the confluence of the North and South Platte Rivers on the western end to the confluence with Loup Power Canal return on the eastern end, where the basin gives way to the Lower Platte River Basin. Major tributaries of the Middle Platte River Basin include:

- North and South Platte Rivers
- Clear Creek
- Prairie Creek
- Silver Creek
- Wood River
- Whitehorse Creek

Stream flow volume in the Middle Platte River is heavily controlled by many irrigation withdrawals and returns including the control offered by Lake McConaughy that actually lies in the North Platte Basin (DEQ 2003b).



**The Platte River just north of Mahoney State Park. Image © K. Dewey, High Plains Regional Climate Center.**

### **Republican River Basin**

The Republican River watershed covers approximately 9,712 square miles and occupies the southwest corner of the State. The basin originates in Colorado and extends generally eastward until it exits Nebraska near Hardy, Kansas. Major tributaries of the Republican River include:

- Thompson Creek
- Elm Creek
- Prairie Dog Creek
- Muddy Creek
- Medicine Creek
- Red Willow Creek
- Arikaree River

Stream flow in the Republican River basin is dependent on precipitation with the majority of precipitation occurring during the spring and early summer. Historically, heavy rain events have resulted in extreme high flows. Remaining flows are from hydrologically connected groundwater (Proposal 2004, DEQ 2004d).

The streams are regulated by irrigation and flood control projects maintained by the Bureau of Reclamation and Army Corps of Engineers. Some of the larger impoundments include Harlan County

Reservoir, Swanson Reservoir, Hugh Butler (Red Willow) Reservoir, and Harry Strunk (Medicine Creek) (DEQ 2004d).

### Water Quality

For the 2004 Integrated Report, the DEQ assessed the waterbodies of the State according to their attainment of designated uses and characterized them using the following five categories (DEQ 2004c):

- **Category 1** – Waterbodies where all designated uses are met.
- **Category 2** – Waterbodies where some of the designated uses are met but there is insufficient information to determine if all uses are being met.
- **Category 3** – Waterbodies where there is insufficient data to determine if any beneficial uses are being met.
- **Category 4** – Waterbody is impaired, but a TMDL is not needed. Sub-categories 4A-C outline the rationale for the waters not needing a TMDL:
  - **Category 4A** – Waterbody assessment indicates the waterbody is impaired, but all of the required TMDLs have been completed.
  - **Category 4B** – Waterbody is impaired, but “other pollution control requirements” are expected to address the water quality impairment(s) within a reasonable period of time. Other pollution control requirements include but are not limited to NPDES permits and best management practices.
  - **Category 4C** – Waterbody is impaired but the impairment is not caused by a pollutant. This category also includes waters where natural causes/sources have been determined to be the cause of the impairment. In general, natural causes/sources shall refer to those pollutants that originate from landscape geology and climactic conditions. It should be noted, this definition is not inclusive.
- **Category 5** – Waterbodies where one or more beneficial uses are determined to be impaired by one or more pollutants and all of the TMDLs have not been developed. Category 5 waterbodies are those listed on the 303(d) list.

For the three river basins, there were 14 stream segments and 14 lakes/reservoirs listed in Category 5. The majority of stream segments in all basins were listed for impairment of primary contact recreation and aquatic life use and the majority of lake/reservoirs were listed for impairment of aesthetics and aquatic life use. Parameters of concern in stream segments include E.coli, fecal coliform, and temperature. Nutrients, pH, and dissolved oxygen are parameters of concern in lakes and reservoirs (DEQ 2004c). Tables 3.3 and 3.4 provide a more detailed summary of water quality conditions of waterbodies potentially located in the proposed CREP project area.

TMDLs have been completed or are in the process of being completed for stream segments on North Platte River, Middle Platte River, and Republican River, and for Johnson Lake. The parameter of concern for all of the TMDLs is fecal coliform, group of bacteria found in the excrement of warm-blooded animals including humans, livestock, and wildlife. E.coli, a bacterium, is an additional parameter of concern for the Republican River TMDL. The Johnson Lake, North Platte River, and Middle Platte River TMDLs have been finalized and the draft TMDL for Republican River was issued in October 2004 (DEQ 2004c).

**Table 3.3 – Waterbody assessment summary of stream segments in the NPRRA CREP project area.**

	Stream Segments		
	Middle Platte	North Platte	Republican
Category 1	0	0	0
Category 2	5	15	15
Category 3	17	112	74
Category 4A	4	3	0
Category 4B	0	0	0
Category 4C	1	2	4
Category 5	2	4	8
<b>Pollutants Causing Impairment or Impaired Parameters</b>	E.Coli	E.Coli, fecal coliform, mercury, Dieldrin, temperature, PCBs	E.Coli, fecal coliform, dissolved oxygen, selenium, temperature
<b>Impaired Beneficial Uses</b>	primary contact recreation, aquatic life use	primary contact recreation, aquatic life use	primary contact recreation, aquatic life use

Source: DEQ 2004c

**Table 3.4 – Waterbody assessment summary of lakes and reservoirs in the NPRRA CREP project area.**

	Lakes/Reservoirs		
	Middle Platte	North Platte	Republican
Category 1	0	1	2
Category 2	15	2	1
Category 3	77	37	10
Category 4A	0	0	0
Category 4B	0	0	0
Category 4C	0	4	0
Category 5	5	4	5

	Lakes/Reservoirs		
	Middle Platte	North Platte	Republican
<b>Pollutants Causing Impairment or Impaired Parameters</b>	nutrients, mercury, fecal coliform, pH	nutrients, pH, dissolved oxygen, conductivity	nutrients, dissolved oxygen
<b>Impaired Beneficial Uses</b>	primary contact recreation, aquatic life use, aesthetics	aquatic life use, agriculture water supply, aesthetics	aquatic life use, aesthetics

Source: DEQ 2004c

### Water Quantity

The NPRRA CREP project area has been suffering from extreme drought conditions the past five years and significant portions of the Republican River, Platte River, and North Platte River have become dry or reduced in water quantity. Lakes and reservoirs in the NPRRA CREP project area have also been impacted by current drought conditions (Proposal 2004).

### Streams

The amount of water flowing through rivers in the proposed CREP project area has decreased greatly during the recent drought. In 2004, major sections and tributaries in both the Republican and Platte River basins were dewatered (Proposal 2004).

Demand for water and lack of precipitation have resulted in the North Platte River becoming dewatered at the Nebraska-Wyoming stateline. Inflows to Lake McConaughy for the last five years are only 75 percent of the 25-year average and inflows in 2002 and 2003 were the lowest in recorded history (Proposal 2004, DEQ 2003a).



**A view of the western part of Lake McConaughy. This entire area is normally under water that extends into the distance and is bounded by the distant hills. Image © K. Dewey, High Plains Regional Climate Center.**

Inflows to Swanson and Harlan County Reservoirs on the Republican River in the last five years were only 37 percent and 54 percent of the last 25-year average. Inflows to Swanson Reservoir for each of the last six years were the lowest flows on record since records began in 1951. The inflows to Harlan County Reservoir for the last two years were record low flows since records began in 1948 (Proposal 2004).

### Lakes/Reservoirs

The amount of water stored within these systems has drastically declined during the current drought. Lake McConaughy provides the majority of surface water storage for irrigation and hydropower in the Platte River system. Upon the completion of the 2003 water-year, storage in this reservoir was less than 30 percent of totals from 1998. This loss of stored water correlated to a 54-foot drop in surface water elevation. Lake McConaughy is projected to be completely dry by the fall of 2005 if current precipitation patterns continue and full irrigation withdrawals are allocated. The downstream reservoirs dependent on Lake McConaughy water now store about 40 percent of the water compared to 5 years previous (Proposal 2004).

Water storage in Republican River reservoirs has decreased more than 50 percent during the last 5 years and occupies less than one-third of the available capacity. Republican River reservoir operators have strictly allocated water delivery to irrigation districts the past few years as irrigation storage has been depleted (Proposal 2004).

### Integrated Surface Water –Groundwater Integrated Management

Pursuant to LB 962, the DNR has made determinations about fully-appropriated and over-appropriated areas. The majority of the NPRRA CREP project area has been designated as either over-appropriated or fully-appropriated by the DNR (see Figure 3.5) (DNR 2004a). Entire NRDs in the CREP project area that have been designated as fully appropriated include:

- Upper Republican NRD
- Middle Republican NRD
- Lower Republican NRD
- Twin Platte NRD
- North Platte NRD (except Pumpkin Creek)

Areas within the CREP project area that have been designated as over-appropriated include:

- Portions of North Platte NRD
- Portions of the Twin Platte NRD
- Portions of the Tribasin NRD
- Portions of the Central Platte NRD

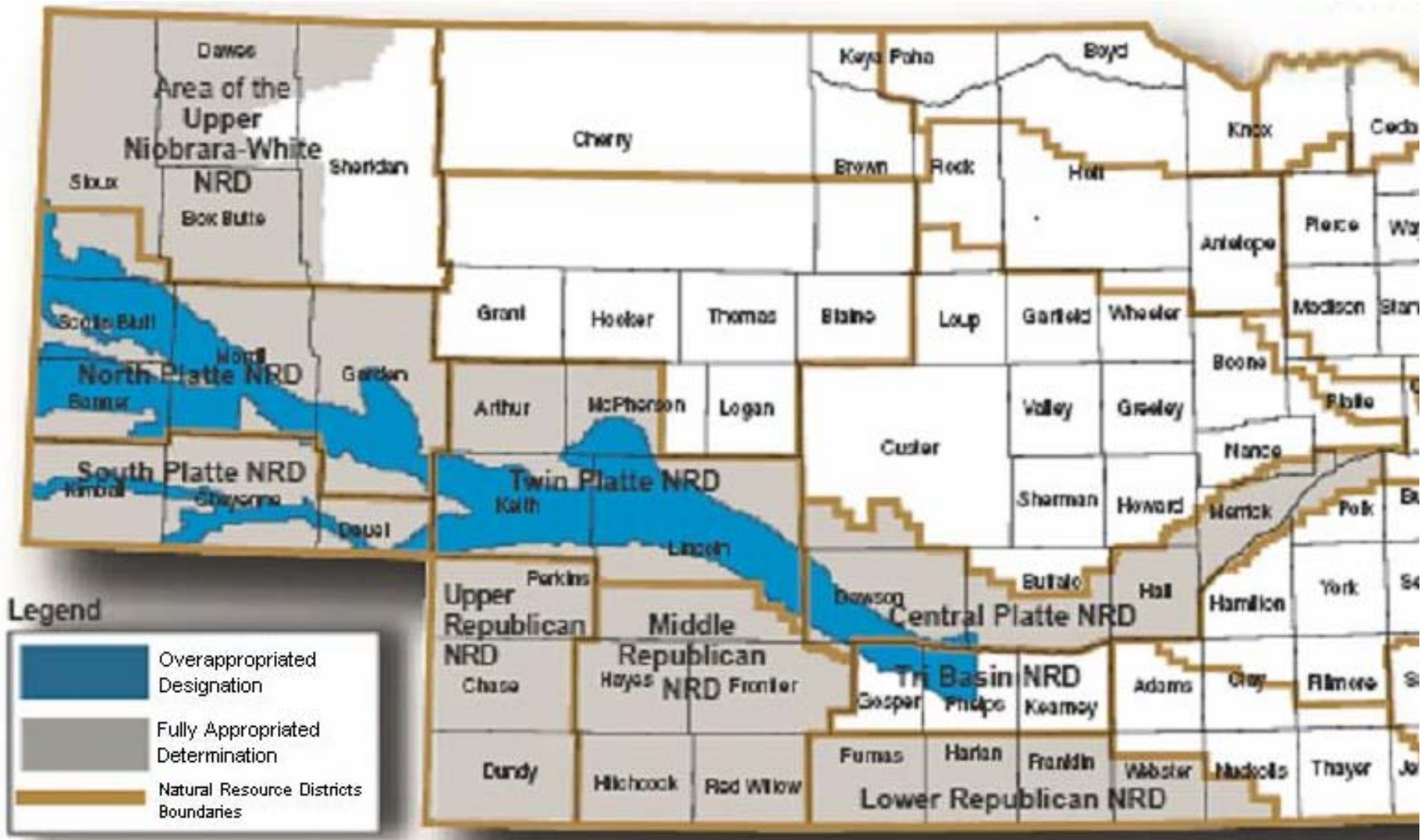


Figure 3.5 – Areas designated as fully-appropriated or over-appropriated (DNR 2004).

### 3.5.3 Agricultural Impacts to Surface Water

#### Water Quality

Agricultural nonpoint sources are the primary cause of stream water quality degradation in Nebraska (DEQ 2000). Nonpoint source pollution is also the primary cause of lake water quality degradation for three main reasons (DEQ 2000):

- Many of the lakes are on-stream reservoirs that trap nonpoint source pollutants during runoff events
- Intensive land disturbing activities including row-crop agriculture and urban construction that occurs within lake watersheds
- Point sources are regulated by State and Federal laws.

Agricultural non-point sources within the CREP project area include polluted irrigation return flow, runoff from livestock pastures, and improper or over-application of biosolids (wastewater treatment facility sludge, septage, or manure) (DEQ 2003a, DEQ 2003b, DEQ 2004d, DEQ 2000). Agricultural pollutants of concern in CREP project area include pesticides, nutrients, and bacteria. Other non-point sources of these pollutants include but are not limited to highway maintenance, urban and road construction, urban stormwater runoff, sewers and septic tanks, landfills, and streamside dumping (DEQ 2000). However since agricultural land use is predominant in the CREP project area (over 90 percent) pollutants loads from non-agricultural sources are minor. The following is a more detailed discussion about the pollutants of concern and their relation to agricultural use.

#### Pesticides

As discussed in Section 2.2.1, pesticides are applied to cropland throughout the NPRRA CREP project area. Although both herbicides and insecticides are used in the State, the quantity of herbicides being applied is much greater. In recent years, the five most commonly applied herbicides in Nebraska are atrazine, metolachlor, cyanazine, alachlor, and acetochlor (DEQ 2000).

Atrazine is the most abundantly used herbicide in the State and patterns and trends of atrazine occurrence can be inferred for other herbicides with allowances given for their level of use in the state. Atrazine is commonly detected in surface water in areas where it has been applied. Atrazine levels are highest in late spring and early summer when atrazine application rates are highest and intense storms result in runoff events. The highest instream concentrations of atrazine have been detected in small, headwater streams that flow through cropland with atrazine application. Other nonpoint sources of atrazine include residential lawn care, recreational areas, weed control related to road maintenance, and golf courses. (DEQ 2000, EPA 2005a, Proposal 2004). Atrazine use could adversely impact terrestrial and aquatic plants in areas adjacent to treated fields and could result in loss of food sources and the loss of vegetative habitat affecting reproduction and the survivorship of both adults and offspring (EPA 2005b).

Dieldrin, a banned organochlorine insecticide, has also been detected in a segment of the North Platte River. Historically, Dieldrin was widely used to control insects on corn crops. Although use of Dieldrin is now prohibited in the United States, it can remain stored in soils. Sediments in runoff from contaminated fields are a potential source of Dieldrin in surface water (EPA 2005a, DEQ 2004c).



### Nutrients

Nitrogen and phosphorus are applied extensively to cropland throughout the NPRRA CREP project area. On average, 200 pounds/acre of nitrogen and 20 pounds/acre of phosphorus are applied in the project area. Nitrogen as nitrate is highly water soluble and susceptible to leaching into groundwater and surface water. These nutrients are especially harmful to lakes and reservoirs.

Phosphorus the primary nutrient of concern in Nebraska's lakes (DEQ 2000). Nutrients stimulate excessive growth of algae and emergent vegetation. Aquatic habitat is lost through over crowding and loss of open water. Death and decay of the excess algae and vegetation stresses the oxygen balance and can lead to fish kills. The result is a loss of aesthetic value, loss of open water, and declining fisheries (Proposal 2004, DEQ 2000).



**Excessive algal growth. Photo courtesy of NGPC 2004c.**

### Bacteria

Fecal coliform is a parameter of concern in all three river basins of the NPRRA CREP project area. Fecal coliform is an indicator of the potential presence of pathogens that are harmful to human health. Primary contact recreation (i.e. swimming, fishing) is the beneficial use most often impaired by bacterial contamination. Agricultural nonpoint sources of bacteria includes runoff from livestock pastures and improper or over-application of biosolids (wastewater treatment facility sludge, septage, or manure) (DEQ 2003a, DEQ 2003b, DEQ 2004d). According to the 2002 Census of Agriculture, 112,000 acres of farmland located in counties of the CREP project area were treated with manure (NASS 2002). While this acreage is not extensive, runoff from these acres may contain bacteria and potentially contributes to the overall contamination of surface water in the CREP project area.

### Water Quantity

Precipitation in the proposed CREP project area is currently insufficient to meet crop water demands and irrigation is required for crop production. Stream flow in all three river basins is largely controlled by irrigation diversions, irrigation returns, and water storage in reservoirs (Proposal 2004).

Drought conditions have resulted in decreased storage in reservoirs and decreased instream flows. Less surface water is available for irrigation, which has led to increased groundwater pumping. Since groundwater and surface water are hydrologically connected in many areas of proposed CREP project area, increased pumping of wells has depleted the amount of groundwater available for stream flow and altered natural flow patterns (Proposal 2004).

Recent changes in land management practices have also decreased the amount of flow in streams. Changes in land management practices include the development of watershed projects, construction of farm ponds and terraces, and improved ecofallow and conservation tillage techniques. All of these land management practices decrease irrigation return flow to streams (Proposal 2004).

### **3.5.4 Effects of Alternative A (No Action) on Surface Water**

Implementation of Alternative A would result in long term, moderate adverse effects to surface water resources. Surface water quality would continue to decline under Alternative A. Agricultural runoff introduces contaminants into surface water and any improvements in water quality would be dependant upon existing and proposed programs.

Under Alternative A, demand for irrigation water would remain at their current levels or possibly increase if current drought conditions continue, and stream flow and reservoir levels would most likely continue to decline. Even with a return to normal precipitation, and a return to pre-drought water quantity, water quality would still be degraded and groundwater recharged with contaminated waters.

Selection of Alternative A would not contribute to achieving any of the CREP Objectives listed in Section 1.4.

### **3.5.5 Effects of Alternative B (CREP Agreement) on Surface Water**

Implementation of Alternative B would provide long term, moderate to high beneficial effects to surface water quality and quantity. Alternative B would result in significant localized improvements to water quality and would help waterbodies achieve and continue to meet State water quality standards. Additionally, acres enrolled in CREP would be removed from irrigation which would result in improvements to water quantity.

Improvements to water quality would come from the installation of all of the Approved CPs. For example, CP21 and CP22 (filter strips and riparian buffers) are effective in removing waterborne pathogens, nutrients and pesticides, thereby reducing the amount of the contaminants in agricultural runoff. Riparian buffers also create shade to lower water temperature to improve habitat for aquatic organisms, provide a source of detritus and large woody debris for aquatic organisms, help stabilize and restore damaged stream banks, and reduce erosion of stream banks. CP23 and CP23A (wetlands restoration) would provide larger areas to retain solids, filter and cycle nutrients, and reduce erosion. CP2 and CP25 restores native plant communities reducing soil erosion and sediment loads to receiving waters. Additionally, land enrolled in FSA-approved CPs would not receive pesticide and nutrient applications, which would reduce pollutant loads in agricultural runoff from previously cropped land.

Implementation of CREP could also potentially aid in the attainment of the TMDL goals for each of the three river basins. For example, cropland currently receiving manure applications could possibly be enrolled in CREP, which would decrease bacteria loads reaching receiving waterbodies. In addition, many of the CPs (e.g. grass waterways, riparian buffers) could also have the leveraged benefit of filtering bacteria in runoff from agricultural land (i.e. livestock pastures and animal feeding operations) not enrolled in CREP.

Alternative B would also result in improvement in water quantity. The NPRRA CREP Agreement would encourage the enrollment of large pieces of land. A benefit to this approach is the efficiency of retiring entire irrigated fields. The efficiency of surface water delivery to fields is often less than 50 percent, and at times partial delivery suffers the entire loss; therefore, retiring the entire field would maximize water conservation objectives of the NPRRA CREP Agreement.

A change from irrigated cropland to CP2 (permanent native grasses) could be expected to have several beneficial effects on hydrology. In general grass uses less water on an annual basis than irrigated corn, and CP2 would result in net water savings. Benefits are likely to include decreased overall runoff, decreased evapotranspiration, increased base flow, and increased overall flow.

Activities associated with the implementation of CPs could potentially result in short-term, adverse impacts to surface water quality and quantity. These activities and their impacts are summarized below:

- Site preparation— CP establishment could require site preparation activities including building physical structures such as dikes and clearing enrolled land of undesirable plant species using chemicals such as herbicides and/or physical methods such as burning, discing, and plowing.
- Establishment of desirable plants and controlling invasive species or noxious weeds—Until desired plants are established, acres enrolled in CREP may be irrigated, potentially affecting water quantity.
- Maintenance of CPs—Maintaining CPs on enrolled CREP land may include additional shifting soil to repair dikes or buffer strips, applying herbicides and/or pesticides to control invasive species, or irrigating land during critical growing periods of drought years.

A conservation plan for each CP would be prepared and BMPs will be used to mitigate any adverse impacts of implementing specific CPs. These impacts are expected to only last until the CP is permanently established and are minor compared to the overall long-term benefits of the CPs. These temporary impacts could be expected to last anywhere between 1-3 years.

The beneficial impacts of the CPs discussed above would provide long-term moderate to high beneficial effects, assisting in the achievement of all six CREP Objectives (Section 1.4).

## **3.6 Groundwater**

### **3.6.1 Introduction**

Groundwater can be defined as water that occurs in the open spaces below the surface of the earth. In Nebraska, useable groundwater occurs in voids or pore spaces in various layers of geologic material such as sand, gravel, silt, sandstone, and limestone. These layers are referred to as aquifers where such geologic units yield sufficient water for human use. In Nebraska, groundwater is a public resource and except as provided by legislature, a reasonable amount of groundwater can be used by overlying landowners for beneficial use on their land (McGuire et al. 2003).

In addition to regulating surface water–groundwater management, an objective of LB108 is to protect both the quantity and quality of groundwater within the State. LB108 addresses groundwater contamination and the depletion of groundwater caused by over-withdrawals. NRDs administer and enforce the groundwater provisions in Nebraska law and may designate groundwater management areas (GWMAs) for groundwater quantity, groundwater quality, integrated management, or any combination of the three (NPNRD 2004, NRC 2004, NASDA 1997). Figure 3.6 shows the location of GWMAs in Nebraska.

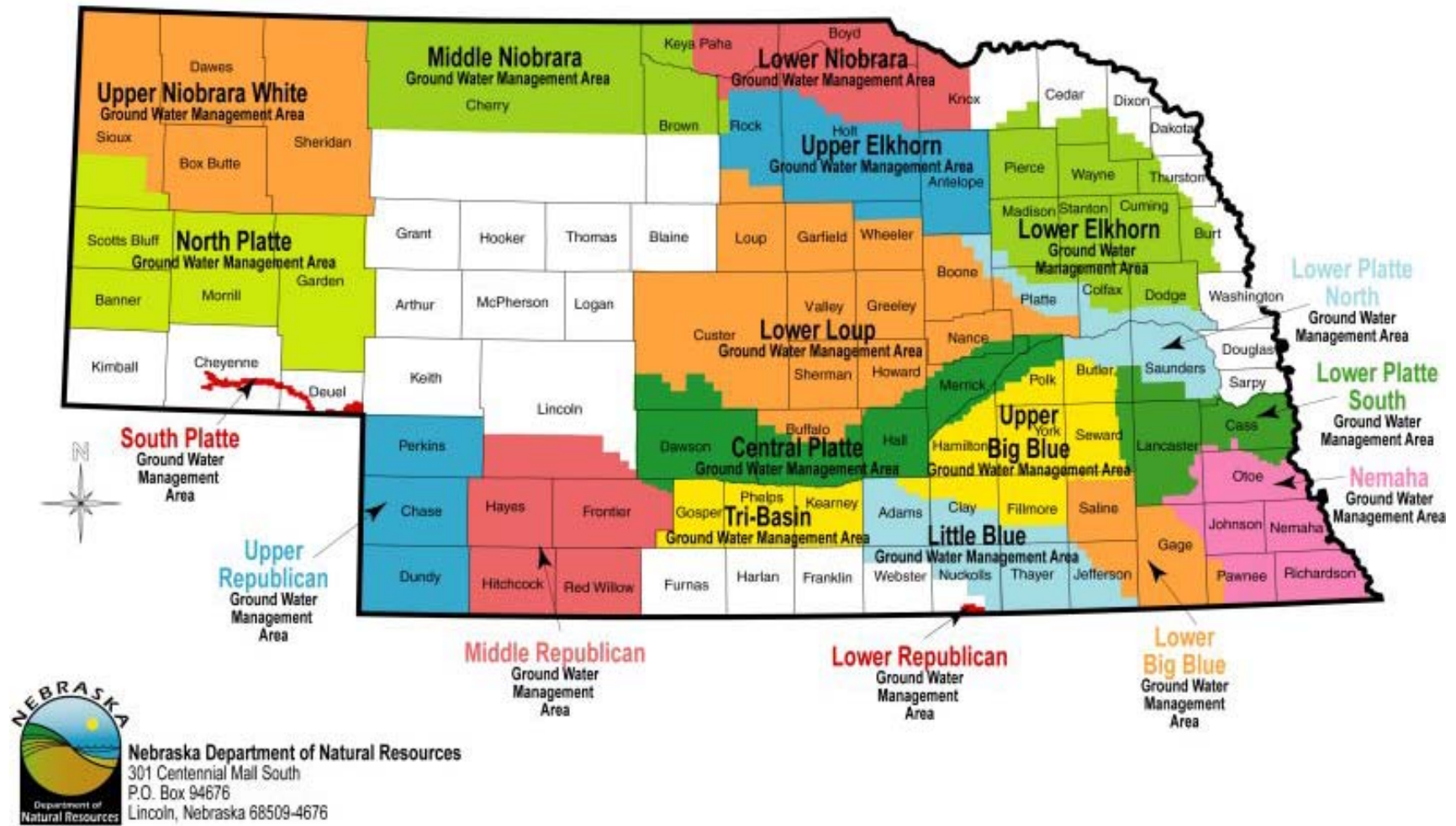


Figure 3.6 – Location of Groundwater Management Areas in Nebraska. Source: DNR 2004

### 3.6.2 Existing Conditions

The NPRRA CREP project area overlies the northern part of the High Plains aquifer system. The High Plains aquifer system underlies 174,000 square miles in parts of eight States (Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming). Approximately 20 percent of the irrigated land in the U.S. is in the High Plains and about 30 percent of the groundwater used for irrigation in the U.S. is pumped from the High Plains aquifer. In Nebraska, groundwater can be found from 1 to 500 feet in depth (McGuire et al. 2003, GWPC 1999).

Nebraska's groundwater supplies are extensive, and the State is the third largest user of groundwater in the nation, behind California and Texas (NRC 2004). Uses of groundwater in Nebraska include drinking water, irrigation, mining, and industrial uses. Groundwater is one of the primary sources of drinking water, providing drinking water to over 85 percent of Nebraska's population and nearly 100 percent of Nebraska's rural population. The State's agricultural industry also uses a vast amount of groundwater to irrigate crops. Groundwater currently irrigates three times as much acreage in Nebraska as surface water (DEQ 2004a, Proposal 2004, NRC 2004).

#### Groundwater Quantity

As of October 2004, the DNR listed over 98,000 irrigation wells and nearly 18,000 domestic wells registered in the State. Domestic wells were not registered with the State prior to September 1993; therefore, thousands of domestic wells exist that are not registered with the DNR. Within the NPRRA CREP project area, there are currently 12,595 groundwater wells registered (Figure 3.7) (DEQ 2004a, Proposal 2004).

Pumping from groundwater wells for irrigation purposes has intensified with the onset of the drought in 1999. From 2000 to 2001, water levels declined throughout the High Plains aquifer system, except in parts of Texas. The cumulative loss of water in storage in the aquifer from 1987 to 2002 is about 56 million acre-feet, which represents about 29 percent of the cumulative loss since predevelopment. Average area-weighted decline in water levels was 0.62 feet. Figure 3.8 shows groundwater level declines for Nebraska from 2000 to 2001. According to this figure, groundwater levels in several areas throughout the CREP project area have declined significantly (McGuire 2003, Proposal 2004).

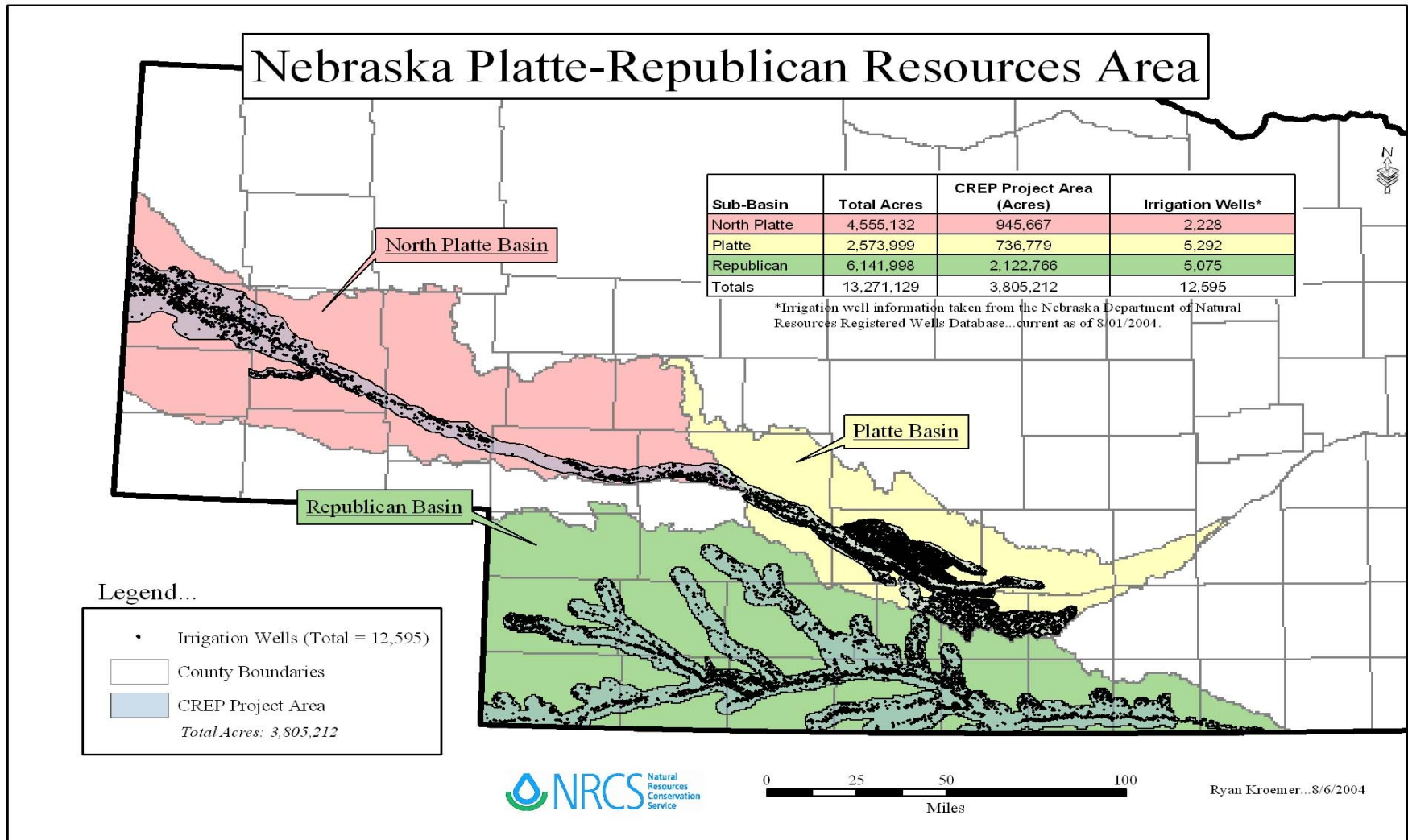
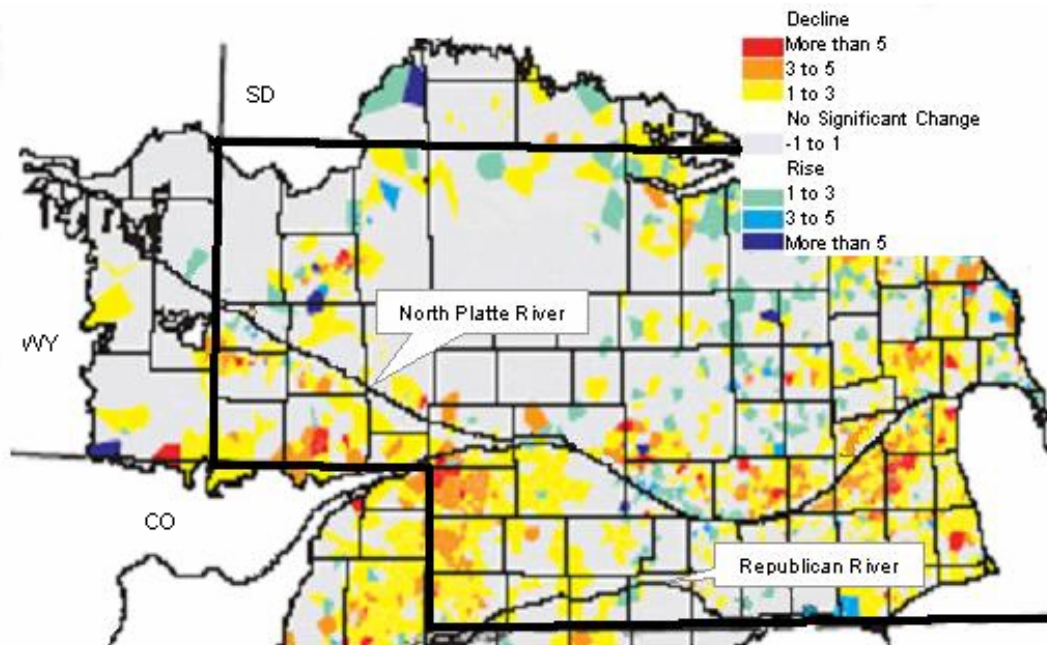


Figure 3.7 – Irrigation wells in the NPRRA CREP project area (Proposal 2004).



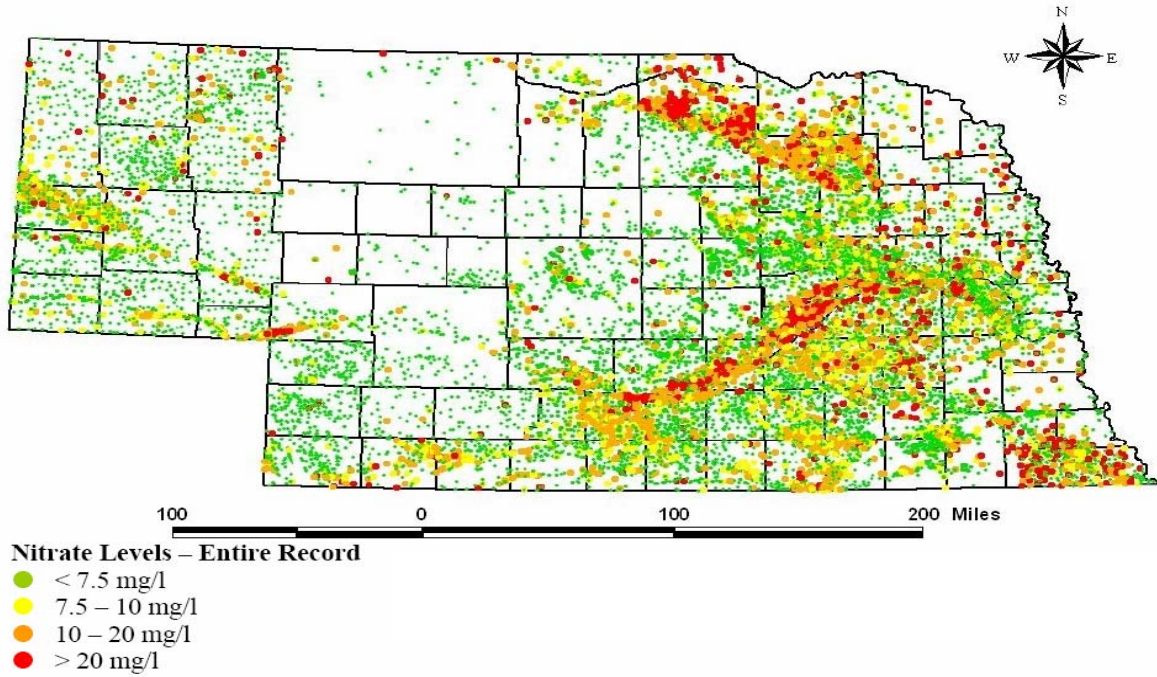
**Figure 3.8 – Groundwater level change in feet from 2000 to 2001 in Nebraska (McGuire 2003).**

### Groundwater Quality

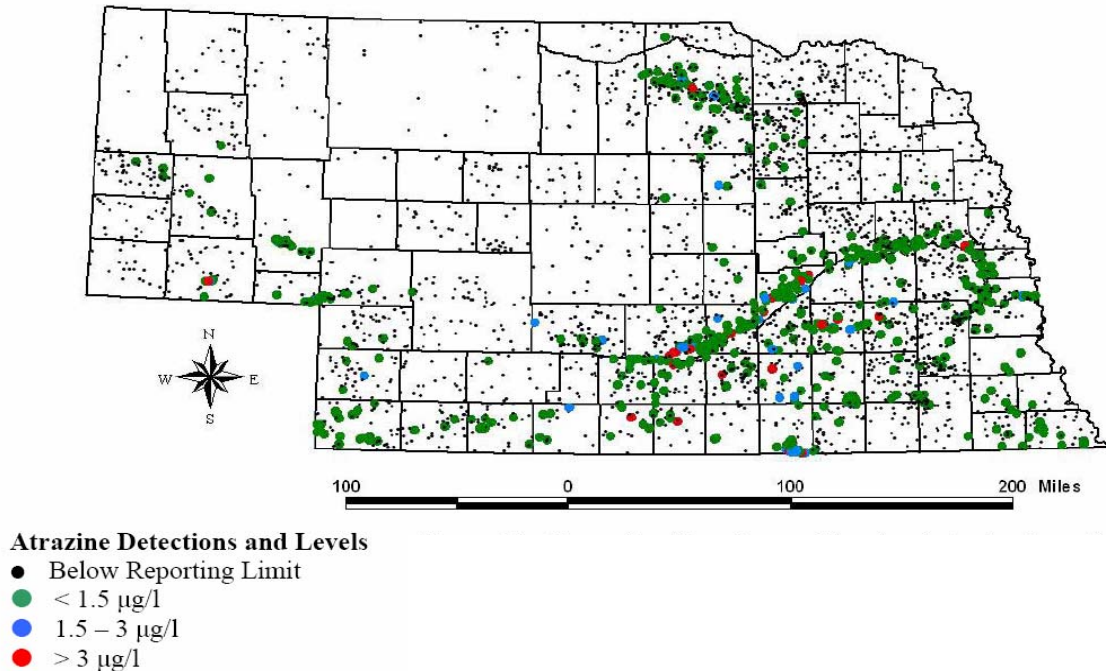
Contamination of groundwater from agricultural sources is of concern in the NPRRA CREP project area. Agricultural contaminants of concern include pesticides and fertilizers, especially nitrates and atrazine. Agricultural contamination of groundwater in Nebraska is most prevalent in areas that are cropped to corn and heavily irrigated (i.e. areas with heavy use of agricultural chemicals) (DEQ 2000). Nitrate and atrazine are the two most widespread contaminants detected in groundwater in Nebraska. Although nitrate is a naturally occurring compound, levels of that constituent in groundwater suggest that many areas of the State are experiencing elevated levels above what would occur naturally. Any detections of atrazine, a man-made compound, indicate that human activity has impacted groundwater (DEQ 2004a).

Application of nitrogen and phosphorous is essential to crop production in the CREP project area. While this region is renowned for producing more than 200 bushel/acre corn at harvest, this production requires soil fertility augmentation. On average, 200 pounds/acre of nitrogen and 20 pounds/acre of phosphorous are applied in the proposed CREP project area. Nitrates have been detected in groundwater wells throughout the CREP project area and elevated concentrations of nitrates in wells correspond well to irrigated areas (see Figure 3.9) (Proposal 2004, DEQ 2000).

Pesticide contamination of groundwater is relatively rare and is limited to low concentrations of atrazine in areas with considerable pesticide applications, irrigation, and high vulnerability (i.e. shallow depths to groundwater, permeable soil, and unsaturated zones) (DEQ 2000). In the proposed CREP project area, atrazine is applied at 1.3 pounds/acre and the National Water Quality Assessment (NAWQA) Program Database reports the highest category of atrazine concentrations are located in samples collected within the proposed CREP project area (see Figure 3.10) (Proposal 2004).



**Figure 3.9 – Generalized nitrate-nitrogen levels in wells sampled, 1974-2003 (DEQ 2004a). Blank spaces on the map are areas where data was not available and does not denote lack of nitrates in those areas.**



**Figure 3.10 – Generalized locations and levels of atrazine in wells sampled, 1974-2003. Maximum Contaminant Level (MCL)= 3 µg/l. (DEQ 2004a). Blank spaces on the map are areas where data was not available and does not denote lack of atrazine in those areas.**



### 3.6.3 Effects of Alternative A (No Action) on Groundwater

Alternative A would result in long term, moderate adverse effects to groundwater quality and quantity. Under Alternative A, current agricultural practices would continue and groundwater quality and quantity would continue to decline. Improvements to groundwater would be dependent on existing programs.

Current agricultural practices introduce pesticides and nutrients into groundwater recharge resulting in the contamination of groundwater quality.

Selection of Alternative A would not contribute to the achievement of any of the CREP Objectives cited in Section 1.4.

### 3.6.4 Effects of Alternative B (CREP Agreement) on Groundwater

Implementation of Alternative B would result in moderate to high beneficial long-term effects to groundwater. Enrollment of land in FSA approved CPs would result in benefits to groundwater quality and quantity.

The retirement of 100,000 acres of land from active agricultural practices would result in less fertilizers and pesticides being applied in the proposed CREP project area and groundwater recharge from land enrolled in FSA approved CPs is expected to be of higher quality than recharge from previously cropped land.

Converting cropland to CPs would remove acres from active agriculture and diminish groundwater pumping to irrigate those acres. Groundwater recharge would also increase with the establishment of CPs 22 and 23 (wetland restoration). Wetlands are reservoirs for rainwater and runoff and as this water is released into the ground, it recharges water tables and aquifers.

Filtration of sediment, nutrients, pesticides, and pathogens provided by the CPs would help improve the quality of groundwater recharge.

Activities associated with the implementation of CPs could potentially result in short-term, adverse impacts to groundwater quality and quantity. These activities and their impacts are summarized below:

- Site preparation— CP establishment could require site preparation activities including building physical structures such as dikes and clearing enrolled land of undesirable plant species using chemicals such as herbicides and/or physical methods such as burning, discing, and plowing. These activities have the potential to add sediments and pesticides to surface water that recharges aquifers.
- Establishment of desirable plants and controlling invasive species or noxious weeds—Until desired plants are established, acres enrolled in CREP may be irrigated, potentially affecting water quantity.
- Maintenance of CPs—Maintaining CPs on enrolled CREP land may include additional shifting soil to repair dikes or buffer strips, applying herbicides and/or pesticides to control invasive species, or irrigating land during critical growing periods of drought years.

A conservation plan for each CP would be prepared and BMPs will be used to mitigate any adverse impacts of implementing specific CPs. These impacts are expected to only last until the CP is permanently established and are minor compared to the overall long-term benefits of the CPs. These temporary impacts could be expected to last anywhere between 1-3 years.

The beneficial impacts of the NPRAA CREP Agreement as discussed above would provide long-term moderate to high beneficial effects, assisting in the achievement of all six CREP Objectives (Section 1.4).

## **3.7 Drinking Water**

### **3.7.1 Introduction**

The SDWA was originally passed in 1974 to regulate public drinking water supplies. The SDWA established standards for various contaminants to ensure that water is safe for human consumption. Additional amendments to the SDWA require states to develop programs to assess and protect public water sources. A summary of those programs is included in the following sections.

### **3.7.2 Existing Conditions**

#### **Wellhead Protection Program**

Amendments to the SDWA in 1986 requested States to establish a Wellhead Protection Program (WHP) for groundwater-based public water supplies. Each State was directed to develop, with public participation, a WHP Plan that was to be reviewed and approved by EPA. The Nebraska Legislature passed LB 1161 in 1998 (Neb. Rev. Stat. §46-1501 – 46-1509), authorizing the Wellhead Protection Area Act. This Act sets up a process for public water supply systems to use if they choose to implement a local WHP plan (DEQ 2004b).

Nebraska's WHP is a voluntary program that assists communities and other public water suppliers prevent contamination of their water supplies. Nebraska WHP activities include:

- Delineating the zones of influence which may impact public supply wells
- Training communities on how to inventory all potential sources of pollution within zones of influence
- Working with the local officials to identify options to manage potential pollution sources
- Working on monitoring plans
- Helping develop contingency plans to provide alternate water supplies and site new wells.

All community public water supplies in Nebraska had a Wellhead Protection Area map as of October 1, 2002 (DEQ 2004b).

#### **Source Water Assessment Program**

Reauthorization of the SDWA in 1996 required States to develop programs that assessed drinking water sources and encouraged the establishment of protection programs. States must develop a source water assessment program (SWAP) that identifies significant potential sources of contamination and determines a drinking water source's vulnerability to contamination. Throughout the country, all States have developed a SWAP with the following basic components (DEQ 2004e):

- Delineate the source of each public drinking water system;
- Identify potential contaminants in the source area;
- Determine the drinking water source's susceptibility or vulnerability to contamination; and
- Make the assessments available to the public.

In 1997, the Department of Environmental Quality was given the authority to develop a Source Water Assessment Program and Nebraska's SWAP was approved by the EPA on October 25, 1999. As of June 30, 2002, 398 source water assessments had been distributed to public water supply systems; these

assessments account for a total of over 397,000 Nebraskans. This accounts for approximately 30 percent of the total number of systems statewide and 26 percent of the State's population (DEQ 2004e).

### Public Water Supply System Violations

Public water systems (PWSs) are required to monitor regularly for a variety of contaminants that are harmful to human health. In compliance with 1996 amendments to the SDWA, any violations must be reported and made available to the public. Nebraska Department of Health and Human Services (HHS) administers the public water systems and reports annually on violations, which have occurred in the State. The 2003 report is currently available and is titled: *Nebraska's Public Water System Program 2003 Annual Report*. The following are terms that were used in the 2003 report and will be referenced in this section (HHS 2004):

**Maximum Contaminant Level (MCL)**— Under the Federal SDWA, EPA sets national limits on contaminant levels in drinking water to ensure that the water is safe for human consumption. These limits are known as maximum contaminant levels (MCLs).

**Monitoring**—A PWS is required to monitor and verify that the levels of contaminants present in the water do not exceed the MCL. If a PWS fails to have its water tested as required or fails to report test results correctly to the Department, a monitoring violation occurs.

**Public Water System (PWS)**—A PWS is a system that provides water via piping or other constructed conveyances for human consumption to at least 15 service connections or serves an average of at least 25 people for at least 60 days each year.

**Administrative Order**— The Public Water System Program issues an administrative order when a public water system is significantly out of compliance. When a contaminant in the drinking water is over the MCL, the water system will receive an Administrative Order for that contaminant from HHS. A PWS is issued an Administrative Order to correct a chronic contamination problem when two violations are issued in a nine-month period. If the contaminant is measured above the “unreasonable risk to health” level, an Administrative Order is issued immediately (HHS 2004, DEQ 2004a). Table 3.5 summarizes Administrative Orders issued in 2003.

**Table 3.5 – Administrative Orders Issued in 2003**

	Total Coliform MCL	Total Coliform Monitoring	Nitrate	Organic Monitoring
Number of Orders	14	3	10	1
Population Affected	2,090	300	8,931	3,001

Source: HHS 2004

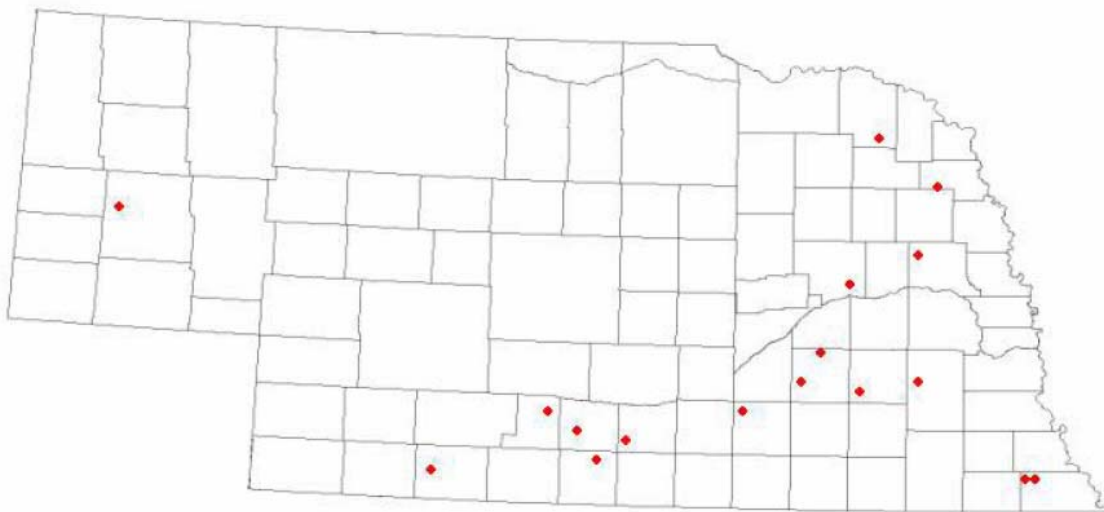
### 3.7.3 Agricultural Impacts to Drinking Water Quality

Since groundwater is the drinking water source for nearly 100 percent of Nebraska's rural population, agricultural chemicals that contaminate groundwater can also potentially contaminate drinking water. In the proposed CREP project area, high nitrate levels in public water supplies have been problematic in both the Platte and Republican basins. PWSs throughout the NPRRA CREP project area have been issued Administrative Orders for exceeding the 10 mg/L MCL for nitrates (Figure 3.10). Counties in the CREP project area with a PWS on Administrative Order for nitrates include: Red Willow, Harlan, Kearney, Phelps, Gosper, and Morrill (Figure 3.11). Over one-third of the municipalities with excessive nitrate levels in Nebraska in 2003 lie within the proposed CREP area. This nitrate loading has required

the periodic or permanent shut down of wells and drilling of new wells for public water (Proposal 2004, DEQ 2004a).

In the North Platte Natural Resources District (NPNRD), nitrate levels in groundwater are of special concern. NPNRD has established the Lisco-Oshkosh-Lewellen Groundwater Quality Sub-Area in parts of Garden and Morrill Counties where groundwater is contaminated by nitrate. The sub-area consists of a strip of land along the north side of the North Platte River ranging in width from about two miles to about five miles. In the Lisco-Oshkosh-Lewellen Sub-Area, about one-third of the wells tested periodically by the NRD exceed the MCL for nitrate. In some areas, nitrate concentrations exceed 80 parts per million. A study conducted for the NRD by the University of Nebraska-Lincoln Conservation and Survey Division identified the source of the nitrate as fertilizer that had leached from corn fields overlying the shallow groundwater aquifer (NPNRD 2005).

Atrazine, another agricultural contaminant, has also been detected in groundwater wells throughout the NPRRA CREP project area. Some detections of atrazine exceeded 3 µg/l., the MCL for atrazine (DEQ 2004a). A more thorough discussion of atrazine and a map of atrazine levels can be found in Section 3.6.



**Figure 3.11 – Seventeen groundwater based community public water supply systems on Administrative Order for nitrate above the 10 mg/l MCL (HHS, 2004, DEQ 2004a).**

### **3.7.4 Effects of Alternative A (No Action) on Drinking Water**

Declining quality in drinking water would continue to be a long term, minor adverse effect under the No Action alternative. Current State and Federal laws prevent any major discharges that would significantly degrade a drinking water source. Still, the cumulative impacts of agricultural activities and other industrial activities in NPRRA CREP project area would have an ongoing adverse effect on drinking water.

Selection of Alternative A would not contribute to the achievement of any of the CREP Objectives cited in Section 1.4.

### **3.7.5 Effects of Alternative B (CREP Agreement) on Drinking Water**

The implementation of Alternative B would result in long term, minor to moderate beneficial effects on drinking water. Either indirectly or directly, each of the CPs improves surface water quality and potentially could improve the quality of water that recharges groundwater.

Since CREP CPs have had beneficial effect on surface water quality, it is likely that groundwater quality would also improve. Acres removed from active agricultural production would have the potential to result in less agricultural pollutants in groundwater. Restoration of wetlands would have the expected benefit of increasing the volume and quality of groundwater recharge.

For individual CREP contracts, FSA and NRCS would ensure through an EE that the practice(s) employed would not contaminate or contribute to the contamination of wellhead protection areas and to drinking water source areas to the extent that a significant hazard to public health is created.

The water purifying capabilities of the CPs would contribute to the achievement of all six CREP objectives listed in Section 1.4.

## **3.8 Wetlands**

### **3.8.1 Introduction**

Section (a) (16) of the Food Security Act, Public Law 99-198, December 23, 1985 defines a wetland as:

The term “wetland,” except when such term is part of the term “converted wetland,” means land that has a predominance of hydric soils and that is inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions.

Numerous laws exist that govern FSA program actions in relation to wetlands. Included are the following:

- Executive Order 11990, Protection of Wetlands
- Clean Water Act
- Food Security Act

### **Benefits of Wetlands**

Wetlands are some of the most productive and dynamic habitats in the world. The physical, chemical, and biological interactions within wetlands are often referred to as wetland functions. These functions include surface and subsurface water storage, nutrient cycling, particulate removal, maintenance of plant and animal communities, water filtration or purification, and groundwater recharge. Similarly, the characteristics of wetlands that are beneficial to society are called wetland values. Some examples of wetland values include reduced damage from flooding, water quality improvement, and fish and wildlife habitat enhancement.

It is important to maintain and restore wetland functions and values because wetlands contribute to the overall health of the environment. Some basic wetland functions and wetlands associated values are listed below (NRCS, 2002):

- **Surface water storage:** This function helps reduce flooding by temporarily storing water, allowing it to soak into the ground or evaporate. This temporary storage can help reduce peak flows after a storm.
- **Subsurface water storage:** Wetlands are reservoirs for rainwater and runoff. As this water is released into the ground, it recharges water tables and aquifers, and extends the period of stream flows in many parts of the United States.
- **Nutrient cycling:** Wetlands enhance the decomposition of organic matter, incorporating nutrients back into the food chain.
- **Sediment control:** By filtering out sediments and particles suspended in runoff water, wetlands help prevent lakes, reservoirs, and other water resources from being affected by downstream sediment loading.
- **Maintenance of plant and animal communities:** Both coastal and inland wetlands provide breeding, nesting, and feeding habitat for millions of waterfowl, birds, fish, and other wildlife.
- **Values to society:** Wetlands often provide sites for hunting, fishing, trapping, photography, outdoor classrooms or environmental education, and the enjoyment of open spaces.

### 3.8.2 Existing Conditions

Nebraska's wetland complexes are as diverse and dynamic as those of any State in the nation. They include marshes, lakes, river and stream backwaters, oxbows, wet meadows, fens, forested swamps, and seep areas (LaGrange 1997).

Nebraska's wetlands are highly productive and an essential component of the landscape. They serve a wide array of functions from improving water quality to providing critical wildlife habitat. Wetlands provide important habitat for 50 percent of Nebraska's bird species, 36 percent of mammal species, 35 percent of reptile species, 100 percent of amphibian species, and 50 percent of plant species (LaGrange 1997).



**Funk Waterfowl Production Area is one of 58 federally managed wetlands in the Rainwater Basin region (Photo courtesy Rainwater Basin Joint Venture ([www.rwbjv.org](http://www.rwbjv.org))).**

### Nebraska's Regional Wetland Complexes

Part or all of four wetland complexes lie within the boundaries of the project area (Figure 3.12). These wetland complexes are diverse in nature and represent playas, saline/alkaline, sandhill, and riverine types. Three wetland areas—the Rainwater Basin, Central Platte River, and Lower North Platte River—are of national and international significance because of the habitat they provide for migratory and threatened and endangered species (Proposal 2004). Appendix F provides detailed information on the profile, loss, and threats to functions and values of these three important wetland areas as well as the Republican Basin. Table 3.6 below gives information on the acreage of wetland complexes in Nebraska and the NPRRA CREP project area.

### Playa Wetlands

Playa wetlands are wind-formed, nearly circular depressions located in semi-arid areas. Playa wetlands in the project area include portions of the Rainwater Basin, Central Table Playas, and Southwest Playas. Playa wetlands have the greatest representation within the project area at 59,170 acres, and most occur within the southwest playas. (LaGrange 1997).

### Sandhill Wetlands

These wetlands are formed in depressions in sandhill areas where groundwater intercepts the surface of the land. The largest sandhill complex is over 1 million acres and located north and northeast of the project area. However, small pockets of sandhill wetlands exist in the project area south of the Platte River (LaGrange 1997).

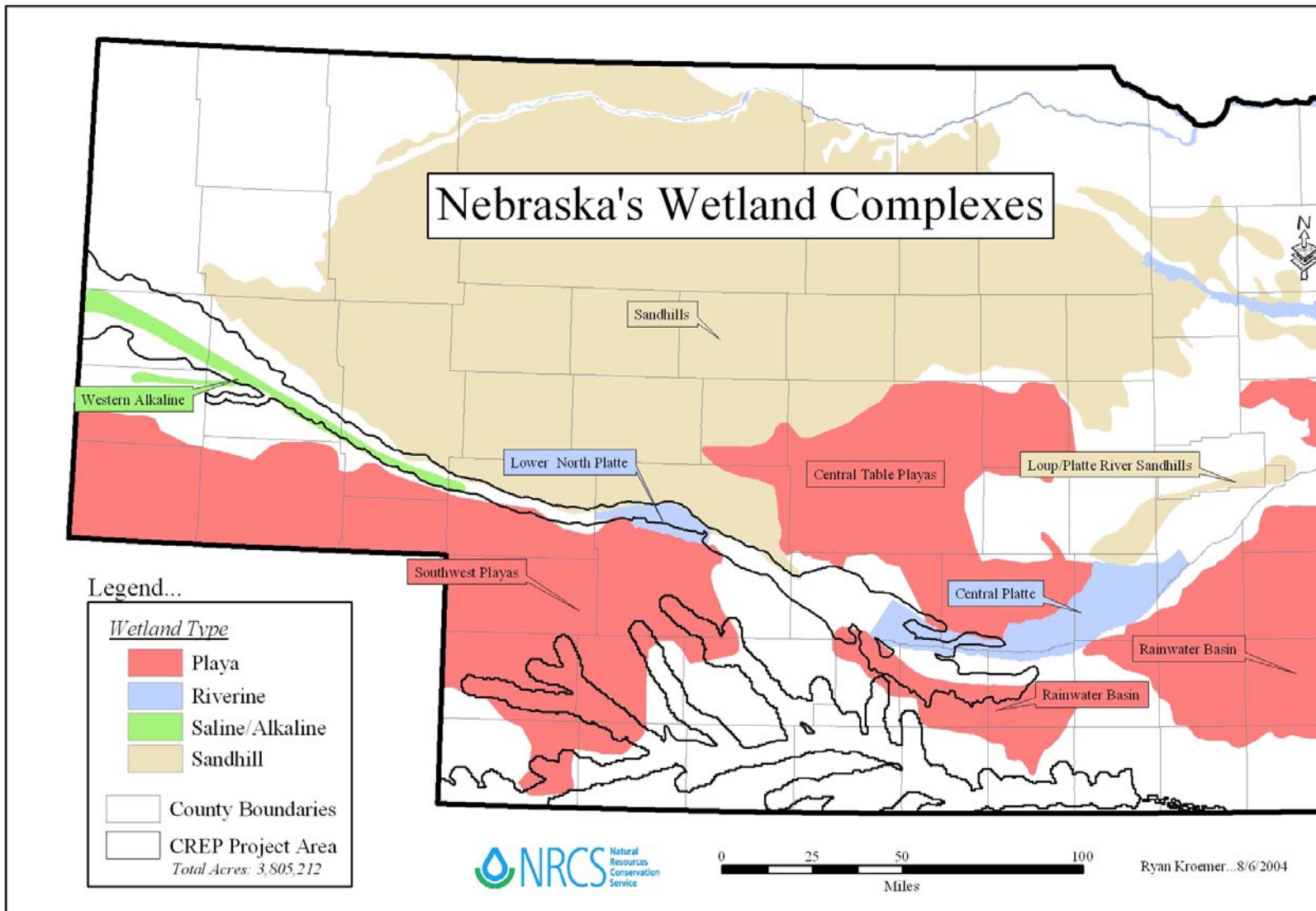


Figure 3.12 – Nebraska’s Wetland Complexes. Source: Proposal 2004



**Table 3.6 – Characteristics and Distribution of Wetlands in Nebraska and NPRRA CREP project area.**

	Wetland Complexes in Nebraska					Total
	Playa	Sand Hill	Saline/ Alkaline	Riverine	Other/ Unclassified	
<b>STATE <sup>1</sup></b>						
State Estimated wetland acres (1780)	--	--	--	--	--	2,910,500
State Estimated wetland acres (1980)	39,375*	1,313,431	3,244 <sup>Δ</sup>	56,500	492,450	1,905,000
<b>PROJECT AREA<sup>2</sup></b>						
Wetland acres in project area ecoregions	59,170	932	40,389	23,446	57,035	180,972
Percent of wetlands in project area ecoregions	33%	.5%	22%	13%	31.5%	
Percent of wetland complex in total project area in	1.6%	<.01%	1.2%	.6%	1.5%	5%

<sup>1</sup> LaGrange 1997<sup>2</sup> FWS 2004

\*Does not include southwest playas, which were quantified in 2004 National Wetlands Inventory (FWS) as 52,667 acres.

<sup>Δ</sup>Does not include western alkaline

### Saline/Alkaline Wetlands

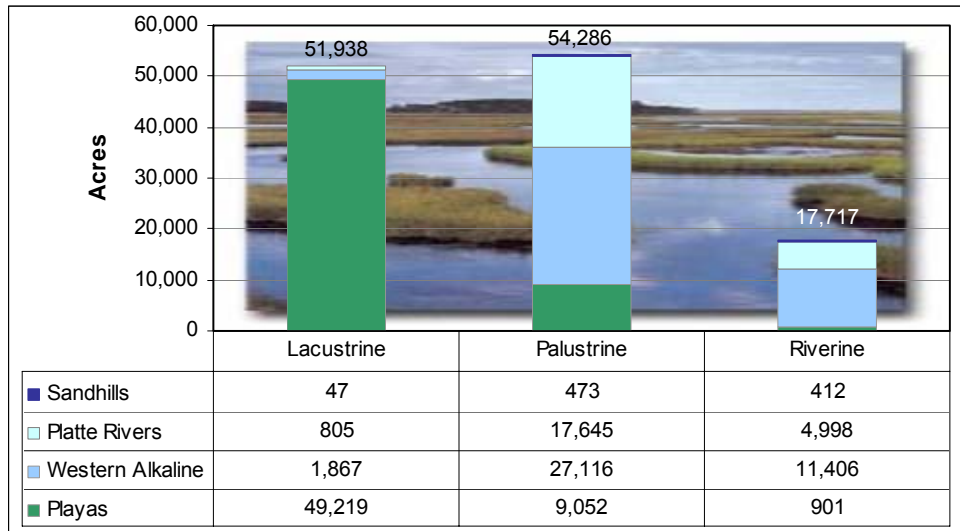
These wetlands have saline or alkaline water. They receive their salts from either groundwater or through concentration by evaporation. The Western Alkaline complex occurs within the project area. Moderately saline/alkaline wetlands are found in scattered pockets along much of the Platte River (LaGrange 1997).

### Riverine Wetlands

Wetlands are closely associated with the riparian zone and floodplain of all of Nebraska's rivers and streams. These riparian areas are complex systems with numerous inter-related components including wetlands, organic matter, sandbars, tree falls, side channels, etc. Wetlands are important components of this system because they produce invertebrates and other organic matter that provide energy and food to other parts of the streams and river. Additionally, these wetlands provide spawning and nursery areas for many different types of fish, and a home for numerous wildlife species. Two segments of the Platte River are singled out because of their importance including the Central Platte River and the Lower North Platte River (LaGrange 1997).

### **Types of Wetlands**

The types of wetlands that occur within the project area include palustrine, lacustrine, and riverine. Palustrine systems usually are marshes dominated by vegetation. Lacustrine systems are lakes, usually deeper than 6.6 feet. Riverine systems are rivers and streams that flow in a defined channel (LaGrange 1997). Figure 3.13 illustrates acres of wetlands by complex and wetland type.



**Figure 3.13 – Acres of wetland types occurring in the NPRRA CREP project area by complex.**  
 Source: FWS 2004.

### 3.8.3 Impacts

The conversion of native wetlands and riparian plant communities to agricultural production has resulted in loss of community diversity and wildlife habitats. Wetland complexes within the priority area have been greatly impacted by agricultural and urbanization activities (Proposal 2004).

At the time of Nebraska’s Statehood in 1867, there were 2,910,000 acres of wetlands in the State. This is approximately 6 percent of the total area of the State. Overall, 35 percent of Nebraska wetlands have been lost since 1867, dwindling to 1,905,000 acres (3.9 percent) in 1980 (NGPC 2004b).



**Birds and Nebraska Wetlands.** Photo Courtesy of Elaine Nowick, University of Nebraska, Lincoln (Mike Rabbe)

Wetlands within the project area have suffered the greatest loss. The Rainwater Basin has lost over 90 percent of wetland acres since settlement, while the Central Platte has lost over 70 percent. The other wetland complexes within the proposed priority area are actively cropped on a regular basis, including over 90 percent of the Southwest Playas. South-Central and Western Nebraska has also lost 60 percent of riparian communities to agricultural development. An additional habitat in jeopardy is a natural bur oak community along the lower Republican River. Loss of wetland acres in the remaining complexes has been difficult to quantify, but has accelerated with drought conditions (Proposal 2004).

The loss of 70 to 90 percent of individual wetland complexes has impacted both resident and migratory species. Wetlands in the project area are an important spring staging area for ducks, geese and other migratory species. Historically, these wetland complexes provided significant recruitment to

the nation's duck population. The loss of wetland habitat has reduced the waterfowl production value of the area to a minor status (Proposal 2004).

In the Republican River Basin alone, there are almost 50,000 acres of upland grass prairie, riparian zones, and wetlands surrounding the five established reservoirs. As surface acreage and groundwater levels decrease, portions of these habitats surrounding reservoirs become stressed and depleted (Proposal 2004).

### **3.8.4 Effects of Alternative A (No Action) on Wetlands**

Implementation of Alternative A would result in long term, moderate adverse effects to wetland values. With the selection of the No Action Alternative, wetland values (e.g., vegetation, water quality, and habitat) would continue their slow decline. Wetlands that have been converted to agricultural production would remain in operation. Given ongoing Federal involvement, total wetland acres would likely be stable or slightly reduced under No Action because Section 404 of CWA and other Federal laws are very restrictive in allowing draining or conversion of existing wetlands for other uses. EO 11990, Protection of Wetlands, applies to private lands and would also promote the stability of wetland acreage.

Alternative A would not achieve any of the CREP Objectives listed in Section 1.4.

### **3.8.5 Effects of Alternative B (CREP Agreement) on Wetlands**

Implementation of Alternative B would result in long term, moderate beneficial effects to wetlands. Under Alternative B, 5,000 acres of wetland restoration would help address the need for functional wetlands that are lacking throughout the CREP project area. Converted wetlands and marginal acres would be removed from agricultural production or converted from fallow land and wetlands restored or constructed. The percent reductions stated above are achievable with wetlands used as water treatment areas.

Another direct effect of Alternative B would be the creation of new wildlife habitat for riparian species in the combined watersheds.

CP installation of wetlands may result in short-term adverse impacts to adjacent land. Until wetland vegetation is permanently established and until the hydrology of restored wetlands is stabilized, flooding of wetlands may also result in flooding of adjacent land. In addition wetland restoration might require earth moving activities and soil disturbance. These activities have the potential to introduce sediments into nearby waterbodies.

Effects of wetland installation are expected to only last until the CP is permanently established (1-3 years) and they are minor compared to the overall long-term benefits of the CP.

Alternative B would help achieve the CREP Objectives listed in Section 1.4.

## **3.9 Floodplains**

### **3.9.1 Introduction**

All Federal actions must meet the standards of EO 11988, Floodplain Management. The purpose of the EO is to avoid incompatible development in floodplain areas. It states, in part, that:

“Each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; (2) providing federally

undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.”

In accordance with the EO and prior to any action, Federal Emergency Management Agency (FEMA) floodplain maps will be reviewed to determine if the proposed action is located in or will affect a 100 or 500-year floodplain (for critical actions). Soil survey maps, aerial photography, and topographical maps should be used where no FEMA maps are available. FSA should complete surveys in areas where no flood hazard or flood elevation data are available and the amount of Federal investment in the proposed action is significant if the action could create a significant adverse effect on a floodplain. Most of the CPs allowed under CRP would have little to no effect on the functions and values of floodplains. CPs that involve construction activities, substantial earth movement, diking, or other means of altering the flowage area (e.g., CP23 – Wetland Restoration) would need to be reviewed and appropriate public notice provided.

Applicable development permits must be obtained from local authorities prior to construction activities within a floodplain.

### 3.9.2 Existing Conditions

Currently there are 31 counties in Nebraska that do not have any floodplain mapping. Counties within the proposed CREP project area that have floodplain mapping include (counties not listed do not have floodplain mapping) (DNR 2002, DNR 2003):

Buffalo	Gosper	Perkins
Dawson	Kearney	Phelps
Dundy	Keith	Red Willow
Franklin	Lincoln	Scotts Bluff
Garden	Nuckolls	Webster

### 3.9.3 Effects of Alternative A (No Action) on Floodplains

Implementation of Alternative A would have no beneficial effect on NPRRA CREP project area floodplains. Floodplain areas would not change, and stream profiles (a major factor in the determination of floodplain areas) would not change based on Federal actions. Under the No Action Alternative, CREP funds would not be available to implement CPs that may have beneficial effects on floodplain conditions, especially the ability of floodplains to store floodwaters. Some construction may occur that would alter floodplain flowage, capacity, or other functions. Without FSA oversight, poor design of structures could affect flowage areas, shifting the floodplain, and impacting areas outside the 100-year floodplain.

Alternative A would not contribute to the achievement any of the objectives listed in Section 1.4 and would result in little change to the State’s floodplains.

### 3.9.4 Effects of Alternative B (CREP Agreement) on Floodplains

Implementation of Alternative B would result in minor, long term beneficial effects to floodplains. Minor improvements in floodplain areas and stream profiles would occur. CREP funds would be used to increase floodwater storage capacity through wetland restoration, stabilize floodplains and improve habitat through restorative plantings, and install structures within existing floodplains. Construction projects may be implemented that would alter floodplain flowage, capacity, or other functions. Appropriate FSA oversight would help ensure the proper design and installation of structures, thus limiting adverse effects to flowage areas and minimizing indirect effects to areas outside the 100-year floodplain. Analysis of the impact on floodplains, per EO 11988, would require the structures to be able

to withstand 100-year flood events and remain functioning. These practices would help control flood events and improve floodplain values.

Alternatives would be carefully considered by FSA at the time that site specific EEs are developed for each CREP contract. The direct impacts of all CPs would be generally beneficial, and would contribute to achieving the CREP Objectives discussed in Section 1.4.

## 3.10 Critical Habitat or Threatened / Endangered Species

### 3.10.1 Introduction

The ESA was enacted to protect T&E species and to provide a means to conserve critical habitat. All Federal agencies were mandated to protect species and preserve their habitats by ensuring that Federal actions do not jeopardize the continued existence of listed species.

The ESA defines an endangered species as one that is in danger of extinction throughout all or a significant portion of its range. Threatened means a species is likely to become endangered within the foreseeable future. T&E designations may be applied to all species of plants and animals except pest insects. A species may be listed as threatened at the State level, but that same designation does not automatically apply nationwide, as species numbers may be greater in other States.

Critical habitat is defined by the ESA as areas that are essential to the conservation of listed species. Private, city, and State lands are generally not affected by critical habitat until the property owner needs a Federal permit or requests Federal funding. Because the NPRRA CREP is partially funded by Federal dollars, consultation with FWS will be required when T&E species or critical habitat are encountered for CREP contracts. FWS has recently proposed rules that would help remove disincentives from private landowners that wish to manage their property for the benefit of listed species (64 FR 32706-32716).



**Whooping Crane. Photograph by George Archibald, International Crane Foundation, 1997 (NRC 2004).**

This would entail the development of Safe Harbor Agreements and Candidate Conservation Agreements with Assurances (CCAAs). These agreements would ensure agricultural landowners that traditional agricultural uses could continue alongside habitat improvements. They would also address the issue of “incidental take” with regard to activities such as habitat restoration.

Section 7 of the ESA, called "Interagency Cooperation," is the mechanism by which Federal agencies ensure the actions they take, including those they fund or authorize, do not jeopardize the existence of any listed species.

Under Section 7, consultation with FWS is initiated when any action the agency carries out, funds, or authorizes may affect a T&E species or critical habitat. This process usually begins as an informal consultation. In the early stages of project planning, a Federal agency approaches FWS and requests informal consultation. Discussions between the two agencies may include what types of listed species may occur in the proposed project area, and what effect the proposed action may have on those species. This process begins with the EE process completed by FSA prior to the approval of each CREP contract.

If the Federal agency, after discussions with FWS, determines that the proposed action is not likely to affect any listed species in the project area, and if FWS concurs, the informal consultation is complete and

the proposed project moves ahead. If it appears that the agency's action may affect a listed species, that agency may then prepare a biological assessment (BA) to assist in its determination of the project's effect on a species.

When a Federal agency determines, through a BA or other review, that its action is likely to adversely affect a listed species, the agency submits a request to FWS for formal consultation. During formal consultation, the Service and the agency share information about the proposed project and the species likely to be affected. Formal consultation may last up to 90 days, after which FWS will prepare a biological opinion on whether the proposed activity will jeopardize the continued existence of a listed species. The Service has 45 days after completion of formal consultation to write the opinion.

In making a determination on whether an action will result in jeopardy, FWS begins by looking at the current status of the species, or "baseline." Added to the baseline are the various effects – direct, indirect, interrelated, and interdependent – of the proposed Federal action. The Service also examines the cumulative effects of other non-Federal actions that may occur in the action area, including State, tribal, local, or private activities that are reasonably certain to occur in the project area (FWS 2003b).

### 3.10.2 Existing Conditions

#### VEGETATION

Native or pre-settlement vegetation in the NPRRA CREP area was dominated by a variety of grass communities (Figure 3.14). The Eastern edge of the project area was composed of mainly mixed grass loess prairie, which shifted to short-grass prairie in Western Nebraska. Lowland tall-grass prairie dominated the rivers and streams, along with some riparian woodland.

Within the region, grassland communities have been significantly reduced to the point where only small fragmented remnants remain. The NGPC estimates that more than 70 percent of loess mixed-grass and lowland tall-grass communities have been lost within the State. Conservative estimates predict that over half of the native short-grass prairie habitat has been converted to agricultural and municipal development. The remaining acres of prairie habitat are generally in poor shape, a problem that has been exacerbated by drought conditions (Proposal 2004). In addition, 70 to 90 percent of Nebraska wetlands have been lost (See Sections 3.9 and 3.10.2). Additional impacts to native plant communities include competition with invasive species. A watchlist for Nebraska's invasive species can be found in Appendix C.



Blowout penstemon. Photo courtesy of NET (2004).

These habitats are extremely important to the stability of wildlife populations in the project area. Grasslands provide nesting sites, cover, and food production for a multitude of native species. Wetlands provide water, forage habitat, breeding habitat, relief from summer and winter extremes, as well as enhance water quality, sediment control, groundwater recharge, and flood storage. Reports indicate that wildlife use riparian areas disproportionately more than other types of habitat (Proposal 2004).

#### T&E and Protected Vegetation

The FWS (FWS 2005) identifies four federally listed plant species, and NGPC (2004a) lists seven State protected species in Nebraska (Table 3.7). In addition, Nebraska Natural Heritage Program (NHP) has

identified 381 vegetative species of concern and 49 natural communities of concern (1996). See Appendix C.

**Table 3.7 – Nebraska Federal and State T & E plant species.**

Scientific Name	Common Name	Federal Status	State Status
<i>Penstemon haydenii</i>	Blowout Penstemon	E	E
<i>Platanthera praeclara</i>	Western Prairie Fringed Orchid	T	T
<i>Gaura neomexicana</i> var. <i>coloradensis</i>	Colorado Butterfly Plant	T	E
<i>Spiranthes diluvialis</i>	Ute Ladies'-tresses	T	T
<i>Salicornia rubra</i>	Saltwort		E
<i>Panax quinquefolium</i>	Ginseng		T
<i>Cypripedium candidum</i>	Small White Lady's Slipper		T

Source: FWS 2005; NGPC 2004a

T=Threatened E=Endangered C=Candidate

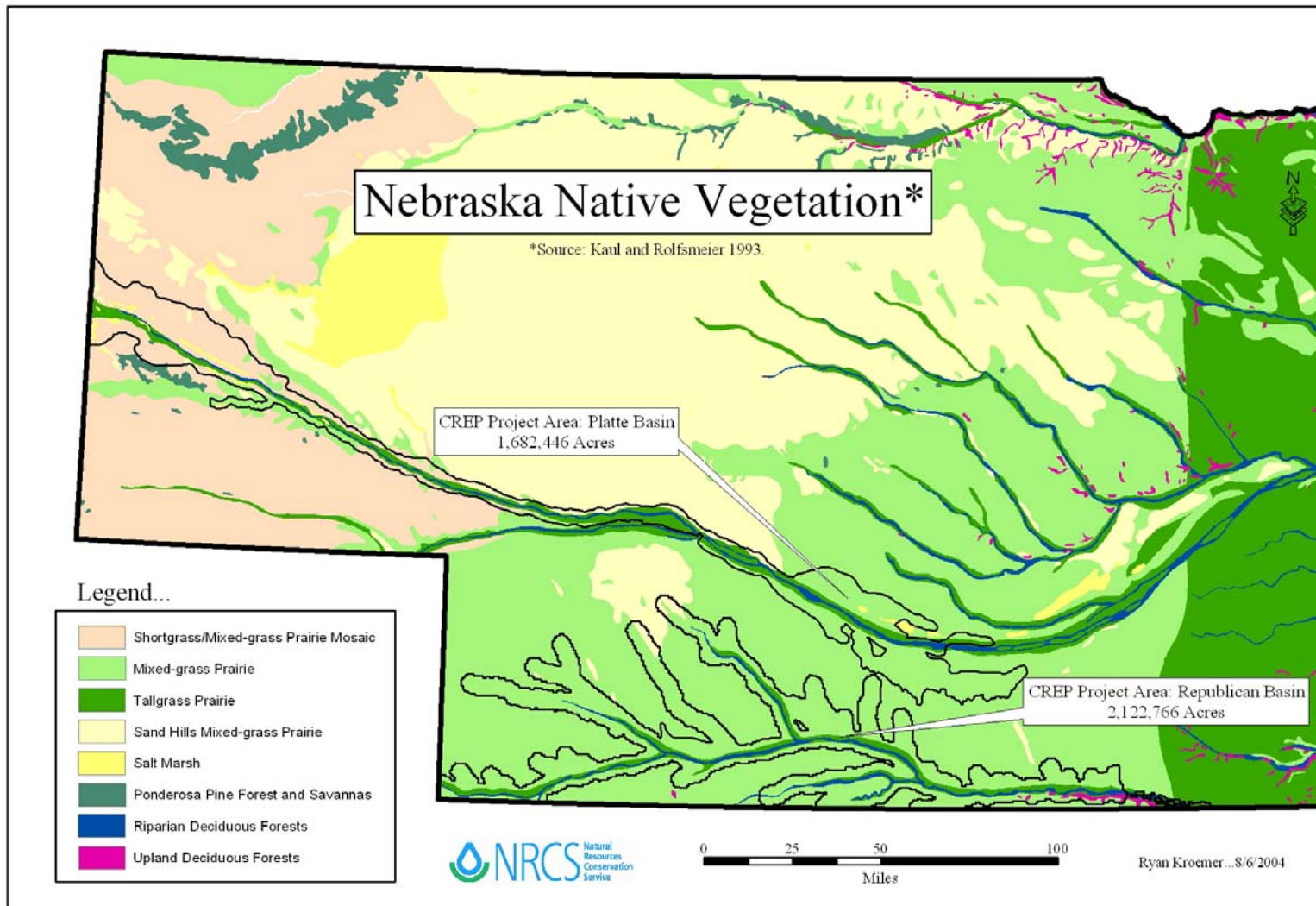


Figure 3.14 – Nebraska Native or Presettlement Vegetation.



## WILDLIFE

The project area supports terrestrial, avian, and amphibian wildlife species common to the Great Plains ecosystem. The mosaic of agricultural lands, grasslands, wetlands, shelterbelts, and riparian areas provides diverse habitat characteristics that meet life requirements for large and small mammals; migratory waterfowl, shorebirds, and wading birds; ground-nesting birds; neotropical migratory birds; reptiles; and amphibians (BOR 2000).



River Otter (NGPC 2004a)

### Mammals

A diverse mammalian community exists within the project priority area, including 23 families and 64 species (Proposal 2004). Mammals common to the NPRRA CREP area include white-tailed and mule deer, coyote, bobcat, opossum, raccoon, rabbits and hares, beaver, muskrat, mink, prairie dogs, skunks, ground squirrels, mice, and bats (BOR 2000).

### Bird Species

Migratory bird species fall under Federal management authority and include ducks, geese, swans, sandhill cranes, mourning doves, and shorebirds. The project area contains two of the most important habitats for migratory waterfowl, shorebirds, and wading birds in the central United States: the Rainwater Basin and the Platte River (BOR 2000). Each spring, approximately 500,000 sandhill cranes (90 percent of the world's sandhill crane population) stop to gain energy from the fertile lands along the Platte River. Invertebrate and amphibian food sources found in project area wet meadows are also important to migrating Whooping cranes, whose numbers have dwindled to less than 200 individuals (Proposal 2004). In addition, 10 million ducks and geese use the Platte and the neighboring Rainwater Basin wetlands on their migration route (NGPC 2004b). These habitats provide sanctuary and protein-concentrated foods critical to the reproductive success and survival of these migratory birds (BOR 2000). Also, native cottonwood-willow stands in this priority area provide important cover, foraging, and breeding habitat for over 80 percent of the riparian bird species present (Proposal 2004).

Resident game birds in the project area include greater prairie chickens, sharptail grouse, northern bobwhite quail, and ring-necked pheasant. A total of 208 non-game birds species breed in the project area (Proposal 2004). Nonmigratory birds, such as owls, vultures, turkeys, pheasant, quail, doves, and grouse, are widespread and are associated with agricultural lands, shelterbelts, and grasslands (BOR 2000).

### Fish and Herptiles

A total of 19 families and 82 species of fish are found in the project priority area including walleye, bluegill, rainbow trout and creek chub. A complete list of fish species occurring within the project area is provided in Appendix C.



Pallid sturgeon. Photograph by Jason Olnes, University of Nebraska, 2001 (NRC 2004).

Nearly 40 different species of frogs, turtles, salamanders, snakes, and lizards are present in the project area. These species include northern leopard frog, American toad, painted turtle, yellow box turtle, tiger salamander, coachwhip snake, milk snake, prairie rattlesnake, eastern fence lizard, and six-lined racerunner (Proposal 2004).

### T&E and Protected Wildlife

FWS (2005) identifies 12 threatened or endangered wildlife species (14 species, including candidate listings), and NGPC (2004a) lists 22 State -protected species in Nebraska (Table 3.8). In addition, NHP (1996) cites 173 species of special concern, including: 6 mollusks, 29 insects, 17 reptiles, 3 amphibians, 28 fish, 69 birds and 21 mammals. See Appendix C.

**Table 3.8 – Nebraska Federal and State T&E wildlife species.**

Scientific Name	Common Name	Federal Status	State Status
<b>BIRDS – 6 Species</b>			
<i>Haliaeetus leucocephalus</i>	Bald Eagle	T	T
<i>Grus americana</i>	Whooping Crane	E	E
<i>Charadrius melodus</i>	Piping Plover	T	T
<i>Charadrius montanus</i>	Mountain Plover	C	T
<i>Numenius borealis</i>	Eskimo Curlew	E	E
<i>Sterna antillarum athalossos</i>	Interior Least Tern	E	E
<b>FISH – 7 Species</b>			
<i>Acipenser fulvescens</i>	Lake Sturgeon		T
<i>Scaphirhynchus albus</i>	Pallid Sturgeon	E	E
<i>Notropis heterolepis</i>	Blacknose Shiner		E
<i>Phoxinus eos</i>	Northern Redbelly Dace		T
<i>Phoxinus neogaeus</i>	Finescale Dace		T
<i>Notropis Topeka (=tristis)</i>	Topeka Shiner	E	E
<i>Macrhybopsis gelida</i>	Sturgeon Chub		E
<b>MAMMALS – 6 Species</b>			
<i>Glaucomys volans</i>	Southern Flying Squirrel		T
<i>Vulpes velox</i>	Swift Fox		E
<i>Mustela nigripes</i>	Black-footed Ferret	E	E
<i>Lutra Canadensis</i>	River Otter		T
<i>Cynomys ludovicianus</i>	Black-tailed Prairie Dog		C
<i>Canis lupus</i>	Gray Wolf, E Distinct Population	T	
<b>INSECTS – 2 Species</b>			
<i>Nicrophorus americanus</i>	American Burying Beetle	E	E
<i>Cincindela nevadica lincolniana</i>	Salt Creek Tiger Beetle	C	E
<b>REPTILES – 1 Species</b>			
<i>Sistrurus catenatus</i>	Massasauga	T	T
<b>MUSSELS – 1 Species</b>			
<i>Leptodea leptodon</i>	Scaleshell Mussel	E	E

Source: FWS 2005; NGPC 2004a. T=Threatened E=Endangered C=Candidate

### 3.10.3 Impacts

The rich and diverse wildlife populations of the CREP project area have responded to various habitat changes brought about by settlement and agricultural development. Prior to settlement, fish were limited to the river systems and their tributaries. Construction of ponds and reservoirs allowed an expansion in

both the diversity and abundance of species. However, the continued development of land for agricultural and municipal purposes reduced and degraded plant communities, wetlands, and aquatic systems, resulting in lost and fragmented wildlife habitats and declining populations of many species (Proposal 2004).



**Pheasant. Photo © by Elna Banzhaf, All Rights Reserved (NGPC 2004c)**

Decline in grasslands is a primary limiting factor affecting abundance of most wildlife species; all grassland communities regardless of status, size, or location are important to wildlife (NGPC 2004a). Grassland habitat is particularly important to ground nesting species such as the ring-necked pheasant, bobwhite quail, greater prairie chicken, and ground-nesting songbirds. The best long-term data on avian population trends in Nebraska is for the ring-necked pheasant, which is believed to be the best indicator species for all grassland nesting birds. The Spring Rural Mail Carriers survey indicates pheasant populations within the area have declined by about 54 percent from 1969 through 1997 and about 95 percent from 1951 (Proposal 2004).

The population of greater prairie chickens has greatly declined from their levels in the 1940s as the amount of native grasslands dropped below the threshold required by this species. These birds have recolonized some areas of the State since the addition of grassland through CRP. The lesser prairie chicken is thought to be extinct within the State, but small populations exist across the border in Colorado and Kansas. Some CRP acres have been set aside for lesser prairie chicken habitat in the upper end of the Republican River basin, but the addition of more acres would be helpful for the re-establishment of this species (Proposal 2004).

The loss of 70 to 90 percent of the different wetland complexes has also impacted both resident and migratory species. Project area wetlands continue to serve as critical spring staging areas for ducks, geese, and other migratory species. Each spring, millions of birds crowd into remnant wetlands in the region. This crowding provides nearly ideal conditions for the spread of disease, and avian cholera outbreaks have been a recurrent event since 1975. Major outbreaks of the disease kill more birds in some years than legal harvest (Proposal 2004).

Periodic dewatering of channels caused by irrigation demands and drought conditions has resulted in numerous negative effects, including fish kills and reduced habitat available for wildlife. Lower flows can have a long-lasting effect on aquatic communities as well. Some of the impacts include (Proposal 2004):

- Less depth/cover available
- Reduced access to spawning habitat
- Reduced ability to move in stream
- Increased water temperature
- Greater risk of oxygen deprivation
- Greater risk of chemical imbalance
- Increased vulnerability of prey
- Increased vegetative growth
- Eutrophication
- Reduced food available

The combination of all these changes is anticipated to greatly reduce the abundance and diversity of stream communities. Species that are less tolerant or occupy specific niches are often replaced by generalist species that can adapt to lower flows.

The changes in the intensity and timing of flows can impact aquatic communities in a variety of ways. First, biotic organisms are dependent on peak flows to reach specific habitat required for spawning and

foraging activities. Secondly, the eggs of many fish require adequate flows to float downstream until they hatch or to keep eggs clean and oxygenated. A shift of timing on flows could result in a much lower recruitment rate for several species. Additionally, diversion and pumping from rivers occurs during July and August, which deprives fish of cooling water in the hottest months of the year. On the other hand, the release of storage water from reservoirs and return flows from imported surface water provide increased flows to the river during the late summer when stream flows are normally low.

As a result of the demands and competition for water in the North, South, and Middle Platte River basins, in 1997 a cooperative agreement was entered into by the States of Colorado, Nebraska, and Wyoming and the FWS. The agreement stipulates “sufficient water” will be provided to support and sustain four targeted threatened or endangered species – Piping Plover, Interior Least Tern, Whooping Crane, and Pallid Sturgeon (DEQ 2003a).

However, the amount of water stored within project area reservoirs has drastically declined during the current drought. Concerns regarding the aquatic life and fisheries that depend on these depleted reservoirs include the following (Proposal 2004):

- Increased eutrophication rate
- Increased susceptibility to water quality limits (water temperature; dissolved oxygen)
- Increased susceptibility to chemical pollution
- Increased opportunity for fish to escape with released water
- Decreased survival of young fish (fewer bays and coves means less protection from predators and reduced invertebrate production)
- Decreased production of all fish (less spawning habitat available)

For more information on declining species in the NPRRA CREP area, see the Proposal (2004) in Appendix D.

### **3.10.4 Effects of Alternative A (No Action) on Critical Habitat or Threatened/Endangered Species**

Implementation of Alternative A would result in long term, minor adverse effects to T&E species. Under the No Action alternative, new T&E listings could continue as newly jeopardized species are identified. These new listings and the declining habitat conditions of the currently listed species suggest that overall impacts on T&E species reflect a slow decline as human actions conflict with and adversely affect both species and their habitat. Under Alternative A, the following negative impacts would occur:

- Habitat values would continue to degrade
- Population growth would continue to crowd natural ecosystems
- Pollution levels in agricultural runoff would remain high

Conservation agreements currently in place would remain. The FWS cooperative agreement would continue to set aside water for targeted T&E species. However, with continued drought and without additional water from retired cropland, the water level in area reservoirs would continue to drop. CRPs already in place would continue to preserve a few grassland acres for prairie chicken habitat, but no additional acres would be set aside to aid in the reestablishment of the species.

Under the No Action alternative, wildlife and terrestrial habitat in Nebraska would not benefit from the leveraged effects of additional habitat restoration and watershed improvement CPs and may continue to decline.

Agricultural activities that include the use of the herbicide atrazine could have indirect effects on wildlife. Atrazine use could adversely impact terrestrial and aquatic plants in areas adjacent to treated fields and could result in loss of food sources and the loss of vegetative habitat affecting reproduction and the survivorship of both adults and offspring. Loss of food and vegetative habitat could force the animals to leave the affected areas and seek another acceptable habitats. Limits on acceptable habitats would increase stress on species competing for limited resources and may affect the ability to successfully reproduce and feed the young (EPA 2005b).

Alternative A would not contribute to the achievement any of the objectives listed in Section 1.4.

### 3.10.5 Effects of Alternative B (CREP Agreement) on Critical Habitat or Threatened/Endangered Species

Implementing Alternative B would result in long term beneficial effects to wildlife habitat values in the CREP enrolled acreage across the three watersheds. Many of the CREP CPs could potentially affect federally listed species. Improvements to water quality and increased water availability would have beneficial effects for all wildlife as well as potential increases in critical habitat.



Waterfowl. Photo © by Tom Niewohner, All Rights Reserved (NGPC 2004c)

As part of the CREP enrollment process, a contract involving appropriate CPs would be developed for each individual site. Each contract would have an EE completed by FSA to determine if any T&E species are present and would be potentially affected by the proposed action. If so, consultation with the FWS would be initiated. In addition, any CREP activity that may result in the disturbance of non-cropped areas adjacent to a proposed project site would be coordinated with FWS.

In general terms, direct benefits for wildlife should accrue by implementing any of the CPs. CP2 (native grass) restores native vegetative communities and provides cover and possible nesting areas for wildlife. CP4D (permanent wildlife corridor – non-easement) creates permanent habitat and movement corridors, both of which are critical in an increasingly fragmented landscape. CP25 (rare and declining habitat) restores and preserves areas of increasingly rare plant communities and wildlife habitat. These CPs would be implemented on 85,000 acres within the CREP project area.

CP21 (filter strips) would remove nutrients and sediment, and contribute to overall health of water bodies and habitat for local species. CP22 (riparian buffer) would provide for removal of nutrients and sediment in areas created for wildlife and aquatic organisms. It would also enhance the potential for wildlife movement along the riparian corridor by buffering the connective habitat from adjacent land uses. Approximately 10,000 acres of CP21 and CP22 would be added to the CREP project area. CP23/23A (wetland restoration) would provide large areas (5,000 acres) for retention of solids and removal of nutrients, while also restoring habitat for species. Filtering provided by all the CPs would contribute to cleaner water entering the watersheds and various water bodies used by wildlife.

An indirect benefit of CREP to wildlife is the complementary habitat development by the NGPC that would occur at Harlan County Reservoir. The added emphasis on habitat management is expected to provide a 50 percent increase in pheasants and ground nesting birds in this localized area. Funding for this project had been greatly reduced but the CREP project is expected to revitalize the program.

Each contract would be evaluated by FSA to determine if the actions resulting from implementing CPs would affect the resources. Consultation with the FWS by FSA would occur when developing a conservation plan where critical habitat or T&E species may be encountered.

Alternative B would help achieve the CREP Objectives outlined in Section 1.4.

## 3.11 Cultural / Tribal Resources

### 3.11.1 Introduction

Cultural resources include prehistoric and historic archaeological sites, architectural structures and designs, and American Indian resources. Prehistoric archaeological resources include the physical remnants of human activity that predate written records. They include archaeological sites, structures, artifacts, and other evidence of prehistoric human activities.

Historic resources can include materials, properties, or locations that postdate written records. These resources can include archaeological sites, structures, artifacts, documents, and other evidence of human behavior. They can also include locations of events that were important in history or that are associated with the lives of historically significant persons. Resources must normally be greater than 50 years old to be considered as historic and eligible for the National Register of Historic Places. However, it is possible for a resource less than 50 years old to be eligible. Properties that are of exceptional importance to a community, State, tribe, region, or the nation may be eligible.



Chimney rock was the most famous landmark on the Oregon, California, and Mormon Trails (Photo courtesy NESHPO).

American Indian resources may include prehistoric sites and artifacts, areas of occupation and events, historic and contemporary sacred areas, materials used to produce tools and other objects, hunting and gathering areas, and other resources that may be of importance to contemporary American Indians. Traditional Cultural Properties (TCPs) that may be impacted by proposed actions may be referred to but not specifically identified in compliance documents in order to avoid unintended impacts on sacred or significant sites. Tribal consultation should be pursued to determine environmental impacts, if any, to TCPs.

### 3.11.2 Existing Conditions

Nebraska's long history of American Indian culture and European settlement has endowed the State with a remarkably diverse collection of historic and cultural resources worthy of preservation. Collectively, millions of cultural resources are believed to be associated with this rich legacy, including residences; houses of worship; barns and farm support structures; burial grounds and cemeteries; historic districts; landscapes; archeological sites; schools; civic buildings; and TCPs. Since 1998, over 64,000 properties have been listed on the Nebraska State & National Registers of Historic Places (NESPRHP, 2004).

The State Historic Preservation Office has conducted archaeological surveys on 197,000 acres in Nebraska, which equates to less than one half of 1 percent of the State's area. The inventory currently contains information on over 5,500 sites (NESHPO, 1998).

No national heritage areas have been identified in the State of Nebraska.

Several national historic trails traverse the NPRRA CREP project area, including the Lewis and Clark, Pony Express, Mormon Pioneer, and Oregon National Historic Trails. Two historic parks, Ash Hollow State Historic Park and Champion Mill State Historic Park, are located within the project area as well. Other historic sites in the NPRRA CREP project area include (MSN 2004):

- **Chimney Rock** is a National Historic Site near Bayard. This rock spire was a landmark for travelers on the Oregon Trail.
- **Scotts Bluff National Monument** is located near Gering. It is located along the Oregon Trail, on which the wheel ruts of wagon trains are still visible. Mitchell Pass provided access through the bluff for wagons, stagecoaches, and the Pony Express.
- **Fort McPherson:** Located south of Maxwell, Fort McPherson is the smallest national cemetery in the nation.
- **Fort Kearny** was a protective outpost for travelers on the Oregon Trail.
- **Buffalo Bill's Ranch:** Located in North Platte, this ranch was home to William F. Cody for 30 years.
- **Gothenburg Pony Express station** was a stop on the Pony Express Trail in Nebraska.



The Historic Pony Express Trail traverses the project area (MSN 2004).

### 3.11.3 Impacts

Some concerns related to agricultural practice and rural lifestyle include alteration of the rural landscape and historic farm buildings due to a declining rural population, loss of agricultural income, and obsolescence of traditional farming practices.

A field review of the North Platte River floodplain was conducted in 2003 for a riverine restoration project. Although it was initially thought to potentially contain archaeological resources, a survey of the project area yielded no cultural resources. Other surveys were conducted on North Platte River islands. These islands are considered modern, dynamic structures that do not support prehistoric sites (FWS 2003).

Extensive reservoir development in the Republican River drainage has damaged many archaeological sites. Shoreline erosion has damaged or ruined some archaeological sites and exposed others. In addition, recreational access of these reservoirs has increased human presence in the area, further endangering these sites (BOR 2000). Several cultural resource inventories have been conducted in the Republican River basin, and many cultural and historic resources have been identified in the area.

### 3.11.4 The Effects of Alternative A (No Action) on Cultural / Tribal Resources

Minor to moderate adverse impacts on cultural resources would continue to occur. These include disturbance and destruction of prehistoric and historic sites and structures, either through ongoing land conversion for development or agricultural use. Sites and structures, if discovered on private land, may often not be reported to anyone. In some instances, destruction of a site or structure may occur before a professional is able to assess its significance. On Federal land or for actions requiring a Federal permit, potential impacts on cultural resources must be considered before the Federal agency can implement, fund, or permit a proposed action.

Without implementation of CREP, areas that could have been enrolled in CREP will not likely be evaluated for cultural resources.

Alternative A would not contribute to the achievement any of the objectives listed in Section 1.4.

### 3.11.5 The Effects of Alternative B (CREP Agreement) on Cultural / Tribal Resources

There would be minimal to no adverse effects on cultural resources, with the implementation of CREP. In fact, CREP implementation would likely complement any cultural resource management and stewardship goals.

Adverse effects to cultural resources in the CREP project area may occur during the installation of CPs. Installation activities requiring excavation or other earth moving activities could potentially disturb buried sites or artifacts.

FSA will assess potential impacts to cultural resources as the result of any CREP contract and take appropriate actions to ensure that any adverse impacts are properly mitigated. As part of this process, a cultural resource survey of the property may be required. The review must take into account that deeply buried sites may be present and that CREP CPs may affect them. In addition, tribal consultation may be required if TCPs are indicated.

Alternative B would assist the State in its efforts to meet the CREP objectives outlined in Section 1.4.



**Pawnee lodges at Loup, Nebraska, with a family standing in front of a lodge entrance. Photo by William H. Jackson, 1873. American Indian Select List # 84. (NARA 2004).**

## 3.12 Human Health, Social, and Economic Issues

### 3.12.1 Introduction

NEPA, and its implementing regulations and guidelines, require consideration of the Human Health, Social, and Economic impacts of Federal actions in preparation of environmental documents. Section 1508.8 of the CEQ's "Regulations for Implementing NEPA" states that:



Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

Effects and impacts as used in these regulations are synonymous. Effects includes ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect would be beneficial.

This PEA will present regional and local information on the health, social, and economic conditions in Nebraska that are relevant to the implementation of CREP and the potential impacts of the proposed project on these conditions.

### **3.12.2 Existing Conditions**

#### **State Economy**

In Nebraska, farms and ranches cover 47 million acres of land, approximately 93 percent of the State's land area (USDA 2002a). Consequently, agriculture is a major contributor to Nebraska's economy. In 2003, agricultural production value was at \$12 billion, its highest level since 1996. Also in 2003, Nebraska was ranked third in the nation in terms of net farm income (\$3.2 billion) (see Figure 3.15). Every dollar in agricultural exports generates \$1.48 in economic activities such as transportation, financing, warehousing, and production. Nebraska's \$3.1 billion in agricultural exports translate into over \$4.6 billion in additional economic activity each year (USDA 2004a, NDED 2004, ERS 2004).

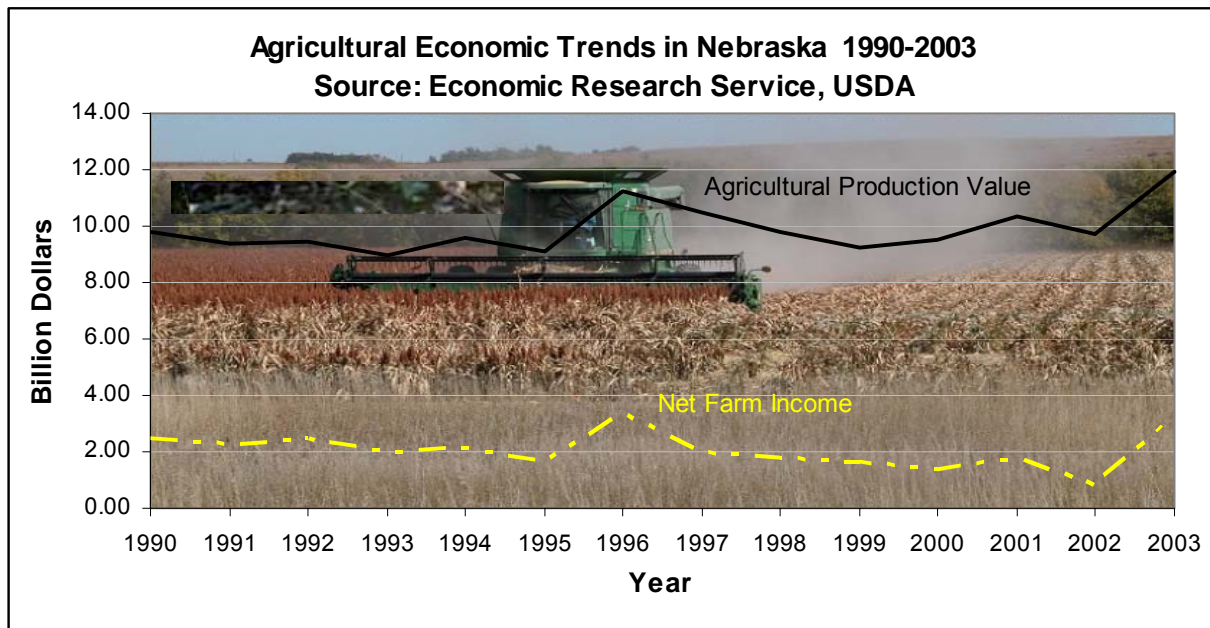
Another indicator of agriculture's contribution to the State's economy is the percentage of the labor force that it employs. Farm and farm-related industries employ a significant portion the labor force each year. Since 1980, farm and farm-related industries have consistently employed more than 20 percent of the labor force each year. In 2000, farm and farm-related industries employed over 260,000 people and accounted for 22.4 percent of the labor force (NDED 2004).

#### **Recreation and Tourism**

Outdoor recreation and tourism contribute significantly to the local economy and these industries have the potential to be impacted by the NPRRA CREP Agreement. State and Federal recreation areas expect almost 2 million visitors annually in the proposed CREP project area. Hunting, fishing, and water related recreation are the main types of recreation in the region, all of which have been adversely affected by prolonged drought conditions (Proposal 2004). Nebraska reported 2,203,652 days of hunting in 2001, resulting in retail sales worth \$232,387,841. Fishing activities accounted for \$76,967,000 from residents and \$44,628,000 from nonresidents (IAFWA 2002). Wildlife associated activities, aside from hunting and fishing, totaled \$585 million (FWS et al. 2001).

#### **Fishing**

The amount of angler days at Lake McConaughy has decreased by more than 33 percent since 2001. A reduction in angler days has a major economic impact on local communities. The FWS estimates that each angler spends \$19.00 on trip-related expenses per fishing trip. Using those estimates, anglers expend a minimum of \$3 million annually at Lake McConaughy, Lake Ogallala, and Harlan County Reservoir. Thus, a 33 percent loss in angler days because of reduced water levels can potentially lead to an annual economic loss of over \$1.0 million in the region (Proposal 2004).



Source: ERS 2004; Image © K. Dewey, High Plains Regional Climate Center

**Figure 3.15 – Agricultural Economic Trends in Nebraska 1990-2003.**

Hunting

Every reservoir in the Republican River basin has associated lands with public hunting access. The largest area is the COE’s land upstream of Harlan County Reservoir. Many of the reservoirs in the Platte River basin also have associated lands with public hunting access including:

- Lake McConaughy
- Sutherland Reservoir
- Jeffrey Reservoir
- Elwood Reservoir

Clear Creek Wildlife Management Area (WMA) (upstream of Lake McConaughy) contains more than 6,000 acres where hunters can pursue a variety of waterfowl, upland game birds, small game, and big game species. These wildlife species require water for survival and are dependent upon the nearby reservoir for maintaining adequate habitat to support their current population numbers (Proposal 2004).



Estimates of hunter participation have been conducted for a few of these areas. The most detailed records are from Clear Creek WMA, which has reported 1,200 to 3,400 hunter use days annually over the past 30 years. With the FWS estimate of nearly \$42.00 in trip related expenditures per day of hunting, the hunting activity at Clear Creek WMA generated at least \$50,000 each year. Almost 5,000 hunter-use days were recorded at Swanson Reservoir, Enders Reservoir, Red Willow Reservoir, and Medicine Creek Reservoir during a survey in 1994. Other wildlife management areas in the project priority area have not

conducted hunter user surveys. A conservative estimate would project hunting trip related expenditures to exceed \$300,000 annually (Proposal 2004).

### Public Parks

The value of public parks and property has been far reaching but difficult to quantify. The NGPC administers the recreational and wildlife resources of Lake McConaughy, Sutherland Reservoir, Lake Maloney, and Johnson Lake, all of which are dependent on water from North Platte River flows via Lake McConaughy. While efforts to quantify the value of Lake McConaughy and associated waters have not been conducted, the dewatering of this lake would likely result in impacts to local, regional, and State economies. An obvious economic impact would be the loss of direct expenditures from many of the 900,000 annual visitors to Lake McConaughy and Clear Creek Wildlife Management Area, as well as 300,000 visitors at the associated downstream properties. Of great importance to Nebraskan economy is the high percentage of non-residents (e.g., more than 70 percent of summer holiday weekend visitors at Lake McConaughy) recreating in the area. The money spent from out-of-state travelers represents net new direct expenditures in Nebraska (Proposal 2004).

Public parks in the Republican River Basin have also been impacted by lower water levels. State parks within the Republican River basin had almost 225,000 visitors in 1999 when water levels were at normal levels. When water levels were low in 2003, State park visitation decreased by almost 25 percent. Federal facilities surrounding Harlan County Reservoir see over 500,000 visitors annually and COE staff believes a direct correlation exists between number of visitors and water level (Proposal 2004).

### **3.12.3 Impacts to Local Economies**

The loss of economic inputs from recreation would lead to significant financial losses in this region of the State. For example, the COE estimates that Harlan County Reservoir produces \$8.8 million in total sales annually and provides 228 jobs. Within the proposed CREP project area, State parks employ more than 100 people annually. Specific economic studies have not been conducted for all the project area facilities, but sales expenditures are estimated to be in the tens of millions of dollars (Proposal 2004).



**Recreation at Lake McConaughy. Photo courtesy of CNPPID.**

Additional losses to the area would be felt by the lack of financial investment for recreational improvements. For the Platte River Basin alone, the NGPC has invested more than \$7.5 million in capital recreational improvements during the past 8 years. An additional \$1.2 million has been re-directed in the past three years to low water boat access projects. Currently in jeopardy are habitat improvement projects scheduled for Enders Reservoir and Harlan County Reservoir over the next few years that could exceed \$5 million in expenditures (Proposal 2004).

Economic impacts could also be felt beyond direct Federal and State expenditures. It is also anticipated that property values would decrease as reservoirs are dewatered. Studies have shown that properties next to public parks and natural areas can be worth up to 23 percent more than properties a block away. If reservoirs in project area have less water, properties will be located farther from their shorelines, potentially leading to decreased property values in the region (Proposal 2004).

### 3.12.4 Environmental Justice

All Federal programs, including CREP, must comply with EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. Federal agencies are required to incorporate environmental justice as part of the overall agency mission.

The EO details that environmental justice ensures that all people, regardless of race, color, national origin, or income, receive the following treatment:

- Are provided with fair treatment and meaningful involvement with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies;
- Have the opportunity to express comments or concerns before decisions are rendered on the Federal programs, policies, procedures, or activities affecting them; and
- Share in the benefits of, are not excluded from, and are not adversely or disproportionately affected by Federal programs, procedures, policies, or activities.

Application for the Nebraska CREP will require the completion of an EE by FSA which addresses environmental justice issues. If the proposed action is found to cause any adverse human health or environmental effects to minority or low-income communities, a discussion of the negative impacts must be attached to the EE and mitigation measures developed.

#### State Minorities

Historically, Nebraska has been a predominantly white, non-Hispanic, State. More than 87 percent of Nebraska's total population in 2000 (1.7 million people) was white, non-Hispanic. However, all of the counties in the CREP project area had a negative percent change in white majority population from 1990 to 2000 and almost all counties in Nebraska had an increase in the Hispanic population during the same time period. Currently, the Hispanic community makes up 5.5 percent of the total population in the State. The African-American population comprises about four percent of Nebraska's population. Other minority groups make up a small percentage of Nebraska's population and include Asian or Pacific Islanders, American Indians, and Alaskan Natives. Almost 95 percent of the minority population lives outside of the proposed CREP project area in the urban areas of Lincoln and Omaha (NDOL 2004).

Following the trend of the general population, the majority of farm operators in Nebraska are white, non-Hispanic. Table 3.9 summarizes Nebraska's farm operator racial characteristics.

**Table 3.9 – Farm operators by race.**

All Operators By Race	Number of farm operators
White	69,393
Black or African American	14
American Indian/Alaska Native	108
Native Hawaiian/Pacific Islander	4
Asian	13
Spanish/Hispanic or Latino Origin	440
More than one race	42

Source: 2002 Census of Agriculture, USDA 2002a.

## Migrant Farmworkers

It is hard to estimate the population of migrant and seasonal farm workers (MSFW) because of the mobile nature of this population. The latest estimates for the population of MSFW in Nebraska are from the 1990 Atlas of Migrant and Seasonal Farmworkers and the 1993 Farmworker Enumeration Study. The 1990 study estimates the population of MSFW at 18,756 people and the 1993 study estimates the population of MSFW at 12,697 people (NCFH 2004).

Information about migrant farm workers was collected for the first time in the 2002 Census of Agriculture. Farm operators were asked whether any hired or contract workers were migrant workers, defined as a farm worker whose employment required travel that prevented the migrant worker from returning to his/her permanent place of residence the same day. Several counties in the proposed CREP project area had farms that reported employing migrant farm labor (Table 3.10) (USDA 2002b).

**Table 3.10 – Summary of migrant farm worker employment in proposed CREP project area.**

County	Number of Farms with Migrant Farm Labor On Farms With Hired Labor	Number of Farms with Migrant Farm Labor On Farms Reporting Only Contract Labor
Chase	7	—
Dawson	4	—
Dundy	2	—
Harlan	7	—
Kearney	4	—
Keith	3	5
Lincoln	2	1
Morrill	16	—
Perkins	9	—
Phelps	2	—
Scotts Bluff	53	12
Sioux	2	—
Webster	6	—

Source: 2002 Census of Agriculture, USDA 2002b.

## Farmworker Health

Migrant farm-working jobs are physically and emotionally demanding with hazardous working conditions from exposure to chemicals to risks for injury from accidents. Skin, eye, and respiratory problems are common occurrences. Additional occupational health hazards of farm work include tuberculosis, diabetes, cancer, and HIV (NCFH 2005). All these conditions that require frequent medical treatment are difficult to treat due to the mobility of the population. Yet many migrant workers are fearful of the farmer causing them to lose their jobs, and therefore do not ask for the needed medical attention (Kossek et al. 2005).

The Environmental Protection Agency estimates that 300,000 farm workers in the U.S. suffer acute pesticide poisoning each year. Many of these workers do not seek treatment, or are misdiagnosed because symptoms can mimic a viral infection (NCFH 2005). Pesticide exposure can occur from a number of sources such as contaminated soil, dust, work clothing, water, and food, or through pesticide drift--the deposition of a pesticide off its target. Because of the nature of agriculture and the proximity of homes to the fields, family members could be exposed to hazardous chemicals through pesticide drift. Agricultural

workers can inadvertently expose family members to hazardous materials by carrying materials home from work on their clothes, skin, hair, and tools, and in their vehicles (McCauley et al. 2000).

Many migrants' lack of education and economic desperation can also contribute to health concerns. For example, Washington State study of 460 hired farm workers found that 89 percent did not know the name of a single pesticide to which they had been exposed, and 76 percent had not received any information on appropriate protective measures (NCFH 2005).

In addition to physical health issues, migrant farm working families have psychological and social concerns. The hassles present in their daily lives pose serious structural constraints to cultural assimilation and the family's ability to manage stress and improve long term overall social and economic well-being (Kossek et al. 2005).

### Poverty

Despite the health concerns, the biggest constraint facing MSFWs is extreme poverty, with household incomes often far below U.S. federal poverty guidelines. National data shows that one half of all farm working families earn less than \$10,000 per year. This income is well below the 2002 U.S. poverty guidelines for a family of four of \$18,100 (Kossek et al. 2005).

For the State of Nebraska, the poverty rate in 2002 was 10 percent, almost two percent less than the national average. Within the counties in the project area, the average poverty rate was 12 percent (ERS 2005). Table 3.11 outlines the poverty rate and the total number of individuals below the poverty line in 2002.

**Table 3.11. Poverty information for counties in the NPRRA CREP project area in 2002.**

County	Poverty Rate est. rate (percent)	Number in Poverty est. rate (number)
Buffalo	10.5	4,253
Chase	11.2	445
Dawson	11.4	2,778
Dundy	14.6	318
Franklin	12.4	421
Frontier	12.7	355
Furnas	12.2	621
Garden	14.1	303
Gosper	9.6	196
Harlan	11.7	426
Hayes	13.8	154
Hitchcock	14.4	431
Kearney	8.2	552
Keith	10.8	913
Lincoln	11.0	3,798
Morrill	14.5	760
Nuckolls	11.4	553
Perkins	11.1	336
Phelps	9.7	915
Red Willow	11.4	1,269
Scotts Bluff	14.8	5,406

Sioux	14.3	215
Webster	11.1	420
<b>Average of Area</b>	<b>12.0</b>	<b>—</b>
<b>Total in Area</b>	<b>—</b>	<b>25,838</b>
<b>Nebraska State</b>	<b>10.0</b>	<b>169,922</b>

Source: 2002 Economic Research Service, ERS 2005.

## Pay Rates

Pay rates vary depending on whether the worker is paid an hourly wage or piece rate. Federal laws require that workers earn a minimum wage of \$5.15 per hour. For the reference week beginning October 10, 2004, hired farm workers in the Northern Plains region, which includes Nebraska, were paid an average \$9.76 per hour, \$0.46 more than the U.S. average and \$0.45 more than the year earlier. On average hired farm laborers worked 45.3 hours/week during the reference week of October 10, 2004 and increase of 2.5 hours from the year before and 4.8 hours more than the U.S. average (USDA 2004b).

### 3.12.5 The Effects of Alternative A (No Action) on Human Health, Social, and Economic Issues

Implementation of Alternative A would result in long term minor to moderate adverse effects Human Health, Social, and Economics. Under Alternative A, agricultural practices would continue as they have for years. The degradation of water quality that currently results from agricultural practices would continue to impact the outdoor recreation industry. Alternative A would not result in any State water quality improvements, unless existing programs (see Section 1.6.14) are greatly expanded.

Implementation of Alternative A would likely have the following effects:

- The total amount of agricultural production in Nebraska would continue to respond to market forces and the economy of the State.
- The rental rates and land values of Nebraska acreage would continue to be affected by development values and population density.
- The total number of Nebraska farms would continue to respond to market forces and the economy of the State.
- Agriculture would continue to contribute roughly the same value to the overall economy.
- Any trends or cycles evident in the labor market would continue and provide the same number of jobs, with fluctuations due to market conditions.
- Alternative A would not offer mechanisms to improve the water quality of Nebraska. Because of the significant income provided by tourism, recreation, fishing, boating, and other water-related businesses, this continued degradation has the potential to negatively impact existing and future growth in the recreation and tourism sector.
- Alternative A offers no additional land preservation than the current programs offer. This may result in continued land use changes in the State (i.e., agricultural land conversion) and the socioeconomic impacts associated with these changes would continue.
- Any ongoing environmental justice compliance problems are likely to continue under the No Action alternative. Exposure to pesticides and other harmful chemicals by farmworkers and their families will continue to occur at current levels.

- Under this alternative, there would be no CREP funds available for any producers (including minorities). No FSA actions are required or necessary under the No Action alternative to address existing or ongoing issues with environmental justice.

The No Action Alternative would not meet any of the CREP objectives outlined in Section 1.4.

### 3.12.6 The Effects of Alternative B (CREP Agreement) on Human Health, Social, and Economic Issues

Implementation of Alternative B would result in long term minor beneficial effects to the State's economy. Though ultimately beneficial, long-term statewide economic effects from CREP implementation would be minimal. The NPRRA CREP Agreement proposes the potential enrollment of up to 100,000 acres across the Republican and Platte River Basins. These 100,000 acres are only 0.2 percent of the total acres of cropland that are harvested each year in Nebraska. Implementation of Alternative B would result in general improvement to the water quality of Nebraska. The degradation of water quality that currently results from agricultural practices, leading to ancillary impact to wetlands, wildlife, and tourism, would decline as a result of implementing CREP.

Implementation of Alternative B would likely have the following effects:

- If CREP was intensively implemented in a small geographic region, it could create a localized and artificial shift in rental rates and land values. CREP contains safeguards to prevent this from happening. For instance, there is a 25 percent acreage cap on CREP enrollments within a county, limiting the amount of cropland enrolled in CREP in a certain geographical region. In addition, the acres enrolled in CREP would likely be spread across the proposed project area, since participating landowners typically enroll partial farms or fields.

CREP could also create a situation where land enrolled in CREP has a greater value than surrounding lands. This is unlikely to happen in Nebraska as income earned through CREP would remain less than the average development value of nearby land. CREP-enrolled lands are also lands that are marginally productive agricultural lands that are non-developable so there is no opportunity cost to enrollees. All of these factors would limit the acres of cropland taken out of production in a given area and, consequently, the local economic impact due to implementation of CREP would be minimal to non-existent. These rental rates and land values of Nebraska acreage would continue to be affected by development values and population density and would not be impacted by the Alternative B.



Farmers and NRCS employees (NRCS 2004)

- Alternative B would not result in changes to total number of Nebraska ranches/farms. The 25 percent acreage cap on CREP and the practice of participating landowners to enroll partial farms or fields means that entire ranches and farms would not be enrolled in CREP. This total would continue to respond to market forces and the economy of the State and not be impacted by Alternative B.



- CREP implementation would not substantially impact the State's economy. Agriculture would continue to contribute roughly the same value to the overall economy. CREP enrolled lands would provide residual income to enrollees, supporting the overall local economy although possibly at a slightly reduced rate. However, this slight reduction, spread across the proposed project area, would have an inconsequential effect on the total economy. Nebraska's economy would continue to be affected by market forces and would not be impacted by Alternative B.
- Any trends or cycles evident in the labor market would continue and provide the same number of jobs, with fluctuations due to market conditions. CREP enrollments would be spread across the western and southwestern part of the State and have only little to no effects to agricultural labor markets.
- Implementation of Alternative B has the potential to slightly reduce total agricultural acreage across the State because the CREP-enrolled land is removed from production. However, even at full enrollment, CREP would only affect one percent of the State's harvested cropland. Additionally, the lands (partial fields, strips, or buffers) enrolled in CREP would most likely be less productive areas of a given farm. By enrolling these areas, the landowner may be able to reduce the overall input costs of farming operations, and in some cases, actually maintain or increase production by being able to concentrate resources on the remaining farmland. These two factors would likely result in minimal to no effects across the State. There would likely be no displacement of migrant farm workers. Agricultural production would continue to respond to market forces and the economy of the State and not be significantly impacted by Alternative B.
- There is a possibility for a slight beneficial effect to farm incomes from the steady and guaranteed receipt of CREP funds by enrolled producers. As discussed above, producers are more likely to enroll marginally productive lands and the residual income from CREP may result in slightly more or at least consistent income than the acreage was capable of producing as farmland. These values, if they occur, would not have a significant impact across the State.
- With the addition of filter strips, buffers, native grasses, and wetlands, wildlife habitat would be improved and expanded. This has the potential to increase opportunities for hunting and fishing in these areas and may lead to localized increases in the sale of hunting and fishing equipment and licenses.
- Local resource-based recreation industries (e.g. boating, hunting) may also be affected by implementation of CPs, which are designed to decrease water use in the project area. Water conservation practices could potentially increase reservoir water levels within the project area. Increased reservoir levels, especially after drought recovery, could potentially restore recreational opportunities to normal conditions. Recovery of economic losses and a small boost in recreation-based revenue may occur.
- Alternative B offers an additional land preservation program to the State's producers, the benefits of which can be added to those provided by the current programs. This may slow the future rate of large scale land use changes in the State (i.e., agricultural land conversion) and the socioeconomic impacts associated with these changes.



**Farmers keeping records. Photo courtesy of USDA FSA.**

Another potential effect is the financial incentive for producers to maintain open space, which may help enhance the value and desirability of surrounding residential and commercial land.

- Disproportionate effects on minority or underrepresented groups are unlikely, because most CREP agreements are likely to be widely separated by intervening non-CREP land holdings. Additionally, sign-up would be monitored annually and barriers to enrollment would be identified using a non-user survey.
- Because of the decrease of harmful chemicals applied to CREP-enrolled land, human exposure to these chemicals will likely decrease. Therefore, the health of farmworkers (including MSFWs) and their families could marginally improve.

Alternative B would assist the State in its efforts to meet the CREP objectives outlined in Section 1.4.

### **3.13 Cumulative Effects**

#### **3.13.1 Introduction**

Since surface water quantity issues affect all of the resources in CREP project area, a discussion concerning the cumulative effects of agricultural practices on surface water quantity is included in this section.

#### **3.13.2 Existing Conditions**

##### **North Platte River and Platte River Basin**

###### Central Nebraska Public Power and Irrigation District Operations

Central Nebraska Public Power and Irrigation District (CNPPID) operates a system of canals and dams (including Lake McConaughy) that delivers irrigation water cropland in the North Platte River and Platte River basins. The hydro-irrigation project first delivered water to irrigators in 1941, and by the following year, irrigation water was being delivered to more than 44,000 acres of cropland. Over the next 35 years, the number of irrigated acres that were receiving direct deliveries from the CNPPID's canal system reached 123,000 acres and has remained stable at 112,000 acres since 1984. Lake McConaughy, which was filled in 1941, provides supplemental water to irrigation projects that serve more than 110,000 additional acres of cropland along the North Platte and Platte Rivers (CNPPID 2005).

###### Bureau of Reclamation Projects

The North Platte River Project is operated by the Bureau of Reclamation (BOR) and extends 111 miles along the North Platte River Valley from Guernsey, Wyoming to Bridgeport, Nebraska. The project provides full service irrigation for about 226,000 acres divided into four irrigation districts. Supplemental irrigation service is furnished to eight water-user associations serving a combined area of about 109,000 acres. The majority of on-stream reservoirs of the North Platte River Project are located in Wyoming, upstream of the NPRRA CREP project area. Portions of the BOR North Platte River Project located in Nebraska include the Interstate Canal and Reservoir System (ICRS) and the Northport Canal (BOR 2005a).

Water for the ICRS is diverted from the North Platte River by the Whalen Diversion Dam and fed into the Interstate Canal. The Interstate Canal carries water to the Lake Alice and Lake Minatare Reservoirs, northeast of Scotts Bluff, Nebraska. Lake Alice and Lake Minatare Reservoirs are off-stream equalizing

reservoirs and are used to supply water to other reservoirs, which are usually filled each year before the start of the irrigation season (BOR 2005a).

The Northport Canal, a continuation of the privately constructed Tri-State Canal, was designed to irrigate 16,170 acres of cropland. The Tri-State Canal diverts water, stored in project reservoirs. Canal construction for the North Platte project in Nebraska was completed by 1925 (BOR 2005a).

## **Republican River Basin**

### **Bureau of Reclamation Project**

The Frenchman-Cambridge project in southwestern Nebraska, extends along the Frenchman River and from Trenton eastward along the Republican River to Orleans and Alma. Storage facilities include the Enders Swanson, Hugh Butler, and Harry Strunk Reservoirs. The four dams, reservoirs, and irrigation systems division store and deliver a full water supply to 56,490 acres of irrigable land and a supplemental supply to 9,600 acres along the Republican River and its three tributaries, the Frenchman River, and Red Willow and Medicine Creeks. Enders Dam and Reservoir, Trenton Dam and Swanson Lake, Red Willow Dam and Hugh Butler Lake, and Medicine Creek Dam and Harry Strunk Lake are located on the Frenchman River, Republican River, Red Willow Creek, and Medicine Creek, respectively. Trenton Dam located on the Republican River was completed in 1953 and Red Willow Dam, the last dam constructed, was completed in 1962 (BOR 2005b).

Additional facilities in the Republican River basin include the Harlan County Dam which is managed by the COE. Harlan County Dam, completed in 1952, was constructed to provide flood damage reduction, irrigation, recreation, and fish and wildlife management (COE 2005).

### **3.13.3 Impacts to Surface Water**

Impacts to surface water were analyzed for streamflow and reservoir levels. For the streamflow analysis, data from two USGS gage stations were used; one on the Platte River and one on the Republican River (see Figure 3.18). The Platte River basin site chosen for analysis is the USGS site, Platte River near Overton, NE. This site was selected for two main reasons 1) it is downstream of major diversions and storage facilities in the basin (e.g. Whalen Diversion Dam and Lake McConaughy); and 2) it has period of record of more than 70 years. The Republican River basin site USGS site, Republican River at Cambridge, NE, was also chosen for two main reasons 1) this site is downstream of the French-Cambridge BOR project; and 2) it has a period of record of almost 60 years.

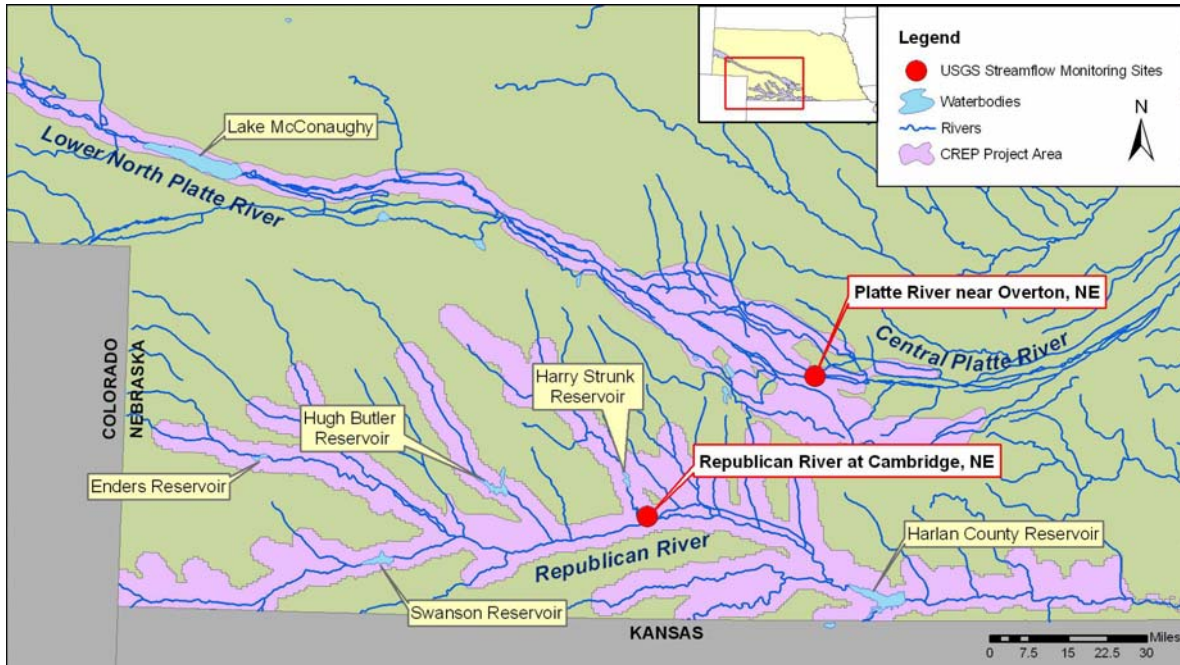
Reservoir levels in the Platte River basin were analyzed for Lake McConaughy using graphs courtesy of CNPPID. Lake McConaughy was chosen since it is the largest onstream reservoir of the Platte River (see Figure 3.18). The Republican River basin reservoir chosen for analysis was the Harlan County Reservoir. Reservoir data that was analyzed included historic reservoir storage and was obtained from the BOR hydromet database (BOR 2005c). This reservoir was chosen because of its location downstream of the irrigation projects that are located in the NPRRA CREP project area (see Figure 3.16).

## **North Platte River and Platte River Basin**

### **Streamflow**

Analysis of streamflow at the Platte River site indicates that although mean annual streamflow is not affected by irrigation projects in the basin, seasonal trends are seen in mean daily discharge (see Figures 3.17 and 3.18). When typical average, wet, and dry years are graphed together for comparison purposes, mean daily discharge for average and dry years show a decreasing trend during the crop growing season;

while streamflow remains largely unaffected by irrigation practices during the wet year (see Figure 3.18). Crop growing season in Nebraska begins in April and continues through September.



**Figure 3.16 – Location of USGS streamflow monitoring sites and major reservoirs in the CREP project area.**

### Reservoir levels

Similar to streamflow, reservoir levels of Lake McConaughy also exhibit seasonal trends, with water elevation decreasing during the irrigation season (see Figure 3.19). However, these trends are to be expected since irrigation is the main use of water stored in Lake McConaughy. The current drought, which began in 1999, has had an effect on Lake McConaughy's elevation (see Figure 3.20). Since 1999, water elevation of Lake McConaughy has steadily declined and there have been larger than normal seasonal drawdowns of water surface elevation during some of those years. Greater than normal seasonal drawdowns can also be seen in other years when drought occurs (see Figure 3.20).

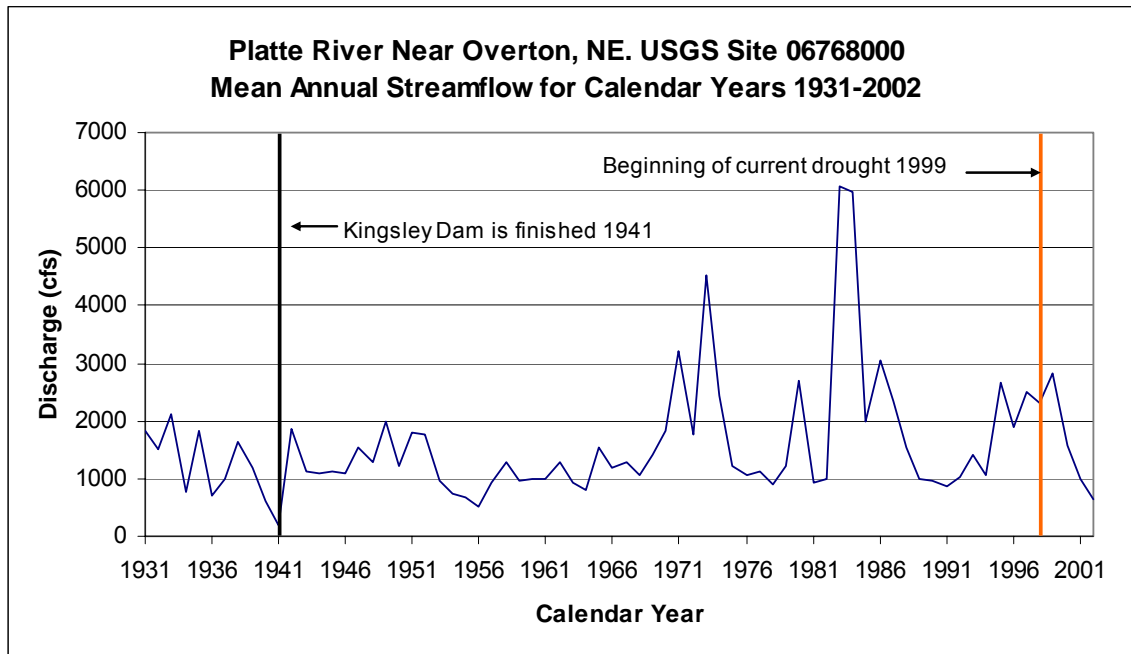
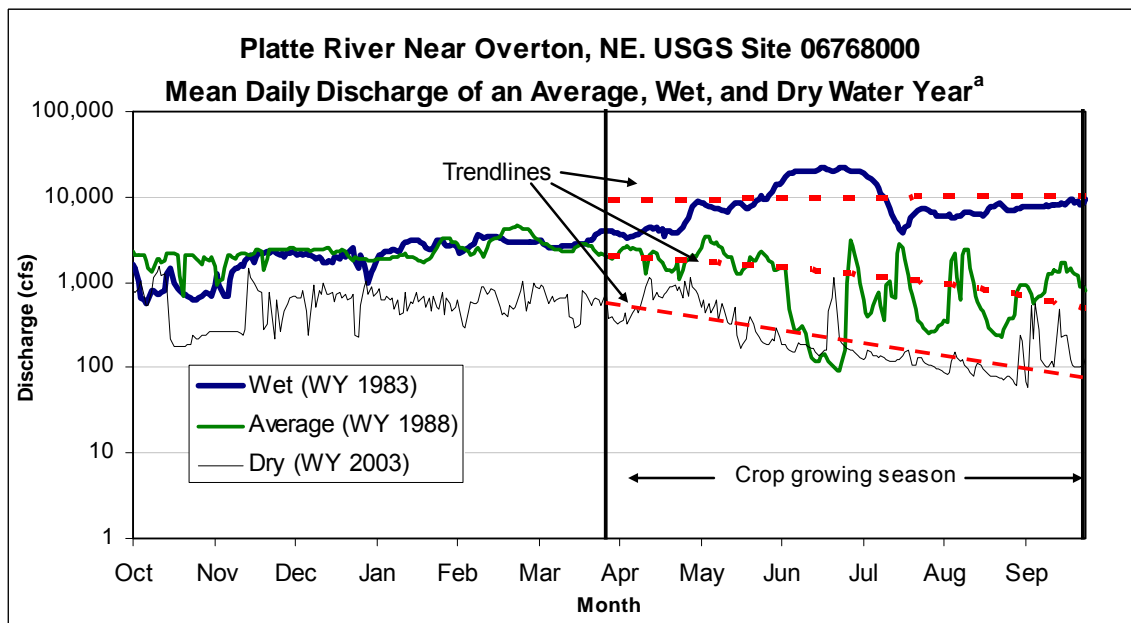


Figure 3.17 – Mean annual streamflow for Platte River near Overton, NE for calendar years 1931-2002. Data courtesy of USGS (2005).



<sup>a</sup> A water year (WY) begins October 1st and ends September 30th. For instance, WY 2003 begins October 1, 2002 and ends September 30, 2003.

Figure 3.18 – Mean daily discharge of an average, wet, and dry WY at Platte River near Overton, NE. Data courtesy of USGS (2005).

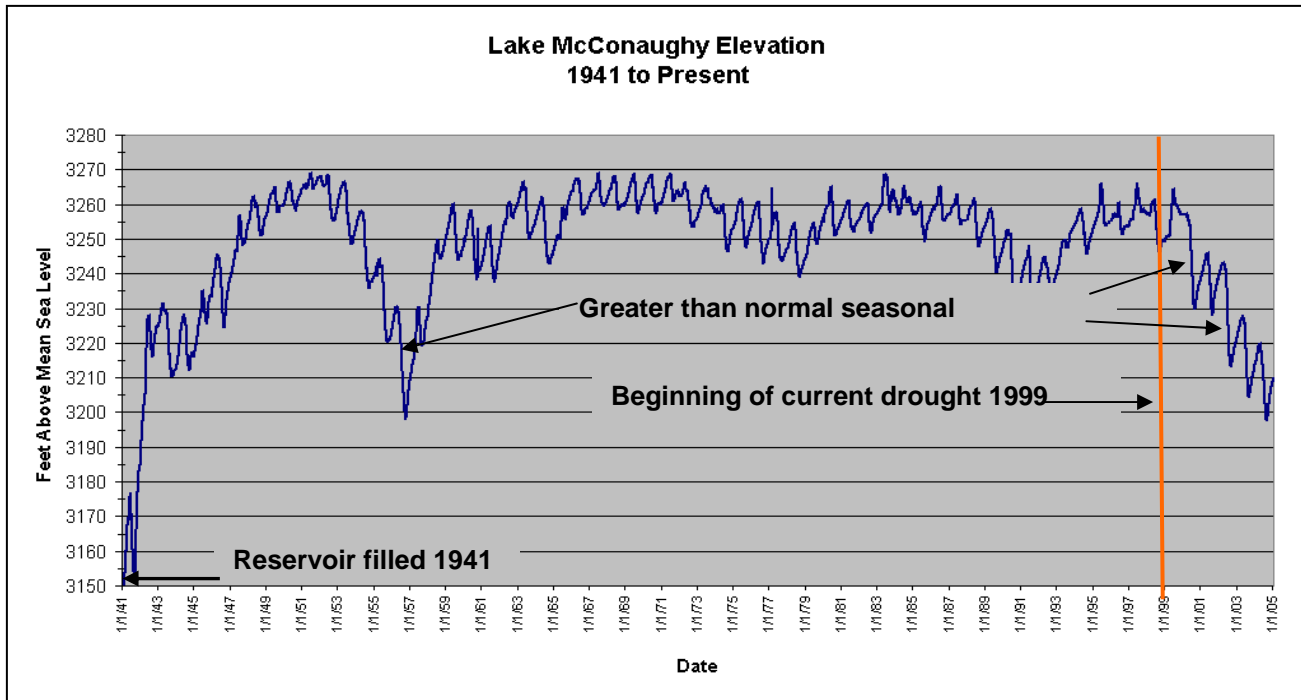


Figure 3.19 – Lake McConaughy water surface elevation from January 2004 through January 2005. Graph courtesy of CNPPID (2005).

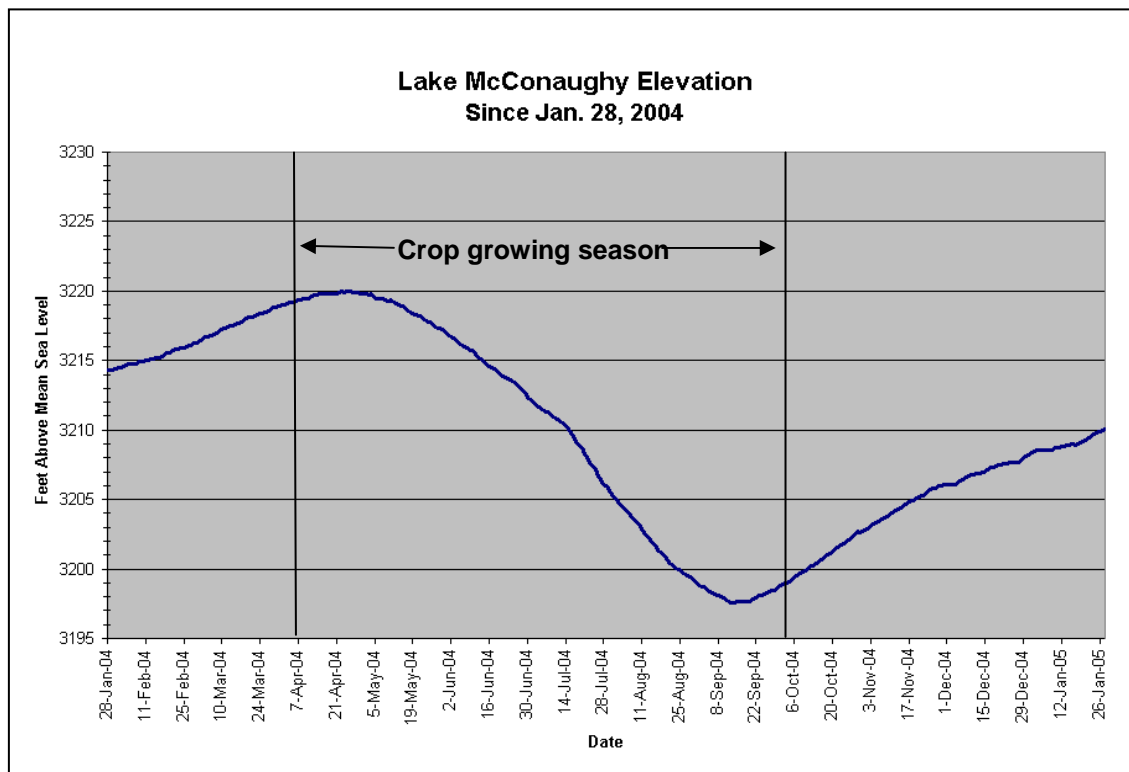
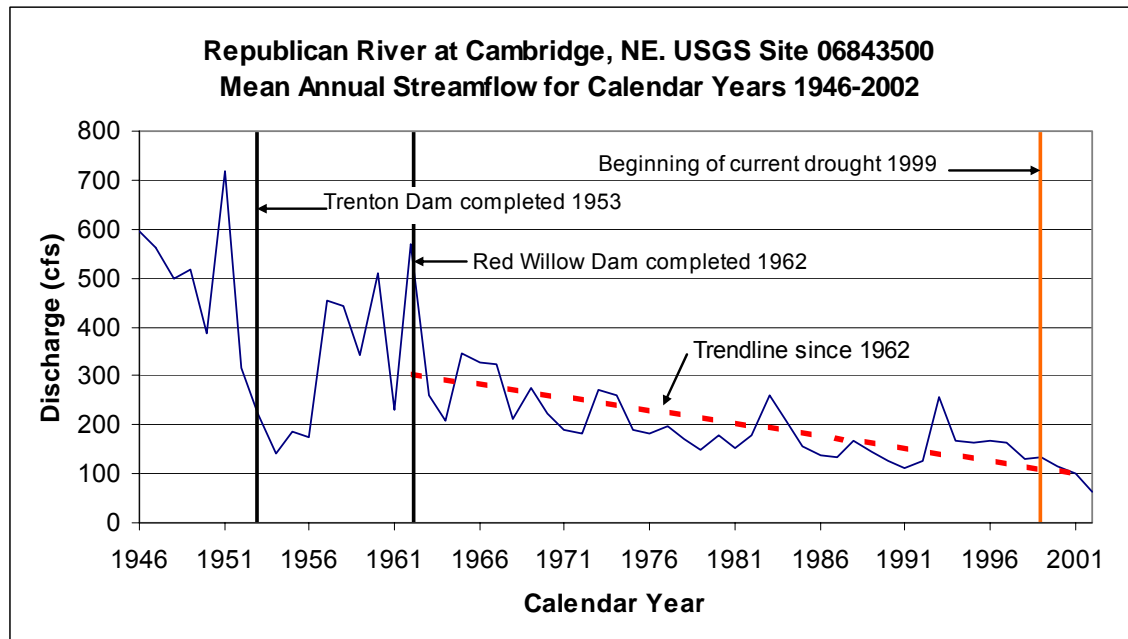


Figure 3.20 – Lake McConaughy water surface elevation from 1941 to present. Graph courtesy of CNPPID.

## Republican River

### Streamflow

Irrigation withdrawals and flood control structures have dampened mean annual streamflow in the Republican River basin and beginning with the completion of the Red Willow dam in 1962, mean annual streamflow in the Republican River below this dam has steadily declined (see Figure 3.21).

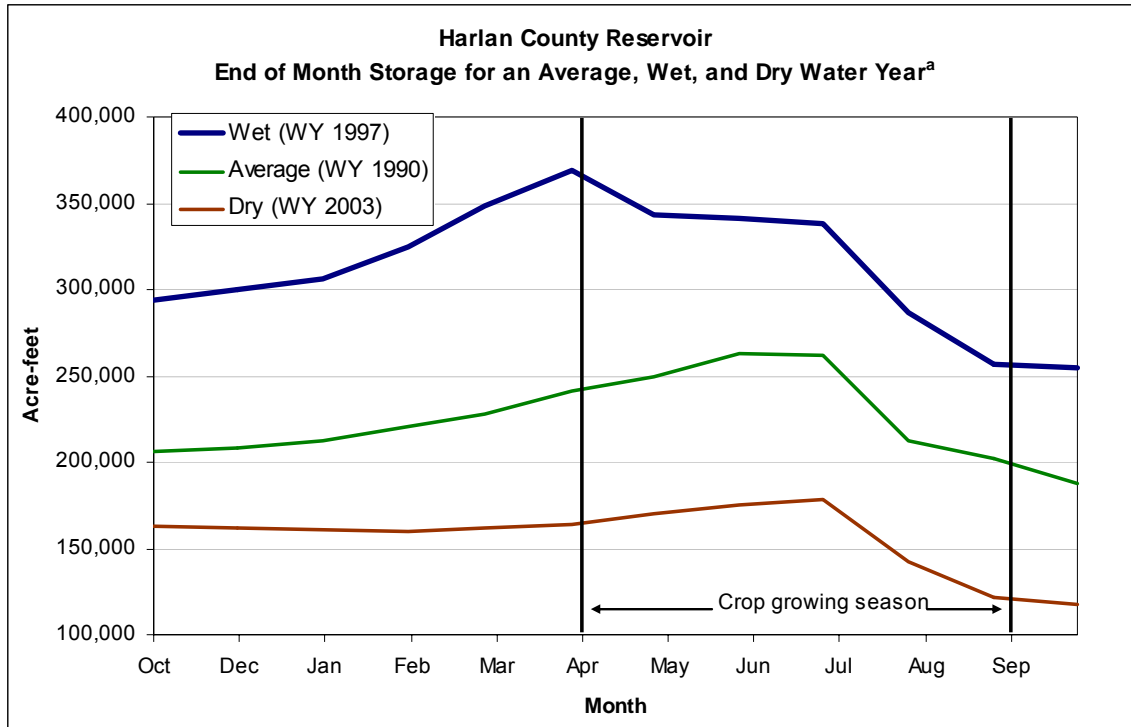


**Figure 3.21 – Mean annual streamflow for Republican River at Cambridge, NE for calendar years 1946-2002. Data courtesy of USGS (2005).**

Unlike the Platte River, seasonal trends are not as evident in streamflow in the Republican River and wet and average water years show little to no evidence of being affected by irrigation practices. However during the dry water year, streamflow has an overall decline during the crop growing season, with a sharp decline occurring in August (see Figure 3.22).

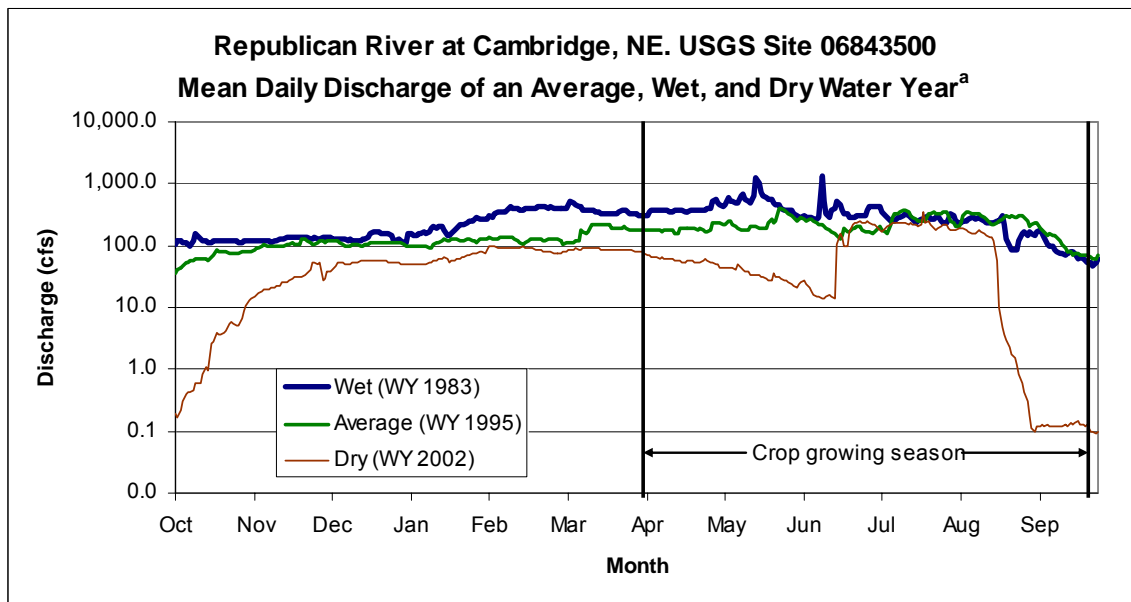
### Reservoir Storage

The typical seasonal decline in reservoir storage is seen at Harlan County Reservoir for average, wet, and dry years. These seasonal trends are normal for a reservoir managed for irrigation purposes. However the effects of decreased storage during a dry year (e.g. loss of wildlife habitat, decreased downstream flows) would be expected to be greater, since reservoir storage is considerably less during dry years than storage during average or wet years (see Figure 3.23).



<sup>a</sup> A water year (WY) begins October 1st and ends September 30th. For instance, WY 2003 begins October 1, 2002 and ends September 30, 2003.

**Figure 3.22 – Mean daily discharge for Republican River at Cambridge, NE for an average, wet, and dry WY. Data courtesy of USGS (2005).**

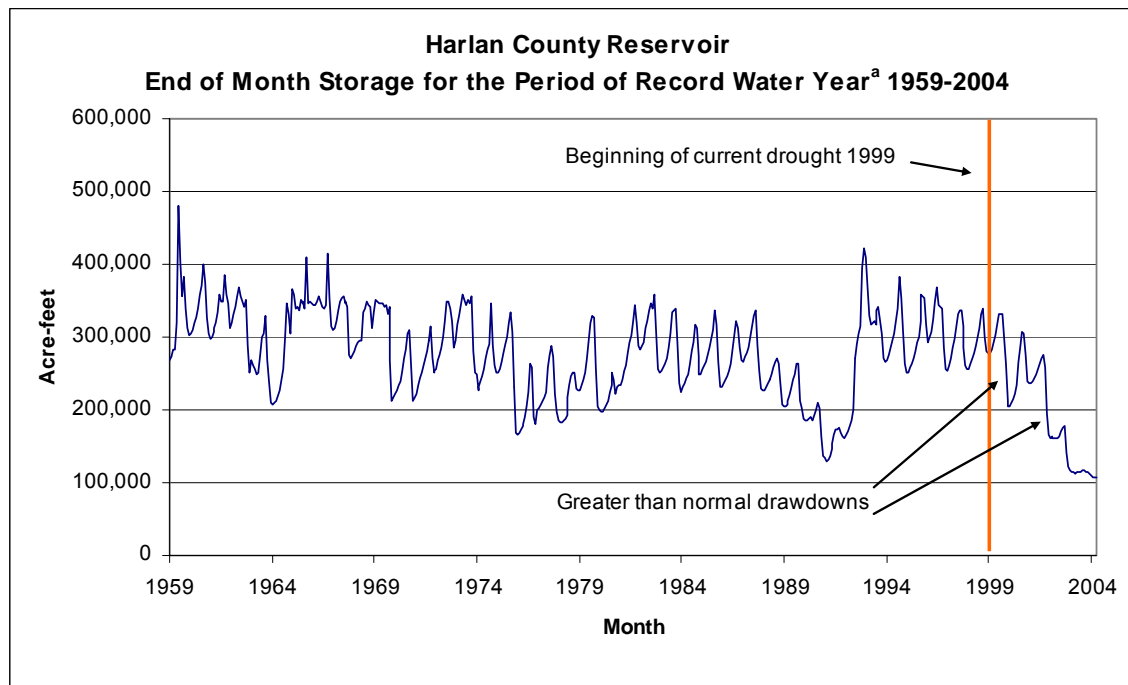


<sup>a</sup> A water year (WY) begins October 1st and ends September 30th. For instance, WY 2003 begins October 1, 2002 and ends September 30, 2003.

**Figure 3.23 – End of month reservoir storage in Harlan County Reservoir for an average, wet, and dry WY. Data courtesy of BOR, 2005c.**



Similar to Lake McConaughy Reservoir storage in Harlan County Reservoir has also declined since the drought began in 1999. This downward trend can be seen in Figure 3.24. Greater than normal drawdowns in storage can also be seen during the current drought (see Figure 3.24).



<sup>a</sup> A water year (WY) begins October 1st and ends September 30th. For instance, WY 2003 begins October 1, 2002 and ends September 30, 2003.

**Figure 3.24 – Harlan County Reservoir end of month storage for WY 1959-2004. Data courtesy of BOR 2005c.**

### 3.13.4 Alternative A (No Action)

Existing State conservation programs (see Section 1.6.21) collectively strive to positively impact State resources. CREP is designed to augment these programs and under Alternative A the complimentary benefits of the CREP CPs would not be realized. Observable current trends in nonpoint source pollution and resource degradation would likely to continue. Irrigation practices in the CREP project area would also continue to impact streamflow and reservoir elevations in the Republican and Platte River basins.

### 3.13.5 Alternative B (CREP Agreement)

Working in conjunction with existing State programs (see Section 1.6.21), CREP implementation would contribute to the cumulative improvement of the State's water quality and decrease the amount of water used for irrigation. This will increase the water available to area streams, rivers, lakes, and reservoirs. Likewise, the enhancement of wildlife habitat across CREP watersheds would add to the State's resources and provide additional protection for listed State and Federal species. The same may be said for all of the CPs that would be implemented. Wetlands, groundwater, wildlife, cultural resources, etc. would all benefit from the cumulative effects that CREP would bring to bear. CREP is designed to augment and enhance conservation of resources and to promote water quality and water quantity improvement. It would work in conjunction with other conservation efforts being implemented at both the State and Federal levels.

However, it should be anticipated that enrollment in CREP may decrease if the current drought ends and conditions return to normal, or if there is a wetter than normal year. During wet and average years the

effects of irrigation on streamflow and reservoir levels is not as evident as during dry years and there may be less incentive for CREP enrollment.

### **3.14 Unavoidable Adverse Impacts**

The following sections describe effects that are adverse and cannot be avoided without mitigation.

#### **3.14.1 Alternative A (No Action)**

Nonpoint source pollution attributed to agriculture would increase over time. Continued agricultural practices would likely contribute to long term water quality degradation in watersheds across the State. There is the probability of increased seasonal erosion accompanied by increased sedimentation in regional streams immediately following harvests. Nutrient loading and waterborne pathogens would continue to impact downstream ecosystems and human populations.

#### **3.14.2 Alternative B (CREP Agreement)**

Alternative B would reduce the unavoidable adverse impacts listed under Alternative A by providing filter strips to reduce sedimentation; creating wetlands to help filter contaminants; and reducing the overall use of fertilizers and pesticides.

### **3.15 Relationship of Short Term Uses and Long Term Productivity**

#### **3.15.1 Alternative A (No Action)**

This alternative would maximize the short term uses of the environment, but would not enhance the long term productivity of eligible lands. Marginal croplands and pasturelands that might otherwise be enrolled in CREP would stay in production and would drain landowners' resources for continued use. Fertilizers and pesticides used on these lands would remain and contribute to watershed pollution.

#### **3.15.2 Alternative B (CREP Agreement)**

Under Alternative B, the short term uses of the human environment would be maximized and long term productivity would be simultaneously enhanced. Marginal croplands would be enrolled in CREP and would provide leveraged benefits to other lands and waterbodies in affected watersheds. Resources used to sustain the marginal lands would be diverted to help maximize the productivity of prime croplands. Potential overuse of fertilizers to increase productivity on marginal lands would be reduced.

### **3.16 Irreversible and Irretrievable Commitments of Resources**

#### **3.16.1 Alternative A (No Action)**

Irreversible and irretrievable commitments of resources include fuel and time spent conducting agricultural practices. The irreversible loss of soil resources from the State's agricultural lands would continue at the current or perhaps an accelerated rate due to splash, rill, and streambank erosion.

#### **3.16.2 Alternative B (CREP Agreement)**

As with Alternative A, the irreversible and irretrievable commitments of resources including fuel and time spent conducting agricultural practices would continue, though perhaps at a decreased rate.

Agricultural soil loss would likely continue, but at a much reduced rate as appropriate CPs are implemented.

## Chapter 4.0 List of Preparers

**Table 4.1 – Name, education, and years experience of those who contributed as part of the interdisciplinary team.**

<b>Name</b>	<b>Area of Expertise</b>	<b>Education</b>	<b>Experience</b>
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James Fortner, FSA	Environmental Compliance Manager	B.S., Agriculture and Extension Education	20 years
Sally L. Benjamin FSA	National Wildlife Biologist	B.A., Field Biology, Fisheries / Wildlife Research M.S., Water Resources Management / Dispute Resolution J.D., Law	27 years
Paul Chernik, NE FSA	State Environmental Coordinator		
Kelson Forsgren, Shiple Group	Project Manager	B.A., English; M.S., Technical Communication	13 years
Suzanne Hill, Shiple Group	Technical Writing	B.S., Watershed Science, M.A., Science Education,	3 years
Claudia Gallegos, Shiple Group	Technical Writing	B.S., Environmental Studies	2 years
Kim Richardson Barker, Shiple Group	Technical Writing	B.S., Environmental Studies, M.S., Range Science	2 years



## **Chapter 5.0 List of Agencies and Persons Consulted and/or Provided Copies of This Environmental Assessment**

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## Appendix A: Federal Laws

### Clean Water Act of 1972

The Clean Water Act (CWA) was passed in 1972, with a goal to “restore and maintain the chemical, physical, and biological integrity of the Nation's waters.” The Act contains a number of provisions that affect agriculture:

Clean Lakes Program is authorized by Section 314 of the CWA. It authorizes Environmental Protection Agency (EPA) grants to State s for lake classification surveys, diagnostic/feasibility studies, and for projects to restore and protect lakes.

Nonpoint Source Pollution Program is established by Section 319 of the CWA. It requires State s and U.S. territories to identify navigable waters that cannot attain water quality standards without reducing nonpoint source pollution, and then develop management plans to reduce such nonpoint source pollution.

National Estuary Program is established by Section 320 of the CWA. It provides for the identification of nationally significant estuaries that are threatened by pollution for the preparation of conservation and management plans and calls for Federal grants to States, interstate, and regional water pollution control agencies to implement such plans.

National Pollutant Discharge Elimination System Permit Program is established by Section 402 of the CWA. This program controls point-source discharge from treatment plants and industrial facilities (including large animal and poultry confinement operations).

Dredge and Fill Permit Program was established by Section 404 of the CWA. Administered by the U.S. Army Corps of Engineers, it regulates dredging, filling, and other alterations of waters and wetlands jointly with EPA, including wetlands owned by farmers. Under administrative agreement, NRCS has authority to make wetland determinations pertaining to agricultural land.

### Endangered Species Act of 1973

The Endangered Species Act (ESA) was enacted to protect and conserve threatened or endangered species (T&E) and the ecosystems in which they exist. When a species is designated as threatened with extinction, a recovery plan that includes restrictions on cropping practices, water use, and pesticide use is developed to protect the species from further population declines.

### Federal Insecticide, Fungicide, and Rodenticide Act of 1947

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) provides the legal basis under which pesticides are regulated. A pesticide can be restricted or banned if it poses unacceptable risks to human health or the environment. The re-registration process, mandated in 1988 for all active ingredients then on the market, has resulted in manufacturers dropping many less profitable products rather than paying the registration fees.

## **Food Security Act of 1985**

The CCC is authorized under the Food Security Act of 1985, as amended and 7 CFR 1410 to institute the actions contemplated in the proposed action. The CCC is authorized to enroll land through December 2007. Sections 1230, 1234, 1242 of the act and 7 CFR 1410.50 authorize CCC to enter into agreements with States to use CRP in a cost-effective manner to further specific conservation and environmental objectives of a given State and the nation. The following provisions are especially applicable to the implementation of CREP:

Highly Erodible Land Conservation Compliance Provisions require that all persons that produce agriculture commodities must protect all cropland classified as being highly erodible from excessive erosion. The provisions have been amended in the 1990, 1996, and 2002 Farm Bills. The purpose of these provisions is to remove the incentive to produce annually tilled agricultural commodity crops on highly erodible land unless it is protected from excessive soil erosion.

Wetland Conservation Provisions (Swampbuster) help preserve the environmental functions and values of wetlands, including flood control, sediment control, groundwater recharge, water quality, wildlife habitat, recreation, and aesthetics. The 1996 Farm Bill modified Swampbuster to give USDA participants greater flexibility to comply with wetland conservation requirements and to make wetlands more valuable and functional. The new Farm Bill changed the other Swampbuster provisions, including those associated with wetland determinations, mitigation (offsetting losses), "Minimal Effect" determinations, abandonment, and program eligibility.

## **National Environmental Policy Act of 1969**

NEPA is intended to help Federal officials make decisions that are based on consideration of the environmental consequences of their actions, and to take actions that protect, restore, and enhance the environment. NEPA mandates that FSA consider and document the impacts that major projects and programs will have on the environment.

## **National Historic Preservation Act of 1966**

The National Historic Preservation Act (NHPA), as amended (16 USC 470, P.L. 95-515), Sections 101, 106, 110-112, 304, establishes as Federal policy the protection of historic properties or places and their values in cooperation with other nations and with State and local governments.

Section 106 requires Federal agencies to identify historic properties their actions could affect; determine whether there could be a harmful or adverse effect, and if so, try to avoid or reduce it. The Federal agency consults with the SHPO/THPO, and in many cases the Advisory Council on Historic Preservation (ACHP), to accomplish the goal.

## **Safe Drinking Water Act of 1974**

The Safe Drinking Water Act (SDWA) requires EPA to set standards for drinking water quality and requirements for water treatment of public water systems while also requiring States to establish a

wellhead protection program to protect public water system wells from contamination by chemicals, including pesticides, nutrients, and other agricultural chemicals.

## **Sustainable Fisheries Act of 1996**

Public Law 104-297 amended the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) to establish new requirements for “essential fish habitat” (EFH) descriptions in Federal fishery management plans and to require Federal agencies to consult with National Marine Fisheries Service (NMFS) on activities that may adversely affect EFH. Under the Magnuson-Stevens Act, NMFS must be consulted by any Federal agency undertaking, permitting, or funding activities that may adversely affect EFH, regardless of its location.

## **Executive Order (EO) 11988: Floodplain Management (g) Floodplains and Wetlands**

EO 11988 restricts Federal support of development in floodplains by requiring Federal projects in a floodplain to meet National Flood Insurance Program standards. It also requires Federal agencies to consider alternatives, and to inform all participants of the dangers involved in floodplain activities.

## **Executive Order 11990: Protection of Wetlands**

EO 11990 restricts Federal support of development in wetlands and outlines the use of the NEPA process in determining whether building in a wetland is necessary.

## **Comprehensive State Groundwater Protection Program**

The program was initiated by EPA in 1991. It coordinates the operation of all Federal, State, tribal, and local programs that address groundwater quality. States have the primary role in designing and implementing the program based on distinctive local needs and conditions.

## Appendix B: Glossary

**Airshed:** A geographic area or region defined by settlement patterns or topography that shares the same air mass and results in discrete atmospheric conditions.

**Aquifer:** A geologic formation that is water bearing. A geological formation or structure that stores and/or transmits water, such as to wells and springs. Use of the term is usually restricted to those water-bearing formations capable of yielding water in sufficient quantity to constitute a usable supply for people's uses.

**Categorical Exclusions:** An agency-defined category of actions that do not individually or cumulatively have a significant effect on the human environment and have been found to have no such effect in procedures adopted by the agency pursuant to NEPA. Projects qualifying for a “categorical exclusion” are not required to undergo additional NEPA analysis or documentation.

**Conservation Practices:** A series of NRCS approved agricultural practices and management techniques designed to control nonpoint pollution.

**Decomposers:** Organisms (e.g., bacteria, fungi) that break down dead plants and animals and release substances usable by consumers.

**Denitrification:** The process whereby bacteria reduce nitrate or nitrite to gaseous products such as nitrogen.

**Environmental Assessment:** A concise public document, prepared in compliance with NEPA, that briefly discusses the purpose and need for an action, alternatives to such action, and provides sufficient evidence and analysis of impacts to determine whether to prepare an environmental impact statement or finding of no significant impact (FONSI).

**Environmental Impact Statement:** A detailed written statement required by section 102(2)(C) of NEPA, analyzing the environmental impacts of a proposed action, adverse effects of the project that cannot be avoided, alternative courses of action, short term uses of the environment versus the maintenance and enhancement of long term productivity, and any irreversible and irretrievable commitment of resources. A *programmatic* EIS or EA: covers general matters in broader terms and analyzes conceptual or planning alternatives. In such cases, at least one more level of site-specific NEPA analysis is necessary before implementation can proceed.

**Erosion:** A geomorphic process that describes the wearing away of the land surface by wind, water, ice or other geologic agents. Erosion occurs naturally from weather or runoff but is often intensified by human land use practices.

**Eutrophication:** The natural and artificial addition of nitrogen and phosphorous (nutrients) to bodies of water, increasing algal growth. As the algae die, the decomposing microorganisms consume dissolved oxygen in the water, reducing the amount available to fish and other aquatic organisms. Ultimately, this can result in a dead lake or pond: a system where no larger aquatic organisms can survive.



**Exotic species:** A species occurring in an area outside of its historically known natural range as a result of intentional or accidental dispersal by human activities. Also known as an *introduced species*.

**Groundwater:** The supply of fresh water found beneath the Earth's surface, usually in aquifers, which supply wells and springs. Because ground water is a major source of drinking water, there is growing concern over contamination from leaching agricultural or industrial pollutants or leaking underground storage tanks.

**Hydric soils:** Soil that, in its undrained state, is flooded long enough during a growing season to develop anaerobic (lacking air – saturated) conditions that support the growth and regeneration of hydrophytic vegetation.

**Hydrophytic vegetation:** Plants specialized to grow in water or in soil too waterlogged for most plants to survive.

**Listed species:** Under the Endangered Species Act, or similar state statute, those species officially designated as threatened or endangered through all or a significant portion of their range. See also: *Threatened and endangered species*.

**Nonpoint source (pollution):** Cause of water pollution that is not associated with point (fixed) sources. Nonpoint sources include runoff from agricultural, urban, construction, and mining sites, as well as septic systems and landfills.

**Nutrients:** Chemical compounds in a usable form and have nutritive value for plants and/or animals.

**Recharging groundwater:** Refers to water entering and replenishing an underground aquifer through faults, fractures, or direct absorption.

**Riparian:** Refers to a stream and all the vegetation on its banks.

**Sediment loading:** Describes the excessive inputs of sediment into a waterbody.

**Siltation:** The deposition of finely divided soil and rock particles upon the bottom of stream and river beds and reservoirs.

**Soundscape:** The natural sound environment of a place. Also, the amalgam of natural ambient sounds created by more or less continuous processes in the natural environment.

**Stormwater runoff:** Water from precipitation that runs straight off the ground without first soaking into it. It does not infiltrate into the ground or evaporate due to impervious land surfaces, but instead flows onto adjacent land or water areas.

**Threatened and endangered species:** Under the Endangered Species Act, those species officially designated by the National Marine Fisheries Service or U.S. Fish and Wildlife Service as being in danger of extinction (i.e., endangered) or likely to become endangered (i.e., threatened) within the foreseeable future through all or a significant portion of their range. Threatened and endangered species are protected by law. See also: *Listed species*.

**Traditional Cultural Properties:** Places that are eligible for inclusion in the National Register of Historic Places because of their "association with cultural practices or beliefs of a living community that are rooted in that community's history and are important in maintaining the continuing cultural identity of the community."

**Watershed:** 1.) Describes a cohesive, hydrologically-linked landscape that is drained by a waterway leading to a lake or reservoir. 2.) A geographic area delineated by its peaks and ridgelines, which divide surface water flow into two or more directions.

## Appendix C: Plants and Wildlife of Concern

### Fish Species present in the project area

Alphabetical listing of fish species (common name) present in project area

Alewife	Bigmouth Buffalo	Bigmouth Shiner
Black Bullhead	Black Crappie	Blacknose Dace
Blue Catfish	Bluegill	Brassy Minnow
Brook Silverside	Brook Stickleback	Brook Trout
Brown Trout	Carp	Channel Catfish
Common Shiner	Creek Chub	Emerald Shiner
Fathead Minnow	Finescale Dace	Flathead Catfish
Flathead Chub	Freshwater Drum	Gizzard Shad
Goldfish	Golden Shiner	Goldeye
Grass Carp	Green Sunfish	Green Sunfish X Bluegill
Johnny Darter	Kentucky Spotted Bass	Largemouth Bass
Longnose Dace	Longnose Gar	Longnose Sucker
Mosquitofish	Muskellunge	Northern Pike
Orangespotted Sunfish	Orangethroat Darter	Paddlefish
Plains Killifish	Plains Minnow	Plains Topminnow
Pumpkinseed	Quillback	Rainbow Smelt
Rainbow Trout	Redbelly Dace (Northern)	Redbelly X Finescale Dace
Red Shiner	Redear Sunfish	River Carpsucker
River Shiner	Rock Bass	Rudd
Sand Shiner	Sauger	Saugeye
Shortnose Gar	Shorthead Redhorse	Shovelnose Sturgeon
Silver Chub	Silvery Minnow (Western)	Smallmouth Bass
Smallmouth Buffalo	Speckled Chub	Stonecat
Stoneroller	Sturgeon Chub	Suckermouth Minnow
Tadpole Madtom	Tiger Muskie	Walleye
White Bass	White Crappie	White Sucker
Wiper	Yellow Bullhead	Yellow Perch

### Nebraska Natural Heritage Program Communities and Species of Concern

For more information on Nebraska Natural Heritage Program Communities and Species of Concern, see <http://www.natureserve.org/nhp/us/ne/ftplist.htm>.

## Nebraska's Watchlist for Invasive Species

SCIENTIFIC NAME	COMMON NAME
<i>Lonicera maacki</i>	Amur Honeysuckle
<i>Cirsium vulgare</i>	Bull Thistle
<i>Linaria dalmatica</i>	Dalmation Toadflax
<i>Allaria petiolata</i>	Garlic Mustard
<i>Cynoglossum officinale</i>	Houndstongue
<i>Cardaria pubescens</i>	Hairy Whitetop
<i>Cardaria draba</i>	Hoary Cress
<i>Sorghum halepense</i>	Johnsongrass
<i>Pueraria lobata</i>	Kudzu
<i>Rosa multiflora</i>	Multiflora Rose
<i>Lotus tenuis</i>	Narrow-leaf bird's-foot-trefoil
<i>Actroptilon repens</i>	Russian Knapweed
<i>Phragmites australis</i>	Phragmites
<i>Tamarix ramosissima</i>	Salt Cedar
<i>Onopordum acanthium</i>	Scotch Thistle
<i>Lespedeza cuneata</i>	Sericea Lespedeza
<i>Centaurea solstitialis</i>	Yellow Starthistle
<i>Linaria vulgaris</i>	Yellow Toadflax
<i>Coronilla varia</i>	Crown Vetch

Source: Nebraska Weed Control 2004. Nebraska Weed Control <http://www.neweed.org/weeds.htm>

## Appendix D. CREP Proposal

### Nebraska Platte-Republican Resources Area CREP

Prepared by the State of Nebraska

Project Leader: Bobbie Kriz-Wickham

(Nebraska Department of Agriculture)

Lead Author: Keith Koupal

(Nebraska Game and Parks Commission)

The 23 Nebraska Counties Included in the Proposed CREP Area are:

Buffalo	Chase	Dawson
Dundy	Franklin	Frontier
Furnas	Garden	Gosper
Harlan	Hayes	Hitchcock
Kearney	Keith	Lincoln
Morrill	Nuckolls	Perkins
Phelps	Red Willow	Scotts Bluff
Sioux	Webster	

## SECTION 1 – ABSTRACT

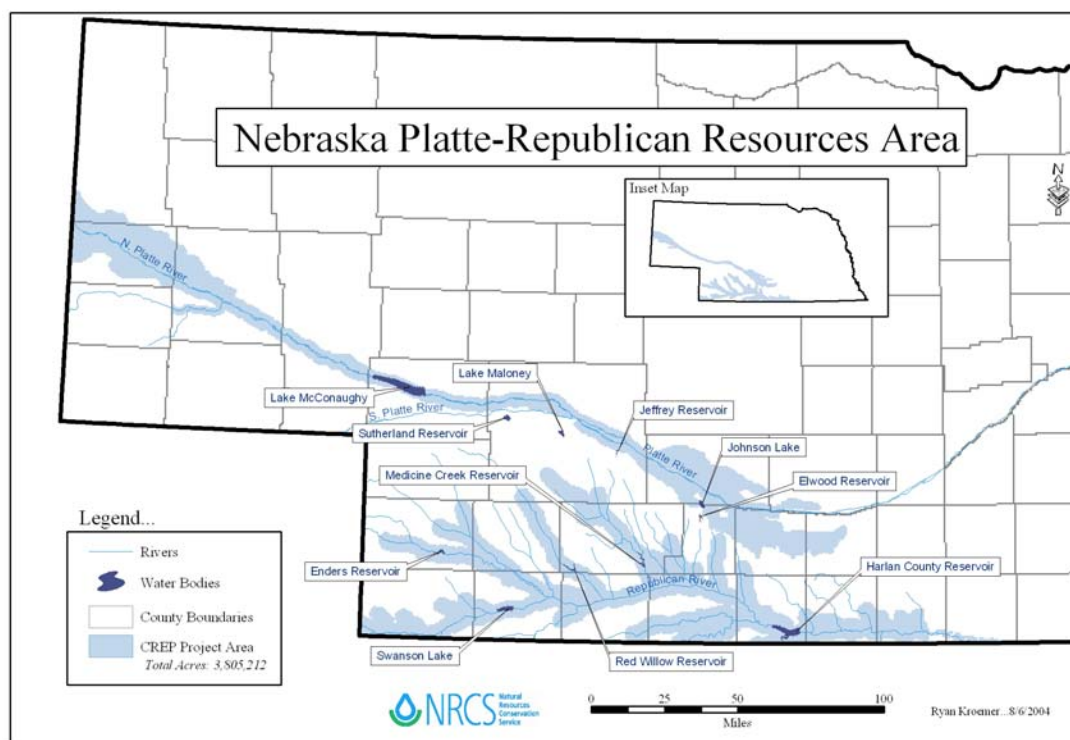
The proposed area includes portions of 23 counties and 7 Natural Resources Districts (NRD), associated with the Republican River, North Platte River and Platte River. Prior to settlement, the vegetative community consisted primarily of lowland tallgrass prairie along the rivers and streams and mixed loess prairie and shortgrass prairie in the remaining area. The soil under these prairie grasses was found to be fertile and quite productive given adequate moisture. Consequently, landowners capitalized on the agricultural potential by converting over 90% of the land in the proposed project priority area to agricultural production. The result has been the fragmentation and substantial reduction of native vegetative communities and wetland complexes. Many wildlife species have responded negatively to these habitat changes and currently 13 different species in the project priority area receive some form of federal or state designation of concern.

The project priority area has been suffering from extreme drought conditions the past 5 years. The drought has stressed the availability of water supplies and accentuated the fact that a number of interests important to the state are competing for the same finite resources. This situation has been exacerbated further by the fact that farmers have been forced to apply additional water to existing irrigated cropland to offset precipitation shortfall. The Farm Service Agency (FSA) estimates our priority area to contain 1,576,219 acres of cropland of which 72% is irrigated. Corn is the major crop of this area (766,070 acres) and soybeans (178,712 acres), wheat (181,809 acres) and alfalfa (172,273 acres) would be considered secondary crops.

The current drought has already cost this region millions of dollars in agricultural and recreational revenues. Without concentrated efforts, the environment, communities and industries of the proposed project area could be devastated over the next few years. Nebraska proposes to initiate a Conservation Reserve Enhancement Program (CREP) project to reduce irrigation demand on available surface and groundwater supplies. Secondary benefits are also anticipated, such as providing more water for aquatic communities and increased terrestrial habitat by converting cropland to approved conservation practices (CP2, CP4D, CP21, CP22, CP23 and CP25). These benefits would be accomplished by retiring 100,000 acres of cropland in the proposed project priority area for a period of 10-15 years. The program acres would be divided between the Platte and Republican River basins. Landowners participating in this CREP would receive the average irrigated rental rates for their county for any qualified acreage they enrolled. The 10-year cost of the project to place 100,000 acres under contract is estimated at \$158,215,000 to be divided 80% by Federal and 20% by State sources. An additional \$10,000,000 would be needed for seeding program acres that would be split 50% by federal and 50% by State and local sources.

## SECTION 2 – GEOGRAPHIC AND EXISTING CONDITIONS

The proposed conservation priority area for Nebraska under this CREP includes 23 counties and 7 NRD's in south-central and western portions of the state (Figure 1). The area is called the Nebraska Platte-Republican Resources Area due to the inclusion of significant portions of the Platte River and Republican River basins. The designated project area has been experiencing persistent above normal temperatures and below normal precipitation since 1999. This on-going climate pattern has resulted in much of the proposed CREP area being designated in an extreme or exceptional drought by the U. S. Drought Monitor the last few years. The duration and severity of the current climate rivals the conditions reported during the "Dust Bowl" of the 1930's.

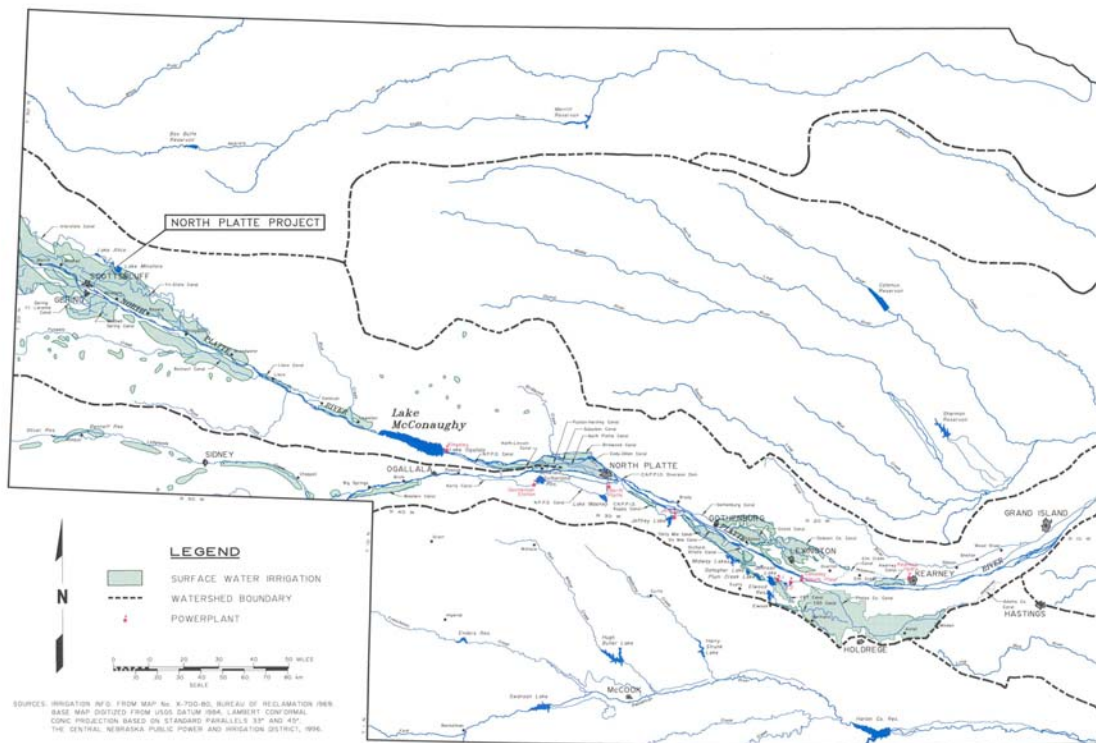


**Figure 1 – Project priority area for the proposed Nebraska Platte-Republican Resources Area CREP**

The Platte River receives water from snow and rain run-off resulting in periodic high flows associated with precipitous weather. The remaining flow seeps as base flow from hydrologically connected groundwater. The Republican River historically receives extreme high flows from heavy rain events and remaining flows come from hydrologically connected groundwater. Significant portions of the Republican River, Platte River and North Platte River have become dry or reduced in water quantity the past few years, exacerbated by the current drought. Lack of water in these basins has resulted in numerous negative effects, including fish kills and reduced habitat available for wildlife. With these effects in mind, and the urgency and severity of this drought upon us, the State of Nebraska has decided to pursue a CREP designed to improve water quantity in these basins.

To fully understand the scope of this CREP proposal, a more complete description is needed of the North Platte reservoir system including Lake McConaughy and the reservoirs within the Republican River basin.

The project that would become The Central Nebraska Public Power and Irrigation District began in 1913 with a proposal to divert water from the Platte River during the spring and fall to soak the soil of farms in the area. Final approval for the project was granted in 1935 resulting in a reliable source of surface water, to assist crop production, and hydroelectric power. Construction began in 1936 on Kingsley Dam (which forms Lake McConaughy), the Diversion Dam by North Platte, the Supply Canal with more than 20 small lakes along its 75-mile route, three hydroelectric plants, and other necessary infrastructure. Upon completion of Kingsley Dam in 1941, Lake McConaughy began filling a designated 21 miles in length and up to 4 miles in width. At full pool (3,265 msl elevation), this reservoir covers more than 30,500 surface acres and offers some 105 miles of public shoreline. Figure 2 depicts the intricate water delivery system stemming from stored water in Lake McConaughy, including several of the notable public access lakes within this system.



**Figure 2 - Delivery system for The Central Nebraska Public Power and Irrigation District**

The Republican River has a history of flooding, which hampered settlement and agricultural development of the area. Perhaps most notable was the flood of 1935, reported as a “wall” of water 8 feet high. That flood claimed over 100 lives and prompted the development of a reservoir storage system for the primary benefits of flood control and irrigation. Five separate reservoirs were constructed in the Republican River Basin of Nebraska starting in the early 1940s. Swanson Reservoir and Harlan County Reservoir are main-stem reservoirs and Enders Reservoir, Red Willow Reservoir, Medicine Creek Reservoir were built on major tributaries.

The climate of the area is typical of the Great Plains of North America. Marked seasonal variations in precipitation characterize the region. Mean annual precipitation varies from 15-26 inches on the western to eastern edge of the priority area, respectively. The majority of precipitation (75-80%) falls during the

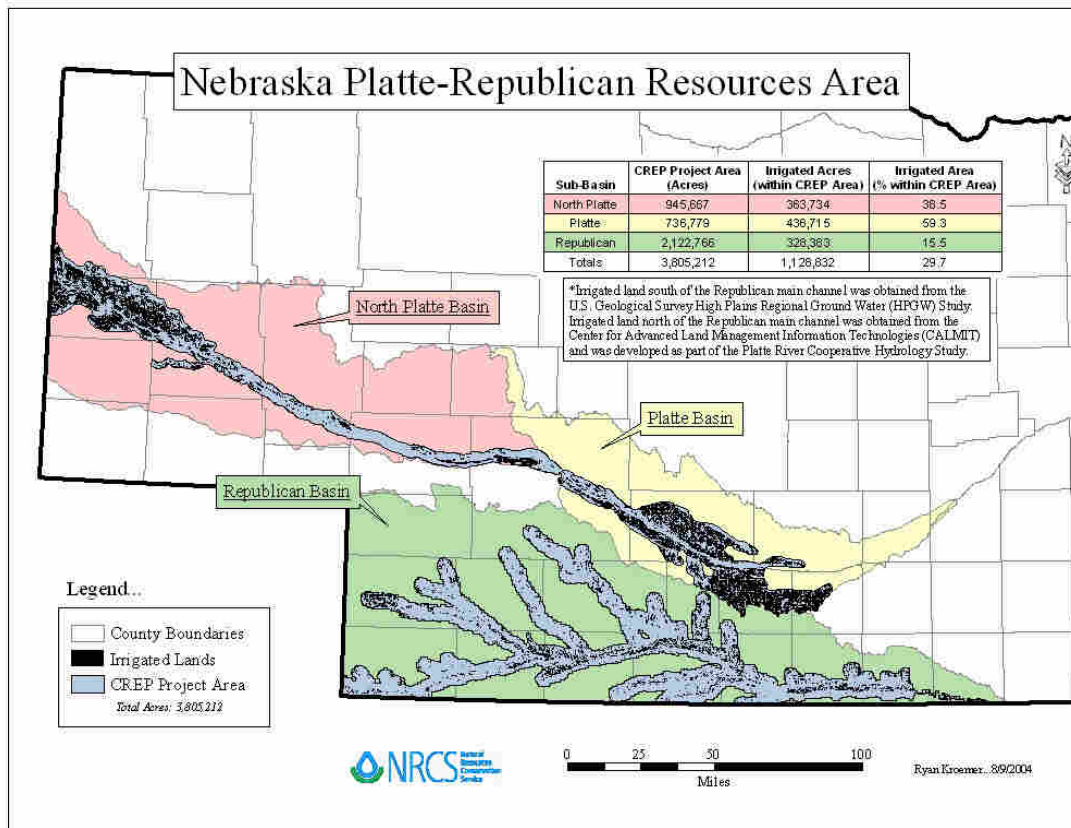


growing season, April through September. Summer precipitation usually arrives in the form of thunderstorms. Mean evaporation rates frequently exceed mean precipitation rates.

Several different soil associations are found in the Republican and Platte River basins. Soils in the eastern priority area are typically very deep, gently sloping to steep, well-drained, silty soils formed in loess and alluvium. The western edge of the priority area has shallower, nearly level to moderately steep, excessively drained; sandy soils formed in eolian sand. Irrigation throughout the area, (Figure 3 & 4) has maximized the fertility and productivity of these soils.

Native or presettlement vegetation in this CREP area was dominated by a variety of grass communities (Figure 5). The Eastern edge of this priority area was composed of mainly mixed grass loess prairie, which shifted to short-grass prairie in Western Nebraska. Lowland tall-grass prairie dominated the rivers and streams throughout much of the CREP area, as well as some riparian woodland. Within the region, all three of these grassland communities have been significantly reduced to the point where only small fragmented remnants remain. The Nebraska Game and Parks Commission (NGPC) estimates that more than 80% of loess mixed-grass and lowland tall-grass communities have been lost within the state. Quantification for loss of short-grass prairie has been hampered by a lack of updated information. However, conservative estimates predict that over half of the native short-grass prairie habitat has been lost to conversion of land to agricultural and municipal development.

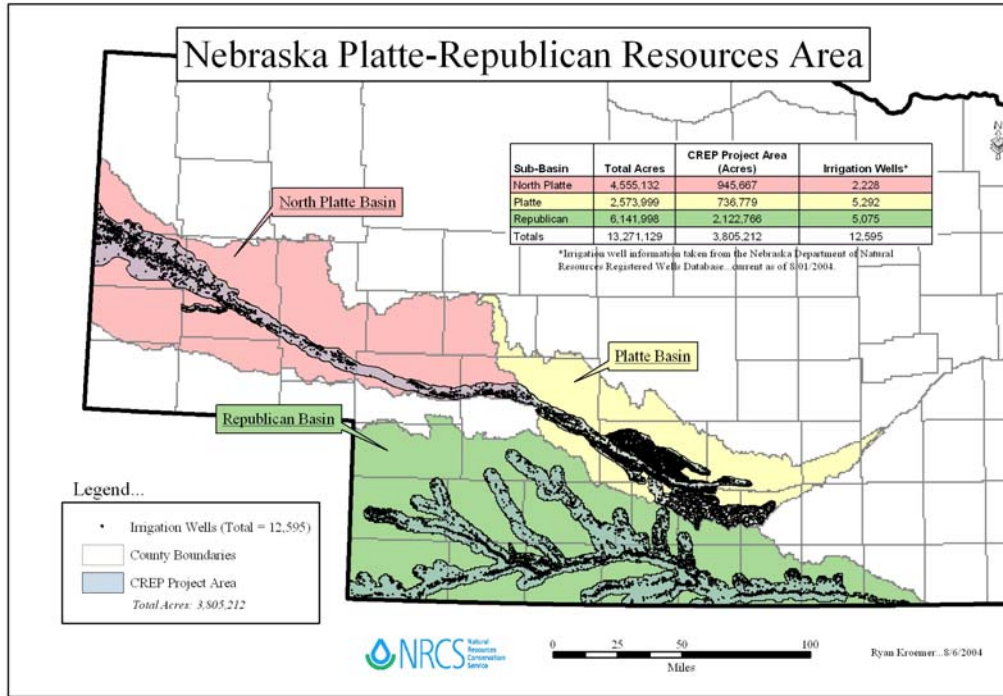
Grasslands were not the only natural and unique communities to be impacted by conversion to other uses. Part or all of five wetland complexes lie within the boundaries of the proposed priority area (Figure 6). These wetland complexes are diverse in nature and represent playas, saline/alkaline, and riverine types. Three of these complexes, the Rainwater Basin, Central Platte River, and Lower North Platte River, are of national and international significance because of the habitat they provide for migratory and threatened and endangered species. Appendix A provides detailed information on the profile, loss and threats to functions and values of these three important wetland complexes. The Rainwater Basin and Central Platte River have both lost >70% of



**Figure 3 – Depiction of irrigated acres within the project priority area for the proposed Nebraska Platte-Republican Resources Area CREP**

wetland acres since settlement. Loss of wetland acres in the remaining complexes has been difficult to quantify, but has accelerated with drought conditions. South-Central and Western Nebraska has also lost 60% of riparian communities to agricultural development. An additional habitat in jeopardy is a natural bur oak community along the lower Republican River.

The project area contains over 6,500 farms, which have 1,576,219 acres of cropland. The average size of these units is 242 acres. We estimate the acreage has been devoted to primary crops as follows: Corn – 766,070 acres; Soybeans – 178,712; Wheat – 181,809; Alfalfa – 172,273. Land use has changed and intensified greatly in the past 40 years, as 72% of the cropland in the project area is irrigated (1,128,832 acres). Corn, soybeans, wheat, and alfalfa crops are raised on approximately 90% of the irrigated acres. The majority of land is privately owned and devoted to agricultural production. Less than 10% of the project area is devoted to urban areas, water, and public lands. Public lands comprise 3% of the area (Figure 7). Counties associated with the proposed CREP project priority area have been active in other federal land reserve programs (Table 1) and taken many other water savings actions, such as moratoriums on the granting of new surface water rights, construction of new wells and development of new irrigated acres.



**Figure 4 – Representation of irrigation well development within the project priority area for the proposed Nebraska Platte-Republican Resources Area CREP**

The rich and diverse wildlife populations of the area have responded to various habitat changes brought about by settlement and agricultural development. Prior to settlement fish were limited to the river systems and their tributaries. Construction of ponds and reservoirs allowed an expansion in both the diversity and abundance of species. However, the continued development of land for agricultural and municipal purposes reduced and degraded plant communities, wetlands and aquatic systems, resulting in lost and fragmented wildlife habitats and declining populations of many species. Wildlife resources of the area include:

A. Threatened and Endangered Species (Federally listed (F) and State listed (S)).

1. Whooping Crane (F)
2. Piping Plover (F)
3. Interior Least Tern (F)
4. Bald Eagle (F)
5. Peregrine Falcon (F)
6. Sturgeon Chub (S)
7. River Otter (S)
8. Finescale Dace (S)
9. N. Redbelly Dace (S)
10. Amer. Burying Beetle (S)
11. Western Prairie Fringed Orchid (F)
12. Small White Lady's Slipper (S)
13. Lesser Prairie Chicken (F-historic)

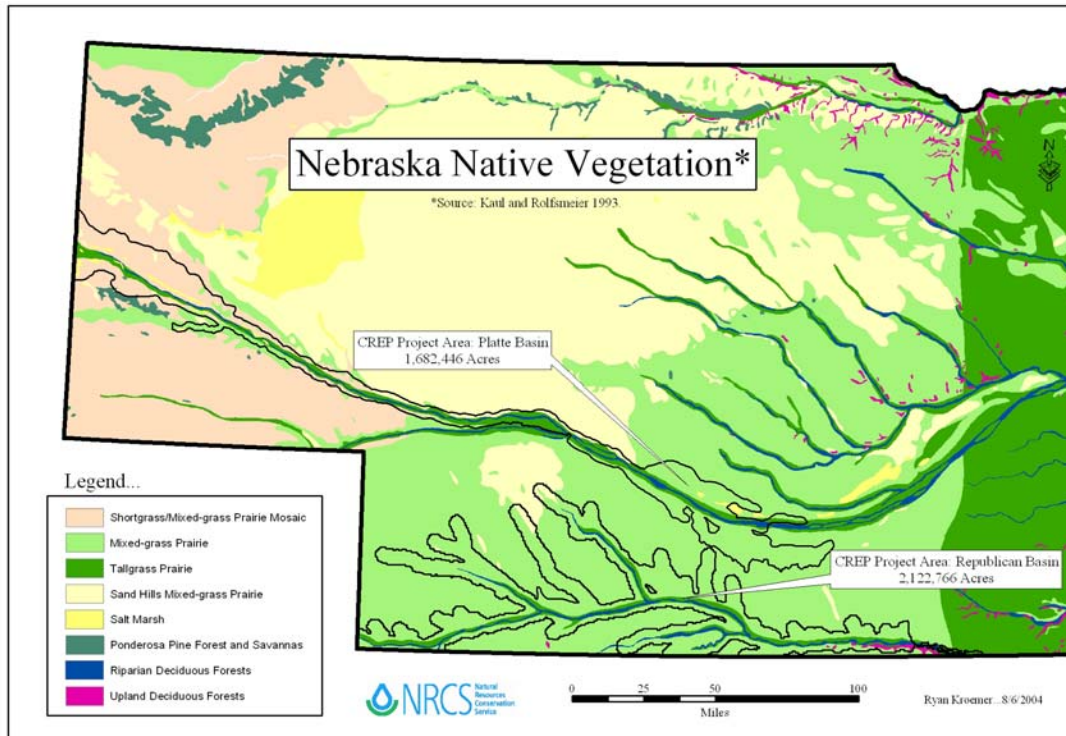
B. Bird Species

1. Migratory Species (Federal Management Authority)

- includes ducks, geese, swans, sandhill cranes, mourning doves, and shorebirds.

## 2. Resident Game Birds

- includes greater prairie chicken, sharptail grouse, northern bobwhite quail, and ring-necked pheasant.



**Figure 5 – Map depicting native vegetation communities within the project priority area for the proposed Nebraska Platte-Republican Resources Area CREP**

## 3. Non-game Birds

- includes a total of 208 species that breed in the project priority area. These species are diverse, including hawks, owls, jays, vultures, woodpeckers, as well as a variety of grassland and migrant neotropical species.

## C. Mammals

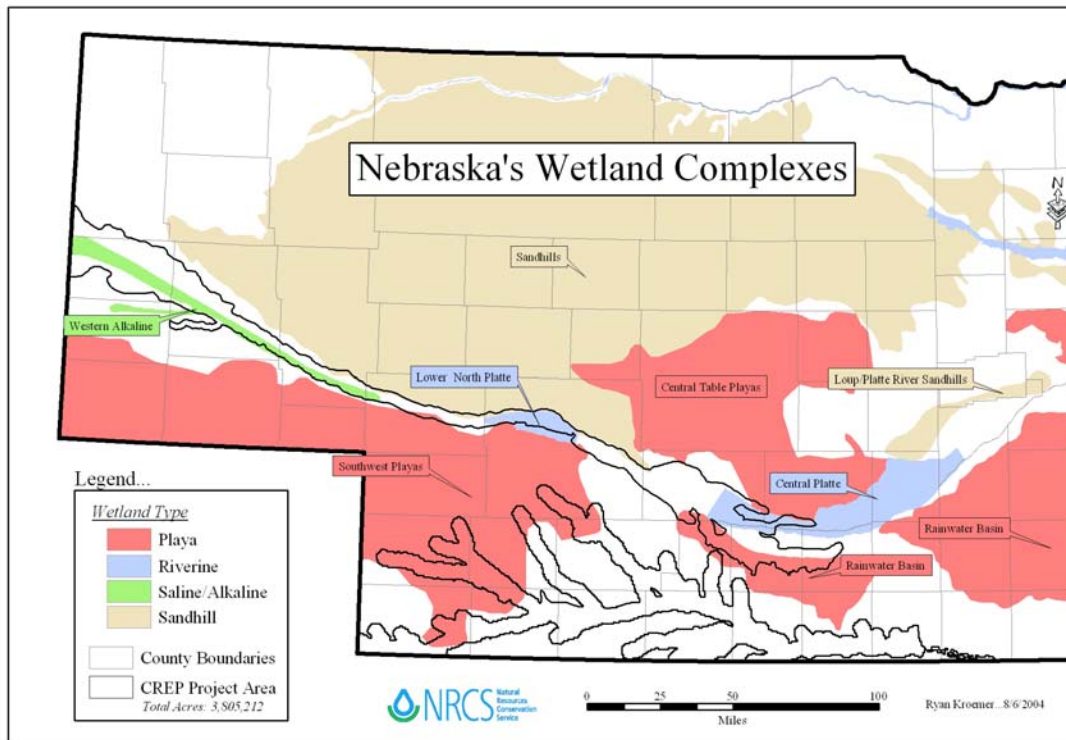
- A diverse mammalian community exists within the project priority area, including 23 families and 64 species. Major sport species, such as white-tail deer, mule deer, and antelope are among the more populous mammals.

## D. Fish and Herptiles

1. Fish - a total of 19 families and 82 species are found in the project priority area including walleye, bluegill, rainbow trout and creek chub. A complete list is

provided in Appendix B, because of the direct impact water quantity will have on these species.

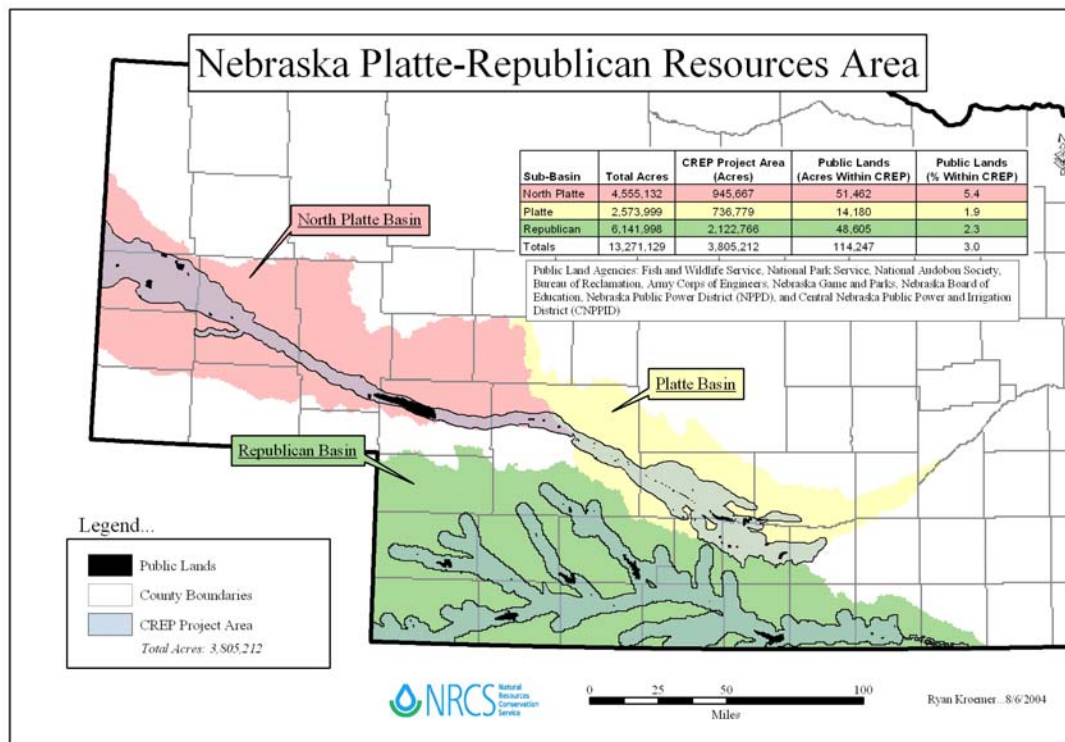
2. Herptile – close to 40 different species of frogs, turtles, salamanders, snakes and lizards are present in the project priority area. Included among these species are northern leopard frog, american toad, painted turtle, yellow box turtle, tiger salamander, coachwhip snake, milk snake, prairie rattlesnake, eastern fence lizard and six-lined racerunner.



**Figure 6 – Map depicting the wetland complexes in the state of Nebraska and their relation to the project priority area for the proposed Nebraska Platte-Republican Resources Area CREP**

### **SECTION 3 – AGRICULTURE RELATED ENVIRONMENTAL IMPACTS**

The primary goal of the Nebraska Platte-Republican Resources Area CREP is the stewardship of our water and wildlife natural resources, as well as maintaining the quality of life. This CREP is designed to address water quantity concerns in a flexible and cost-effective manner by maximizing public returns from government programs such as the CRP. Targeting two major river basins will provide resource and human benefits over a large geographic area. Secondary benefits of increased terrestrial habitat and improved water quality would also be realized with the implementation of this CREP. The drought has highlighted the fact that a number of interests are competing for the same finite resource. Irrigated agriculture is one of those competing interests and the primary out of stream user of water supplies. Thus irrigated agriculture has the unintended consequence of conflicting with the attainment of our goals, which justifies the pursuit of this CREP.



**Figure 7 – Map depicting location of public lands within the project priority area for the proposed Nebraska Platte-Republican Resources Area CREP**

The inter-relationship between agricultural impacts and the natural and human environments must be clearly defined. The resource basis of concern includes water, wildlife, and human well-being. Water resources can be assessed in terms of the quantity and quality available from groundwater, reservoirs and rivers. Wildlife resources are determined by the availability of preferred aquatic and terrestrial habitat. Human well-being refers to physical, emotional, and economic well-being that, in this case, stems from adequate water and wildlife-related resources. Thus the primary impacts of agriculture on the environment of the area include:

- The effects of the drought have reduced reservoir storage the past 5 years. The amount of water in reservoirs directly correlates to available aquatic habitat and is important to human well-being.
- Pumping of water to irrigate land reduces the amount of water available for stream flow, alters natural flow patterns, and in some cases, degrades water quality, impacting wildlife habitat and public water systems.
- The conversion of native grassland, wetland, and riparian plant communities to agricultural production has resulted in:
  - a loss to community diversity and wildlife habitats;
  - a long term decline in wildlife populations;
  - a decline in recreational opportunity and participation.

**Table 1. Total current enrollment in major federal land programs for counties that have land within the proposed CREP priority area.**

County	CRP Acres	WRP Acres	EQIP Acres	Total Acres
Buffalo	6,968.4	544.0	23,116.0	30,628.4
Chase	9,647.2	0	64,151.0	73,798.2
Dawson	1,673.9	51.0	46,227.0	47,951.9
Dundy	10,938.6	0	69,087.0	80,025.6
Franklin	5,797.4	82.0	6,044.0	11,923.4
Frontier	1,142.5	0	27,082.0	28,224.5
Furnas	15,094.2	0	36,089.0	51,183.2
Garden	10,712.8	0	135,827.0	146,539.8
Gosper	2,125.5	0	26,282.0	28,407.5
Harlan	2,888.3	0	8,667.0	11,555.3
Hayes	14,686.2	0	17,004.0	31,690.2
Hitchcock	6,081.9	0	25,681.0	31,762.9
Kearney	1,071.7	226.0	7,574.0	8,871.7
Keith	14,118.7	0	83,885.0	98,003.7
Lincoln	10,120.7	0	65,347.0	75,467.7
Morrill	23,450.2	1,485.0	51,520.0	76,455.2
Nuckolls	2,593.4	0	15,195.0	17,788.4
Perkins	39,205.6	84.0	26,010.0	65,299.6
Phelps	726.9	1,149.0	6,147.0	8,022.9
Red Willow	2,978.1	0	17,475.0	20,453.1
Scotts Bluff	22,937.5	731.0	37,843.0	61,511.5
Sioux	4,189.6	160.0	0	4,349.6
Webster	15,810.1	0	32,628.0	48,438.1
Total in CREP Project Area Counties	224,959.4	4,512.0	828,881.0	1,058,357.4

An expanded review of the impacts of agriculture on the environment is necessary to understand the scope and complexity of the problems. These problems do not lend themselves to compartmentalized analysis.

1) Quantity of surface water stored in reservoirs

A) Loss of water storage

The amount of water stored within these systems has drastically declined during the current drought. Several factors have contributed to the depletion of stored water, which will be discussed in later sections; here we will quantify the magnitude of this loss. Lake McConaughy provides the majority of surface water storage for irrigation and hydropower in the Platte River system. Upon the completion of the 2003 water-year, storage in this reservoir was less than 30% of totals from 1998. This loss of stored water correlated to a 54-foot drop in surface water elevation. Lake McConaughy is projected to be completely dry by the fall of 2005 if current precipitation patterns continue and full irrigation withdrawals are allocated. The downstream reservoirs dependent on Lake McConaughy water now store about 40% of the water compared to 5 years previous. Water storage in Republican River reservoirs has decreased more than 50%

during the same time period and occupies less than 1/3 of the available capacity. Republican River reservoir operators have strictly allocated water delivery to irrigation districts the past few years as irrigation storage has been depleted.

B) Less water equals fewer fish

Reservoirs are impacted in several ways by the loss of water. First and foremost, aquatic systems have a finite capability to support life. A major factor in determining the biotic limitations of an aquatic system is the amount of water available. Aquatic life and fisheries concerns stemming from reductions in the quantity of water include:

- increased eutrophication rate
- increased susceptibility to water quality limits (water temperature; dissolved oxygen)
- increased susceptibility to chemical pollution
- increased opportunity for fish to escape with released water
- decreased survival of young fish (fewer bays and coves means less protection from predators and reduced invertebrate production)
- decreased production of all fish (less spawning habitat available)

C) Value of fish

Using population indices from NGPC standardized surveys conducted on Lake McConaughy and valuation standards established by the American Fisheries Society, the value of adult walleyes in 2002 exceeded \$12 million. Declining water levels in 2003 reduced available habitat and only \$7.1 million worth of adult walleye remained in Lake McConaughy. The trend of less walleye was also evident in other project priority reservoirs. On average, 39% and 62% less walleye were caught from 5 years and 8 years previous, respectively.

The production experienced by fish populations on an annual basis allows anglers to harvest fish. Harvested fish also have value that can be measured by replacement costs. In 2001, anglers harvested nearly 85,000 walleye from Lake McConaughy, which held a value of nearly \$1.7 million.

Lake Ogallala has an established cold-water fishery that is dependent on cold hypolimnetic water releases from Lake McConaughy to maintain cooler water temperatures. This trout fishery is in immediate danger of being lost because of the elevated temperature of incoming water. The NGPC estimates the standing population of trout in Lake Ogallala to be valued at \$117,000 and the annual angler harvest of stocked trout to be worth an additional \$180,000.

Other species of fish in Lake McConaughy, Lake Ogallala and the other public waters in the project priority area also have value, which is not currently documented. However, the general trends are anticipated to be the same and the net result would be tens of millions of dollars of fish lost to these systems due to the reduction in available water.

D) Value of angling and hunting

The loss of water and reduction in fish populations decreases angler participation. The reasons anglers stop participating include:



- lack of boat access
- muddy shorelines
- established fishing access points are out of water
- fewer coves and bays that are out of wind and have shade trees
- encounter higher numbers of other anglers
- average size of harvested fish becomes smaller

The loss of angler days has become evident. Again using Lake McConaughy as an example, angler days have decreased over 33% since 2001. However, the average catch rate per hour of walleye (the most popular species) has increased 35% during this time. So despite better fishing, fewer anglers are showing up.

Only three fisheries within the priority area have regular creel surveys conducted to track the number of anglers and their success. The creel surveys are designed to count the number of daytime anglers between mid-April through October when the bulk of participation occurs. Therefore angler day estimates are extremely conservative to the total number of angler days on a fishery. These creel surveys estimate angler participation for years with above average water to be 70,000 trips at Lake McConaughy, 40,000 trips at Lake Ogallala (and canals below the lake), and 50,000 trips at Harlan County Reservoir.

A reduction in angler days is a major economic impact on local communities. The U. S. Fish and Wildlife Service (USFWS) estimates that each angler spends \$19.00 on trip-related expenses per fishing trip. Using those estimates, anglers expend a minimum of \$3 million annually at Lake McConaughy, Lake Ogallala, and Harlan County Reservoir. Thus, a 33% loss in angler days due to reduced water levels equates to an annual economic loss of over \$1 million to this region. The loss of economic expenditures would be greater if full year creel surveys and the other fisheries in the priority area were included.

Every reservoir in the Republican River basin has associated lands that are accessible for public hunting. The largest area is the Corps of Engineers (COE) land upstream of Harlan County Reservoir that extends for approximately 15 miles. Many of the reservoirs in the Platte River basin also have associated lands for public hunting including Lake McConaughy, Sutherland Reservoir, Jeffrey Reservoir and Elwood Reservoir. Clear Creek Wildlife Management Area (WMA) (upstream of Lake McConaughy) contains more than 6,000 acres where hunters can pursue a variety of waterfowl, upland game birds, small game and big game species. These wildlife species require water for survival, and are dependent upon the nearby reservoir for maintaining adequate habitat to support their current population numbers.

Estimates of hunter participation have been conducted for a few of these areas. The most detailed records are from Clear Creek WMA, which has found from 1,200-3,400 hunter use days annually over the past 30 years. Using USFWS estimates of nearly \$42.00 in trip-related expenditures per day of hunting, the hunting activity at Clear Creek WMA results in at least \$50,000 in hunting trip-related expenditures each year. Almost 5,000 hunter use days were recorded at Swanson Reservoir, Enders Reservoir, Red Willow Reservoir, and Medicine Creek Reservoir during a survey in 1994. Other wildlife management areas in the project priority area have not conducted hunter user surveys. A conservative estimate would project hunting trip-related expenditures to exceed \$300,000 annually.

E) Value of parks

Participation and use

The value of public parks and property has been far-reaching and difficult to quantify, but by all accounts a great investment for government entities. The NGPC administers the recreational and wildlife resources of Lake McConaughy, Sutherland Reservoir, Lake Maloney, and Johnson Lake, which are all dependent on water from North Platte River flows via Lake McConaughy. While efforts to quantify the value of Lake McConaughy and associated waters have not been conducted, the de-watering of this lake would clearly be a drastic loss to the community, region and state. An obvious economic impact would be the loss of direct expenditures from many of the 900,000 annual visitors to Lake McConaughy and Clear Creek Wildlife Management Area, as well as 300,000 visitors at the associated downstream properties. Of great importance to Nebraska is the high percentage of non-residents, which have composed more than 70% of summer holiday weekend visitors at Lake McConaughy. The money spent from out-of-state travelers represents net new direct expenditures in Nebraska.

Public parks in the Republican River Basin have also been impacted by lower water levels, and again, while difficult to quantify, the effects would be noticeable. State parks within this basin had almost 225,000 visitors in 1999 when water levels were at higher (normal) levels. Total visitors in state parks decreased by almost 25% in 2003 when water levels were lower. Federal facilities surrounding Harlan County Reservoir see over 500,000 visitors annually and COE staff believe a direct correlation exists between number of visitors and water level.

In total, state and federal recreation areas expect almost 2 million visitors annually in the project priority area. Many of these visitor days, and their economic impact on the region, are in jeopardy if something is not done to keep water in these reservoirs.

Extending impacts to local economies

Loss of these economic inputs would financially cripple this region of the state. For example, the COE estimates that Harlan County Reservoir produces \$8.8 million in total sales annually, which supports 228 jobs. Within the proposed CREP area, state parks employs an additional 100+ people annually. Specific economic studies have not been conducted for all the project area facilities, but sales expenditures are in the tens of millions of dollars.

Additional losses to the area would be felt by the lack of financial investment for recreational improvements. For the Platte River Basin alone, the NGPC has invested more than \$7.5 million in capital recreational improvements during the past 8 years. An additional \$1.2 million has been re-directed in the past 3 years to low water boat access projects. Currently in jeopardy are habitat improvement projects scheduled for Enders Reservoir and Harlan County Reservoir over the next few years that could exceed \$5 million in expenditures.

Economic impacts can also be felt beyond the direct expenditures by the state for employees and projects. Studies have shown that properties next to public parks and natural areas can be worth up to 23% more than properties as little as a block away. With the loss of water from Lake McConaughy and the lowered surface elevation in other priority area reservoirs, the houses would be farther away from the resource (water) that gives them value.

F) Quality of life

Water-based recreation at reservoirs in the project priority area generates benefits that may be less apparent and perhaps even more important than direct expenditures. These benefits are typically identified as “quality of life” improvements and include personal, social, community, educational, environmental, and non-direct economic gains.

Personal benefits

Participation in outdoor recreation activities associated with reservoirs and natural areas has been linked to a multitude of benefits including:

- increased level of physical fitness
- increased participation in activities
- decreased obesity
- youth who are less shy and introverted-
- greater optimism
- increased self-esteem
- reduced heart disease
- reduced stress

The overall result is a happier, healthier and more optimistic community.

Social/community benefits

Because outdoor recreationists are more active, they build relationships between family, people and organizations, thus promoting community unity. Also, participation in outdoor recreation activities has been documented to reduce delinquency by providing youth and adult with options for activities and increased community ethics. Evidence of this can be found in the U.S. F.B.I. Crime Reporting Program Data, which shows that the Nebraska counties with the 3 largest reservoirs report, on average, half the rate of total crime per capita as compared to the state average. Preserving, protecting and providing aquatic resources and open space in communities enhances the desirability of an area, as well as contributes to the safety and enjoyment of its inhabitants.

Educational/environmental benefits

While enjoying the outdoors through recreation, people often enhance their ethnic and cultural understanding, natural resource knowledge, and ecological awareness. This increased knowledge provides a basis for individuals to make better decisions about how their actions may affect the environment. Historically more knowledgeable participants have demonstrated a willingness to preserve valuable sites, contribute to management, and collaborate with outdoor recreation groups that promote conservation and preservation. Individuals on the path to becoming environmental stewards are instrumental in creating awareness and protecting the quality and integrity of these unique natural resources.

Non-direct economic returns

Various businesses and individuals with money are attracted to relocate in areas with a high quality of life that includes recreation, reduced crime rates, healthier inhabitants, and a

community that expresses a high environmental ethic. The jobs created by these transplants are not just poor-paying service jobs, but rather include the types of jobs that keep young people from moving out of the area, e.g. technology jobs. In fact, Keith County, home to the state's largest reservoir, Lake McConaughy, beat out Nebraska's urban counties for the percentage of new housing units developed over the past two years. With more stable water levels, Lake McConaughy and other project priority area reservoirs could serve as an "economic engine" by continuing to attract housing starts, escalating real estate values and recruiting young intelligent professionals to the local community.

G) Summary of impacts surrounding reduced water storage

The project priority area has lost almost 70% of the water stored in existing reservoirs during the past 5 years. This loss of water has negatively impacted the amount of habitat available for biotic communities and reduced population numbers. Less acres of standing water and fewer fish has resulted in reduced visits from anglers and park patrons. The loss of visitors to this project priority area jeopardizes the economic well-being of surrounding communities. Furthermore, the potential impact of losing one or all of these reservoirs will have a much greater impact on the "quality of life" for local inhabitants.

2) Surface and groundwater irrigation pumping leads to reduced flows, altered flow patterns, and in some cases, degraded water quality

A) Reduced flow in river basins

The amount of water flowing through rivers in the project priority area has decreased greatly during the recent drought. This past year saw major sections and tributaries to both the Republican and Platte River basins go dry. Inflows to Lake McConaughy for the last five years are only 75% of the previous 25-year record and the inflows for 2002 and 2003 were the lowest since records began in 1942. Inflows to Swanson and Harlan County Reservoirs on the Republican River in the last five years were only 37% and 54% of the last 25-year average. Inflows to Swanson Reservoir for each of the last six years were the lowest flows on record since records began in 1951. The inflows to Harlan County Reservoir for the last two years were record low flows since records began in 1948.

Where has all the water gone? Recent changes in land management practices, including the development of watershed projects, construction of farm ponds and terraces, and improved ecofallow and conservation tillage techniques, all have produced positive benefits to the basin but decreased the runoff to streams. The intensification of groundwater pumping has also had a major impact. There are currently 12,595 groundwater wells in the priority area (Figure 5). Unfortunately, the drought has caused the pumping of these wells to increase with a concomitant increase in depletions to stream flows from these wells. The best offset to this increased depletion would be to retire the uses of some of these wells.

Reduced flows and periodic de-watering of channels has an adverse impact on fish and herptile communities. No water is obviously detrimental to thousands of individual fish that are unable to find adequate water. However, the impact of lower flows can also have a long-lasting effect on the aquatic communities that do persist. Some of the impacts include:

- less depth/cover available
- reduced access to spawning habitat

- reduced ability to move in stream
- increased water temperature
- greater risk of oxygen deprivation
- greater risk of chemical imbalance
- increased vulnerability of prey- increased vegetative growth
- eutrophication
- reduced food available

The combination of all these changes is anticipated to greatly reduce the abundance and diversity of stream communities. Species that are less tolerant or occupy specific niches will be extirpated and replaced by generalist species that can adapt to lower flows.

#### B) Changes in flow patterns

The changes in the intensity and timing of flows can impact aquatic communities in a variety of ways. First, biotic organisms are dependent on peak flows to reach specific habitat required for spawning and foraging activities. Secondly, the eggs of many fish require adequate flows to float downstream until they hatch or keep eggs clean and oxygenated. A shift of timing on flows could result in a much lower recruitment rate for several species. Additionally, diversion and pumping from rivers occurs during July and August, which deprives fish of cooling water in the hottest months of the year. On the other hand, the release of storage water from reservoirs and return flows from imported surface water provide increased flows to the river during the late summer when stream flows are normally low.

The USFWS has recognized habitat provided by traditional flows as important to all four of the listed threatened and endangered species in the Central Platte. This includes open channel habitat for nesting and foraging of piping plover and least interior tern, as well as whooping crane roosting. Peak flows also need to reach adjacent wetlands and grasslands to produce forage for whooping cranes and forage fish for the interior least tern.

#### C) Water quality concerns

The integrity of water quality is dependent on reducing point source pollution that is generated from various agricultural, domestic, industrial and natural processes. Standard farming practices in South-Central and Western Nebraska apply Atrazine, Nitrate-Nitrogen and Phosphorous ( $P_2O_5$ ). Application rates of these chemicals vary depending on the crop planted, soil type and individual preference, but we will present average annual application in pounds/acre as estimated by University of Nebraska-Lincoln crop specialists for this region. These chemicals are necessary for production but additive to water quality concerns of the surface and groundwater.

Atrazine and other triazine herbicides are very important to Nebraska corn and sorghum producers. They are effective, easy to use and relatively inexpensive. Other available alternatives cost from 5 to 10 times as much per acre. Use of these compounds has a positive impact on the farmer's net income and state's economy. Unfortunately, the triazines do raise health concerns. These chemicals and compounds move from the point of application in solution or suspension or attached to sediments. The National Water Quality Assessment Program Database reports the highest category of atrazine concentrations from samples collected within the proposed CREP area. In the priority area, atrazine is applied at 1.3 pounds/acre meaning that at full capacity this CREP would prevent the application of 130,000 pounds of atrazine annually.

The triazine herbicides are “Restricted Use” pesticides that require applicator certification and contain label restrictions on where they can be mixed, loaded or used. Even despite these strict application guidelines, concentrations of these herbicides have been increasing. At risk is the potential disruption of the aquatic food chain as these compounds are toxic to aquatic invertebrates. Resident species of fish and amphibians would be impacted by the localized absence of these invertebrates. Additionally, millions of migratory waterfowl and shorebirds use these wetlands for extended periods each spring to build body reserves for the stresses of continued migration and nesting. Aquatic invertebrates are essential components in building these reserves.

Application of Nitrogen and Phosphorous is essential to crop production in the project priority area. While this region is renowned for producing 200+ bushel/acre corn at harvest, this production requires soil fertility augmentation. On average, 200 pounds/acre of Nitrogen and 20 pounds/acre of Phosphorous are applied in the priority area. Nitrogen as nitrate is highly water soluble and susceptible to leaching into ground and surface waters. Nitrates in drinking water can be hazardous to human health. High nitrate levels in public water supplies have been problematic in both the Platte and Republican basins. Almost 1/3 of the municipalities with excessive nitrate levels in Nebraska in 2002 lie within the proposed CREP area. This nitrate loading has required the periodic or permanent shut down of wells and drilling of new wells for public water. Nitrogen and Phosphorous are also harmful to lakes and reservoirs. These compounds stimulate excessive growth of algae and emergent vegetation. Aquatic habitat is lost through over crowding and loss of open water. Death and decay of the excess vegetation stresses the oxygen balance and can lead to fish kills. The result is a loss of aesthetic value, loss of open water and declining fisheries.

This CREP project has the potential to reduce application within the priority area of Nitrogen by 20 million pounds/year and Phosphorous by 2 million pounds/year. An estimated 50-60 pounds/acre annually leaches from these applications into the surface and groundwater, which is used for domestic and industrial purposes. Reduced application of chemicals and fertilizers in the area will help prevent the degradation of water supplies and reduce concentration levels that may impact aquatic systems and pose human health risks.

#### D) Summary

The current drought has imposed a major adverse impact on fish and wildlife habitat along the Platte and Republican Rivers. Not only has the drought decreased inflows to the area, but it has also increased the need to pump water for irrigation. By reducing the number of irrigated acres in the area, CREP will reduce the consumptive use of water and thereby conserve more of the available water for fish and wildlife.

#### 3) The intensification of converting native grasslands, wetlands, and riparian plant communities to agricultural production has resulted in:

##### A) Loss of community diversity and wildlife habitats

Loss of grasslands, wetlands and riparian communities from conversion to cropland has reduced the community diversity and available wildlife habitat within the priority area. The native habitats within the priority area have been particularly impacted by various changes. Over 80% of the native mixed grass loess prairie and lowland tallgrass prairie have been lost within the state. Conservative estimates for the loss of shortgrass prairie are in excess of 50%. The remaining acres of prairie habitat are generally in poor shape, a problem that has been exacerbated by the drought.

Wetland complexes within the priority area have also been greatly impacted by agricultural and urbanization activities. Overall 35% of the wetland complexes in the state have been estimated to be lost, however wetlands within the priority area have suffered the greatest share. The Rainwater Basin has lost over 90% of wetland acres since settlement, while the Central Platte has lost over 70%. The other wetland complexes within the proposed priority area are actively cropped on a regular basis, including over 90% of the Southwest Playas. In addition to the loss of wetland complexes, loss of riparian communities to agricultural development in South-Central and Western Nebraska has been estimated at 60%.

Wet meadows represent another critical habitat type in the project priority area, especially for whooping cranes. Wet meadows require high water tables and high spring flows. Wet meadows include a mosaic of grassland habitats within a small geography, including lower wet areas and upland prairie is present on higher humps and dunes within the meadows. This diverse habitat also is an important area for producing invertebrates and amphibians.

These habitats are extremely important to the stability of wildlife populations in the priority area. Grasslands provide nesting sites, cover and food production for a multitude of native species. Wetlands provide water, forage habitat, breeding habitat, relief from summer and winter extremes, as well as enhance water quality, sediment control, groundwater recharge and flood storage. Riparian areas can easily be distinguished from surrounding upland areas by the abundance of vegetation that is associated with water. Reports indicate that wildlife use riparian areas disproportionately more than other types of habitat. Also, native cottonwood-willow stands in this priority area provide important cover, foraging, and breeding habitat for over 80% of the riparian bird species present. In addition to the open water habitat created by reservoirs within the priority area, these resources also provide much of the available specialized habitat for wildlife. In the Republican River Basin alone, there are almost 50,000 acres of upland grass prairie, riparian zones, and wetlands surrounding the 5 established reservoirs. As surface acreage and groundwater levels decrease, portions of these habitats surrounding reservoirs become stressed and depleted.

#### B) Loss of wildlife populations

Measuring the impact of agriculture on wildlife populations is difficult because two major factors, weather and habitat determine annual population changes. Either one of these factors can mask the influence of the other. Grassland habitat is particularly important to ground nesting species such as the ring-necked pheasant, bobwhite quail, greater prairie chicken and ground-nesting songbirds. Long-term population trend data is not readily available for the grassland songbirds. The best long-term data on avian population trends in Nebraska is for the ring-necked pheasant, which is believed to be the best indicator species for all grassland nesting birds. The Spring Rural Mail Carriers survey indicates pheasant populations within the area have declined by about 54% from 1969 through 1997 and about 95% from 1951. Numbers would be expected to be much lower without the addition of CRP grassland habitat on the perimeter of this area.

The population of greater prairie chickens has greatly declined from their levels in the 1940s as the amount of native grasslands dropped below the threshold required by this species. These birds have recolonized some areas of the state since the addition of grassland through the CRP. The lesser prairie chicken is thought to be extinct within the state, but small populations exist across the border in Colorado and Kansas. Some CRP acres are available for lesser prairie chicken habitat in the upper end of the Republican River basin, but the addition of more acres would be helpful for the re-establishment of this species.

Whooping cranes are a federally listed species with less than 200 individuals remaining in the population. These birds use wet meadows along the Platte River during their migration between

Canada and Texas. Whooping cranes depend on the invertebrate and amphibian production of these wet meadows to provide them valuable protein and maintain their energy and fat levels during these migrations.

The loss of 70 to 90% of the different wetland complexes has impacted both resident and migratory species. Historically, these wetland complexes provided significant recruitment to the nation's duck supply, similar to the production of the Prairie Pothole Region. The loss of wetland and grassland habitat has reduced the waterfowl production value of the area to a minor status. However, the area wetlands are a critical spring staging area in the ecology of ducks, geese and other migratory species. Each spring, millions of birds crowd into remnant wetlands in the region. This crowding provides nearly ideal conditions for the spread of disease, and avian cholera outbreaks have been a recurrent event since 1975. Major outbreaks of the disease kill more birds in some years than legal harvest.

#### C) Decline in recreational opportunity and participation

Thousands of hunter use days occurring annually on lands surrounding reservoirs within the priority area are only a small part of the importance of this area to hunting participation. The areas of the Republican, Platte and North Platte River basin included within this project are extremely important to hunting participation in this state. State wildlife biologists estimate that within these regions over 60% of the hunter use days occur within 2 miles of the river basins. The total number of hunter use days for the state of Nebraska exceeds 2.2 million according to the USFWS 2001 National Survey and the expenditures linked to this participation was almost \$200 million. Considering the majority of the hunter use days within the priority area occur around the rivers and reservoirs, a major economic impact will be felt if wildlife populations continue to decline.

The presence of diverse and abundant wildlife populations is important to more than the hunting community. Wildlife watching has become a popular activity, and the flocks of waterfowl and cranes migrating through Nebraska have brought many residential and non-residential visitors to the reservoirs and public use areas in the project priority area. The USFWS 2001 National Survey estimated 2.2 million days of wildlife watching activity annually in Nebraska. These wildlife watchers spent over \$125 million dollars on their trips, much of which went to rural Nebraska businesses.

#### D) Summary

The loss and degradation of the native prairie grasslands, wetlands, riparian communities and wet meadows in the project priority area have greatly reduced available wildlife habitat. The result has been decreased abundance of many resident wildlife species, including our best indicator species the ring-necked pheasant. Additionally, migrating birds using the project priority area encounter greater stress due to reduced food and overcrowding on the remaining habitat. Among the migrating birds are whooping cranes, which have fewer than 200 individuals remaining. The resulting decrease in wildlife populations will lead to less hunter use days and wildlife watching days for this area. The regional communities and businesses depend heavily upon their share of the over \$325 million spent annually in Nebraska by these recreationists. Converting additional land within this area from agricultural use to native habitat would improve wildlife populations, assist migrating species and provide more acreage for hunting and wildlife watching activities.



## **SECTION 4 – PROJECT OBJECTIVES**

It is important to characterize the purpose of the Nebraska Platte-Republican Resources Area CREP project. Currently, the priority area suffers from drought conditions, which has strained the wildlife populations, agricultural industry and recreational industry in this region. The intent of this CREP therefore is to reduce the quantity of water being used for irrigated agriculture, thus sustaining the existence of wildlife populations and protecting the agricultural and recreational industries vital to this region. If reservoirs or rivers become dry for any extended period of time the wildlife and communities surrounding this habitat will be devastated. Consequently the success of some aspects related to this CREP may not be directly measurable, as it hopes to allow animals to persist and rural stores to stay open. Therefore, evaluation of project objectives will be in terms of quantity of water conserved, not as a percent increase in storage or flow.

- 1) Reduce application of water for irrigation in the priority area by 125,000 acre-feet (over 40 billion gallons) annually. If implemented the project will meet this objective by retiring 8.3% (100,000 acres) of the irrigated cropland from production. Average application of irrigation water on crops in the priority area is approximately 15 inches/acre or 1.25 feet/acre.
- 2) Conserve 100,000 acre-feet of water annually within priority area reservoirs. Water that is not delivered becomes available for storage in reservoirs.
- 3) Increase flows in priority area rivers by 50,000 acre-feet annually. This water will be available to augment seasonal flows.
- 4) This project will provide 85,000 additional acres of native grassland habitat for wildlife in the priority area. This will increase the populations of pheasants and other ground nesting birds by 25% in the area. The NGPC will employ supplementary habitat development at Harlan County Reservoir. The added emphasis on habitat management is expected to provide a 50% increase in pheasants and ground nesting birds in this localized area.
- 5) Reduce the application of triazine products by 8.3% (130,000 pounds) annually in the priority area. This goal will be accomplished by retiring 8.3% of the irrigated cropland in the priority area. Additional reduction of triazine products in agriculture run-off will be accomplished with the use of 10,000 Acres of filter strips and an educational campaign to share appropriate use of these products.
- 6) Reduce the application of Nitrogen and Phosphorous by 8.3% (20 million pounds and 2 million pounds, respectively) annually in the priority area. This goal will be accomplished by retiring 8.3% of the irrigated cropland in the priority area. Additional reduction in leaching of Nitrate and Phosphate is anticipated through educational efforts to improve the efficiency of water and chemical use in the project area.
- 7) Assist communities whose public water supplies are affected by Nitrogen and Phosphorous contamination issues.
- 8) Provide educational assistance to project priority area irrigators to develop a more efficient use of applied water, nutrients, and herbicides.
- 9) Monitor the aquatic communities and associated habitat parameters in project priority area reservoirs and rivers to determine biological relationships.

## **SECTION 5 – PROJECT DESCRIPTION**

The Nebraska Platte-Republican Resources Area CREP proposal is designed to create and enhance federal, state and local partnerships to address natural resource problems in a coordinated cost effective

manner. The pooling of personnel and financial resources results in a targeted approach to conserve natural resources and more effectively install land management.

The project priority boundaries selected to maximize water quantity savings are irrigated Nebraska cropland that is:

- designated as quick response acres in the Republican River above the Guide Rock Diversion
- within 2 miles of the North Platte River and Platte River from the Wyoming border down to the Kearney Canal diversion
- within 1-mile of the Pumpkin Creek tributary through the Morrill County line
- receiving surface irrigation water from these defined rivers.

Several criteria must be met for land parcels to qualify for this program including:

- land must have been irrigated 4 of the 6 years (1996-2001)
- land must have been cropped 4 of the 6 years (1996-2001)
- over half of each land parcel enrolled must fall within the project boundaries
- to qualify as surface irrigated land, the water delivered to the land must exceed half the amount needed to augment growth of the crop on that land for 4 of the 6 years (1996-2001)
- surface irrigated acres that are supplemented by groundwater pumps do qualify
- all retired land must currently be legally and capably irrigated

The following conservation practices will be used in the Platte-Republican CREP:

- |                                |                                   |
|--------------------------------|-----------------------------------|
| CP2 - Native Grass             | CP4D - Wildlife Habitat           |
| CP21 - Filter Strips           | CP22 - Riparian Buffer            |
| CP23/23A - Wetland Restoration | CP25 - Rare and Declining Habitat |

In order to maximize benefits throughout the entire project area available acreage will be split between the Republican and Platte River basins (50,000 acres each). Enrolled land in the Republican River Basin will be ranked for potential water savings (Appendix C). Acres in the Platte River Basin will be available with general sign-up, but a ranking system will be developed as more detailed hydrological information becomes available.

Goals for specific conservation practices are; 85,000 acres of native grass-CP2, wildlife habitat-CP4D, and rare and declining habitat-CP25; 10,000 acres of filter strips-CP21 and riparian buffers-CP22; 5,000 acres of wetland restoration-CP23, CP23A.

Native grass, wildlife habitat, and rare and declining conservation practices are emphasized in this CREP to encourage enrollment of large pieces of land. A benefit to this approach is the efficiency of retiring entire irrigated fields. The efficiency of surface water delivery to fields is often less than 50%, and at times partial delivery suffers the entire loss, therefore retiring the entire field would maximize program benefits. Additionally, larger habitat sanctuaries that are more apt to act as a population source can be created with the retirement of entire fields. Using at least 40 point seeding mixes of CP2, CP4D, and CP25 on retired fields will maximize wildlife benefits.

The 10,000 acres designated towards filter strips and riparian buffers will be effective at removing nutrients and water-borne pesticides. Advantages to these vegetative practices are that specific acres are

removed from irrigation, as well as herbicide and nutrient applications. Also, the strips of land actively filter out herbicide and nutrient applications made on cropland above them. This common sense approach will maximize the benefits for this CREP.

The 5,000 acres of wetland restoration will help address the need for functional wetlands that are lacking throughout the project area. Wetlands provide benefits in terms of water quality (sediment and nutrient filtering and cycling), floodwater storage, and wildlife habitat. These wetlands are essential components of wildlife habitat, and serve as a primary staging source for millions of migrating birds. These wetlands also provide value for wildlife associated recreation (hunting and wildlife viewing) which bring substantial funds into the local and state economies.

## SECTION 6 – COST ANALYSIS

- A) Total Estimated Costs = \$158,215,000 over 10 years, 80% federal and 20% state (Appendix D). An additional \$10,000,000 for program cost share is needed with initial sign-up and would be split 50% federal and 50% state and local.
- B) A table listing practices and applicable incentives:

Use	Practice	Incentive
Natural Resource Area	CP2, CP4D, CP25	EI of $\geq 8$ not required for enrollment  Irrigated rental rates on enrolled cropland  Up to 25% of cost-share
Filter Strips	CP21	Irrigated rental rates on enrolled cropland
Riparian Buffer Strips	CP22	Irrigated rental rates on enrolled cropland
Wetland Restoration	CP23, CP23A	Up to 25% of cost-share ( $\leq \$100/\text{Acre}$ )  6:1 maximum ratio of associated: wetlands acres  Eligible on farmed wetlands and prior converted acres

Federal land use rental payments would be based on irrigated rental rates. The focus of this CREP is to retire irrigated lands from crop production for 10-15 years, during which those lands will be planted to high value cover for water, soil, and wildlife conservation. The anticipated cost to crop production based from 3-year harvest average is 50,000 Acres of corn (150 bushels/Acre); 17,000 Acres of soybeans (49 bushels/Acre); 17,000 Acres of wheat (42 bushels/Acre); and 16,000 Acres of alfalfa (5 tons/Acre). The opportunity costs foregone will be negligible, since this land is currently farmed and in regions with ample land available for commercial and agricultural development.

## SECTION 7 – MONITORING PROGRAM

- A) The Nebraska Department of Natural Resources (NDNR) and participating NRD's and irrigation districts will monitor water savings. These entities will undertake additional efforts to improve

water use efficiency. The total savings in consumptive use will be delineated by river basin and include a separate assessment of surface and groundwater conserved.

The NGPC and participating NRD's and irrigation districts will monitor aquatic and terrestrial populations for select species, as well as recreational participation associated with the project area.

The NGPC and participating NRD's and irrigation districts will monitor and address problems associated with low water conditions. Additional efforts will be undertaken to improve aquatic habitat, control invasive plant species (especially salt cedar which uses large amounts of water), and sustain recreational access.

The Nebraska Department of Environmental Quality (NDEQ) will collect water quality data at selected project area points. The USGS and University of Nebraska-Lincoln will collect supplemental data. The NDEQ and NGPC will monitor watersheds associated with reservoirs targeted for aquatic habitat improvement. All water quality monitoring will be done using standard methods.

- B) The NDNR and NGPC will cooperatively compile and submit an annual report to the FSA by the first of April each year.
- C) The program will be evaluated each year to ensure that project objectives are being met. If the results of the evaluation indicate that a substantial difference exists between the objectives and the results, practices and the program will be modified, with FSA concurrence, to ensure that they are reached.

## **SECTION 8 – PUBLIC OUTREACH AND SUPPORT**

- A) Support for this project is broad based and includes state, county and local government agencies, NRD's, producer and commodity groups, conservation groups and environmental groups (see Appendix E).
- B) A multi-media public outreach campaign will be initiated using all of the public relations resources available to the partners in the proposal. Specific emphasis will be placed on an educational campaign that will promote water conservation and resource utilization within the project area. All supporting agencies and entities will assist with the public outreach and educational campaign by applying their full resources. Additional funding will be sought through grants.

## **SECTION 9 – DEVELOPMENT OF PROCEDURE**

Specific procedures for implementing this CREP will be developed upon acceptance of this proposal.

## **SECTION 10 – TRAINING OF STAFF**

A team of federal and state staff will coordinate the necessary training sessions to reach persons involved with the sign-up, promotion, maintenance, and monitoring of the accepted CREP. Specific details and procedures will be shared during this training, as well as contact information for future support.

## **SECTION 11 – COMMUNICATION PLAN**

A detailed communication plan will be developed upon acceptance of the CREP plan. The communication plan will share project goals, objectives, criteria, and most recent updates on project accomplishments. All available resources will be used to disseminate information including organizational newsletters, brochures, displays, magazine articles, agency internet pages, and TV/radio spots if funds are available. Sign-up will be monitored annually and barriers to enrollment identified via a non-user survey.

**ATTACHMENT A ENERGY USE PER ACRE**

		<b>Application 15 Inches/Ac</b>	<b>Application 20 Inches/Ac</b>	<b>Application 25 Inches/Ac</b>
Lift = 25 feet				
Electricity (kwh)		90.4	120.6	150.7
Diesel (gals)		7.6	10.1	12.6
Propane (gals)		12	16	19.9
Nat Gas (1000cu ft)		2	2.7	3.4
Lift = 50 feet				
Electricity (kwh)		137.4	183.2	229
Diesel (gals)		11.5	15.3	19.2
Propane (gals)		18.2	24.3	30.3
Nat Gas (1000cu ft)		3.1	4.1	5.1
Lift = 75 feet				
Electricity (kwh)		184.4	245.9	307.4
Diesel (gals)		15.4	20.6	25.7
Propane (gals)		24.4	32.5	40.7
Nat Gas (1000cu ft)		4.1	5.5	6.8
Lift = 100 feet				
Electricity (kwh)		231.4	308.6	385.7
Diesel (gals)		19.4	25.8	32.3
Propane (gals)		30.6	40.8	51.1
Nat Gas (1000cu ft)		5.1	6.9	8.6

**ATTACHMENT B POTENTIAL ENERGY SAVINGS\***

		<b>Application 15 Inches/Ac</b>	<b>Application 20 Inches/Ac</b>	<b>Application 25 Inches/Ac</b>
Lift = 25 feet				
Electricity (kwh)		5424000	7236000	9042000
Fossil Fuels (gals)		196000	261000	325000
Lift = 50 feet				
Electricity (kwh)		8244000	10992000	13740000
Fossil Fuels (gals)		297000	396000	495000
Lift = 75 feet				
Electricity (kwh)		11064000	14754000	18444000
Fossil Fuels (gals)		398000	531000	664000
Lift = 100 feet				
Electricity (kwh)		13884000	18516000	23142000
Fossil Fuels (gals)		500000	666000	834000

\* Based on 60,000 acres served by wells powered by electricity & 20,000 acres served by wells powered by fossil fuels





**ATTACHMENT C**

Area	Total Harvested Cropland - Irrigated	Corn for grain - Irrigated	Corn for silage - Irrigated	Sorghum for grain - Irrigated	Wheat for grain - Irrigated	Barley for grain - Irrigated	Oats for grain - Irrigated	Sunflower seed - Irrigated	Soybeans for beans - Irrigated	Dry edible beans, excluding limas - Irrigated	Potatoes - Irrigated	Sugarbeets for sugar - Irrigated	Forage - Irrigated	Orchards - Irrigated
Nebraska	7,506,900	4,505,579	155,646	16,587	101,120	447	3,891	4,602	1,923,066	160,614	22,044	41,285	532,965	282
Region	2,306,963	1,387,099	61,812	3,643	69,082	226	454	2,219	368,555	110,475	2,136	19,328	254,796	16
Sioux	36,682	14,207	1,359	-	807	-	-	-	-	3,652	-	829	16,672	-
Scotts Bluff	162,971	74,295	4,197	-	1,785	-	51	196	-	38,337	-	6,332	38,484	-
Banner	19,727	5,151	619	-	2,064	226	-	-	-	3,767	-	-	6,575	-
Kimball	25,281	5,630	688	-	3,157	-	-	130	-	2,374	-	3,911	8,754	-
Morrill	110,195	52,803	4,564	-	2,293	-	-	283	-	17,779	-	4,013	29,417	-
Cheyenne	49,840	13,168	3,066	-	10,307	-	360	1,039	1,899	8,263	-	1,701	8,767	-
Garden	33,443	13,968	660	-	2,187	-	-	-	218	1,937	-	-	14,898	-
Deuel	16,365	10,845	-	-	1,949	-	-	-	245	783	-	-	1,652	-
Arthur <sup>1</sup>	6,903	-	300	-	-	-	-	-	-	-	-	-	6,603	-
Keith	90,322	56,487	3,501	-	3,342	-	-	-	3,964	4,670	-	1,929	11,285	-
Perkins	121,152	87,818	999	-	6,747	-	-	-	7,534	5,365	-	-	6,492	-
Chase	164,854	115,048	3,642	-	12,796	-	-	-	7,453	13,684	2,136	613	5,563	-
Dundy	86,826	56,723	4,210	-	2,240	-	-	-	2,489	7,492	-	-	9,694	-
Lincoln	201,789	140,074	6,049	-	2,008	-	-	-	18,242	1,230	-	-	31,551	-
Hayes <sup>1</sup>	44,326	28,948	3,022	-	1,489	-	-	186	1,730	1,142	-	-	7,809	-
Hitchcock	31,195	21,903	1,296	382	1,788	-	43	219	2,570	-	-	-	3,526	-
Frontier	59,832	38,424	1,700	539	2,767	-	-	166	13,325	-	-	-	3,046	-
Red Willow	43,894	29,146	2,485	536	2,076	-	-	-	6,072	-	-	-	4,333	-
Dawson	223,810	169,790	6,043	-	-	-	-	-	28,348	-	-	-	14,898	16
Gosper	82,929	47,341	1,627	221	2,022	-	-	-	27,326	-	-	-	3,015	-
Furnas	67,189	34,886	1,468	717	3,264	-	-	-	21,671	-	-	-	6,042	-
Phelps	249,175	146,500	4,283	-	450	-	-	-	93,844	-	-	-	3,484	-
Harlan	70,483	38,404	1,116	766	2,625	-	-	-	23,879	-	-	-	3,770	-
Kearney	215,268	133,299	3,599	-	111	-	-	-	75,081	-	-	-	3,126	-
Franklin	92,512	52,241	1,319	482	808	-	-	-	32,665	-	-	-	5,340	-

Note: <sup>1</sup>Total Harvested Cropland - Irrigated values were entered as the summation of listed crops rather than a "(D)" as shown in Table 23 of the Census for Hayes and Arthur counties.

**ATTACHMENT C**

Area	Total Harvested Cropland - Irrigated	Irrigated Acres of Included Crops	Corn for grain - Irrigated	Corn for silage - Irrigated	Sorghum for grain - Irrigated	Wheat for grain - Irrigated	Barley for grain - Irrigated	Oats for grain - Irrigated	Sunflower seed - Irrigated	Soybeans for beans - Irrigated	Dry edible beans, excluding limas - Irrigated	Potatoes - Irrigated	Sugarbeets for sugar - Irrigated	Forage - Irrigated
Nebraska	43.3%	99.5%	60.0%	2.1%	0.2%	1.3%	0.0%	0.1%	0.1%	25.6%	2.1%	0.3%	0.5%	7.1%
Region	56.0%	98.8%	60.1%	2.7%	0.2%	3.0%	0.0%	0.0%	0.1%	16.0%	4.8%	0.1%	0.8%	11.0%
Sioux	61.8%	102.3%	38.7%	3.7%	-	2.2%	-	-	-	-	10.0%	-	2.3%	45.5%
Scotts Bluff	93.4%	100.4%	45.6%	2.6%	-	1.1%	-	0.0%	0.1%	-	23.5%	-	3.9%	23.6%
Banner	26.4%	93.3%	26.1%	3.1%	-	10.5%	1.1%	-	-	-	19.1%	-	-	33.3%
Kimball	17.5%	97.5%	22.3%	2.7%	-	12.5%	-	-	0.5%	-	9.4%	-	15.5%	34.6%
Morrill	73.4%	100.9%	47.9%	4.1%	-	2.1%	-	-	0.3%	-	16.1%	-	3.6%	26.7%
Cheyenne	15.8%	97.5%	26.4%	6.2%	-	20.7%	-	0.7%	2.1%	3.8%	16.6%	-	3.4%	17.6%
Garden	30.1%	101.3%	41.8%	2.0%	-	6.5%	-	-	-	0.7%	5.8%	-	-	44.5%
Deuel	12.3%	94.6%	66.3%	-	-	11.9%	-	-	-	1.5%	4.8%	-	-	10.1%
Arthur <sup>1</sup>	28.8%	100.0%	-	4.3%	-	-	-	-	-	-	-	-	-	95.7%
Keith	54.5%	94.3%	62.5%	3.9%	-	3.7%	-	-	-	4.4%	5.2%	-	2.1%	12.5%
Perkins	45.5%	94.9%	72.5%	0.8%	-	5.6%	-	-	-	6.2%	4.4%	-	-	5.4%
Chase	77.6%	97.6%	69.8%	2.2%	-	7.8%	-	-	-	4.5%	8.3%	1.3%	0.4%	3.4%
Dundy	67.5%	95.4%	65.3%	4.8%	-	2.6%	-	-	-	2.9%	8.6%	-	-	11.2%
Lincoln	69.7%	98.7%	69.4%	3.0%	-	1.0%	-	-	-	9.0%	0.6%	-	-	15.6%
Hayes <sup>1</sup>	45.8%	100.0%	65.3%	6.8%	-	3.4%	-	-	0.4%	3.9%	2.6%	-	-	17.6%
Hitchcock	24.9%	101.7%	70.2%	4.2%	1.2%	5.7%	-	0.1%	0.7%	8.2%	-	-	-	11.3%
Frontier	46.5%	100.2%	64.2%	2.8%	0.9%	4.6%	-	-	0.3%	22.3%	-	-	-	5.1%
Red Willow	31.7%	101.7%	66.4%	5.7%	1.2%	4.7%	-	-	-	13.8%	-	-	-	9.9%
Dawson	81.4%	97.9%	75.9%	2.7%	-	-	-	-	-	12.7%	-	-	-	6.7%
Gosper	72.7%	98.3%	57.1%	2.0%	0.3%	2.4%	-	-	-	33.0%	-	-	-	3.6%
Furnas	38.1%	101.3%	51.9%	2.2%	1.1%	4.9%	-	-	-	32.3%	-	-	-	9.0%
Phelps	90.9%	99.8%	58.8%	1.7%	-	0.2%	-	-	-	37.7%	-	-	-	1.4%
Harlan	52.6%	100.1%	54.5%	1.6%	1.1%	3.7%	-	-	-	33.9%	-	-	-	5.3%
Kearney	81.8%	100.0%	61.9%	1.7%	-	0.1%	-	-	-	34.9%	-	-	-	1.5%
Franklin	64.3%	100.4%	56.5%	1.4%	0.5%	0.9%	-	-	-	35.3%	-	-	-	5.8%

Note: Total Harvested Cropland - Irrigated values were entered as the summation of listed crops rather than a "(D)" as shown in Table 23 of the Census for Hayes and Arthur counties.

**ATTACHMENT E**

The following procedures and calculations were used to determine a weighted average cost per acre. Local Farm Service Agency personnel estimated the number of irrigated cropland acres available in each CREP project county. Each participating county was assigned to either the Platte or Republican River basin according to which drainage held the majority of available land. Irrigated rental rates were assigned to each county by taking the mean of the three-year average. The percentage of land in each county is established by drainage and then multiplied by the average irrigated rental rate. The resultant mean weighted rental rates are then averaged between drainage's for the overall weighted mean. The calculations are shown in the following table. A special note, these calculations are slightly altered from the original calculations due to a few modifications to the project area and estimated acres in specific counties.

**Calculations for Weighted Mean Cost per Acre in Platte River Basin**

<b>County</b>	<b>Number of Irrigated Acres</b>	<b>Percent of Acres in Basin (%)</b>	<b>Three-year Average Irrigated Rental Rate (\$)</b>	<b>Contribution to Weighted Average (\$)</b>
Buffalo	22,500	3.30	141.67	4.68
Dawson	68,480	10.04	138.33	13.89
Garden	27,400	4.02	123.33	4.96
Kearney	60,991	8.94	138.33	12.37
Keith	14,900	2.18	125.00	2.73
Lincoln	95,000	13.93	120.00	16.72
Morrill	96,300	14.12	125.00	17.65
Phelps	88,220	12.93	140.00	18.10
Scottsbluff	186,330	27.32	113.33	30.96
Sioux	22,000	3.23	95.00	3.07
<b>Total</b>	<b>682,121</b>	<b>100</b>		<b>125.13</b>

**Calculations for Weighted Mean Cost per Acre in Republican River Basin**

County	Number of Irrigated Acres	Percent of Acres in Basin (%)	Three-year Average Irrigated Rental Rate (\$)	Contribution to Weighted Average (\$)
Chase	32,700	8.93	128.00	11.43
Dundy	4,080	1.11	125.00	1.39
Franklin	27,000	7.37	126.67	9.34
Frontier	21,500	5.87	100.00	5.87
Furnas	40,032	10.93	125.00	13.66
Gosper	46,400	12.67	125.00	15.84
Harlan	31,000	8.46	140.00	11.84
Hayes	9,000	2.46	110.00	2.71
Hitchcock	28,143	7.68	110.00	8.45
Nuckolls	16,800	4.59	150.00	6.89
Perkins	28,635	7.82	135.00	10.56
Red Willow	36,100	9.85	116.67	11.49
Webster	44,956	12.27	145.00	17.79
<b>Total</b>	<b>366,346</b>	<b>100</b>		<b>127.26</b>

Because available acres will be split equally between river basins the two weighted mean cost per acre figures can be averaged to determine the overall estimated cost per retired acre.

$$\$125.13 + \$127.26 = \$252.39; \$252.39/2 = \$126.20$$

100,000 Acres to be retired at estimated cost of \$126.20/Acre = \$12,620,000 per year

Ten years of full sign-up \* \$12,620,000 cost per year = \$126,200,000 for ten-year projected landowner payments

The federal government would provide landowner payments and the state would provide 20% of total payments as match; Calculated by  $\$126,200,000 / (0.8) = 157,750,000$  for total projected ten-year costs. Federal responsibility = \$126,200,000 State responsibility = \$31,550,000

Because landowners can choose to enroll land for 10-15 years these calculations will represent the total for ten years when enrollment would be full. Total payments would decrease accordingly as land was released from this program over the next five years.

An additional \$10,000,000 would be needed for seeding program acres. This money would be split between federal (\$5,000,000) and state and local sources (\$5,000,000).

## Appendix E. Responses to USDA Letter Dated October 19, 2004

### State of Nebraska's Platte-Republican Resources Area CREP Responses to USDA Letter Dated October 19, 2004

For purposes of this document, the following are definitions of generally used acronyms:

FSA = Nebraska Farm Service Agency; NRCS = Nebraska Natural Resources Conservation Service; DNR = Nebraska Department of Natural Resources; DEQ = Nebraska Department of Environmental Quality; NDA = Nebraska Department of Agriculture; Game and Parks = Nebraska Game and Parks Commission; NRDs = any or all of the seven affected Natural Resources Districts in the project area; and CNPPID = Central Nebraska Public Power and Irrigation District.

**An irrigation Water Management Plan should be developed and described in detail. The plan should clearly indicate verification (monitoring and detailed annual reports) to FSA that water savings due to irrigated land enrollment are achieved.**

Below are the steps we've outlined as our irrigation water management plan:

- I. The State will provide a CREP Coordinator to manage and monitor the program on a continuing basis. DNR has agreed to assume that responsibility.
- II. For all lands in the CREP program, the following information shall be provided:
  - A. A map showing the legal description, number of acres and specific boundaries of the land enrolled in the CREP program.
  - B. A description of past practices including:
    1. The crops grown in the last five years;
    2. The irrigation application system used to irrigate the crops;
    3. The source of irrigation water, groundwater, surface water, or both, individual pump of irrigation district;
    4. An estimate of the total amount of water pumped and applied to the land.
  - C. A description of the proposed land cover or treatment during the period the land is in the CREP program.
- III. Each person enrolling land in the CREP program and the contractors of storage water from Lake McConaughy must sign the appropriate agreements as described below.
- IV. Each year, using the above information, other technical information and the annual weather conditions for that year, the CREP coordinator will calculate the difference in the amount of water that would have been consumed if the land was not in the CREP program as compared to the amount of water that was consumed by the land enrolled in the CREP program. This information will be compiled to estimate the water savings each

year resulting from the program. This report will be provided to the FSA office by February 1 of each year.

- V. The DNR will be responsible for monitoring lands in the CREP program that were formerly irrigated with surface water or a combination of surface water and groundwater. The local NRD will monitor the land irrigated with groundwater only. The lands in the CREP program will be checked at least once a year during the middle to the later part of the cropping season to determine compliance with the CREP contract. If any violations are found, this information will be reported to the FSA. The DNR will also be responsible for monitoring any water savings resulting from CREP in the targeted reservoirs.

**A formal water rights leasing document between the State and the participant should be developed and forwarded to FSA. The application process (including flow chart) indicating the application process should be included as part of the Water Management Plan.**

Options for Consideration: The objective can be accomplished several ways under Nebraska law.

Option 1: Include on the FSA application form the commitments that the participant must make to ensure there will be a reduction in consumptive use. Those commitments would include the following:

1. No water from any other source will be used to apply water to the lands described during the period covered by the application/agreement.
2. The surface water right or groundwater allocations previously used to irrigate the lands described will not be transferred elsewhere for irrigation or any other purposes.
3. If there is a violation of item 1 or 2 above during the period covered by this application/agreement, the applicant/participant agrees to forfeit all rights to any remaining CREP payments from FSA and/or the (State or NRD) and also to reimburse the FSA (and the State or NRD) as follows: (insert repayment provisions).
4. If either the land described or the control over the source of water used to irrigate such land is sold, leased or otherwise transferred during the period covered by this application/agreement, the applicant/participant shall continue to be responsible for ensuring compliance with items 1 and 2 above and for the consequences of any violation as described in item 3 above unless the responsibility, therefore, is assumed by the buyer, lessee, or other applicable party through the completion and filing with the FSA office of an FSA-approved form documenting such party's acceptance of the assignment of those responsibilities.

Option 2: Develop a separate agreement form that would supplement the FSA application/agreement form. The form developed under this option would need to commit the applicant to the same obligations as those proposed for Option 1, except that, as a separate form, additional information duplicating that on the FSA application/agreement would need to be included (e.g., participant's name, address, social security number, description of the land involved, cross reference to the FSA application involved, etc.).

By reducing the consumptive use of water on lands that otherwise would be irrigated, the CREP program over time will result in an increase in stream flow and reservoir storage. However, if the goal of the CREP program is to target any increases in specific reservoirs, a third option would be more advantageous.

Option 3: In addition to agreements outlined in either Option 1 or Option 2, to ensure the water savings that are realized by retiring the participating acres result in an increase in the targeted reservoirs, the State

will develop additional agreements with storage appropriators stating that reductions in the demand for storage water that results from the CREP program would not be converted to an increased supply for other users with rights to that storage water. The feasibility of this option depends upon whether there are contractual issues that could not be overcome, but DNR would not have to approve such agreements.

**The proposal should include proposed or current irrigation water management techniques, including State moratoriums, water rights restrictions, and any other legal activities (proposed or current) which may address water savings issues.**

In Nebraska, surface water is administered by the DNR under the prior appropriation system. Under this "first-in-time, first-in-right" system, when water is short, junior rights are shut off so senior rights can receive their full entitlement. Groundwater, on the other hand, is administered by 23 local NRDs under a modified correlative rights system. In this system, when water is short, the available supply is for the most part shared equally among all permitted wells.

In basins where the groundwater and surface water supplies are hydrologically connected, surface water and groundwater must be managed as one resource. In recognition of this reality in 2004, the Nebraska Legislature passed an innovative proactive conjunctive water-use bill. This bill not only enables the integrated management of surface water and groundwater supplies but also takes actions to prevent basins from becoming over appropriated.

Under the new law, on an annual basis, the DNR will survey the river basins of the state to determine if a basin, sub-basin or river reach is or soon will be fully appropriated. If a basin is determined to be fully appropriated, there will be an immediate stay on the issuance of new surface water and groundwater use permits and on the increase in the number of acres irrigated. In addition, in these basins, the DNR and NRD are required to jointly develop an integrated surface water, groundwater management plan with a required goal of sustaining a balance between water uses and water supplies so that the economic viability, social and environmental health, safety and welfare of the river basin, sub-basin, or reach can be achieved and maintained for both the near term and the long term. In so doing, it is expected that the long-term viability of the ecosystems, upon which the economy and the health of the human and fish and wildlife populations in the Platte River and Republican River basins depend, can be sustained.

Also, under the new law, certain basins are deemed to be over appropriated. On September 15, 2004, the DNR declared that the North Platte River Basin, the South Platte River Basin, and the Platte River Basin above the Kearney Diversion Dam, and certain portions of the area deemed to be hydrologically connected to these basins as over appropriated. An over appropriated basin must meet all the requirements of a fully appropriated basin and in addition incrementally further reduce the consumptive use of water until the use is in balance with the supply.

In the Republican Basin, water use also exceeds the supply. Under the Republican River Compact, signed in 1943 by the states of Kansas, Nebraska and Colorado no state's beneficial consumptive use can exceed its allocation of the basin's virgin water. In 1998 the State of Kansas sued Nebraska and Colorado claiming that the use of hydrologically connected groundwater was causing the states to violate the compact. In response, the U. S. Supreme Court legally recognized that both surface water and hydrologically groundwater supplies must be managed so their conjunctive use does not exceed the basin's virgin water supply. As a result of this decision, all three states must reduce their consumptive use of water.

To comply with the new surface water-groundwater management law and the Republican River Compact, the DNR and the local NRDs are currently in the process of developing integrated management plans to

reduce the consumptive use of water to a sustainable level. Irrigation of crops is the primary consumptive use of water in these basins. Thus, these plans will use a number of tools to reduce the consumptive use of irrigation water.

Where appropriate the plans will take advantage of advances in the technology of delivering water to crops. However, as explained in more detail below, increasing system efficiencies at best produces only a small reduction in consumptive use. Moreover, in many cases, increased system efficiencies are counter productive because the greater efficiency of water application increases the ability of crops to consume water. If Nebraska is truly going to preserve the economic and environmental viability of the basin's ecosystems, there must be restrictions on consumptive use and in the case of over appropriated basins a true reduction in water consumption.

In both the Republican and Platte River Basins, there have been restrictions on new irrigation uses for some time. In the Republican River Basin, there has been a moratorium on the issuance of new surface water permits since 1994. Moratoriums on surface water on certain tributaries of the Platte River system were implemented as early as 1979. By 1993, moratoriums were placed on the issuance of new surface water rights in most of the North Platte River, the South Platte River, and the Platte River above the confluence with the Loup River. The DNR has also implemented an aggressive program of adjudicating and canceling unused surface water rights in the Platte River and Republican Basin. Just last year, the adjudication process on the Republican River resulted in reduction of 17,000 acres out of a total of 27,000 acres that were certified to receive surface water. Because the number of acres that can be irrigated with surface water is limited to those with a permit for irrigation from the DNR, these moratoriums mean there cannot be any expansion of the number of surface water irrigated acres. As a result of the new integrated management law, as of July 16, 2004, there has also been a moratorium imposed on the construction of new wells and on the expansion of groundwater irrigated acres in most parts of both basins. Therefore, if additional acres are taken out of production, the result will be an overall reduction in the number of acres being irrigated and a corresponding reduction in the consumptive use of water in the basin.

In the Republican River Basin, the DNR and the Upper Republican Natural Resources District, the Middle Republican Natural Resources District, the Lower Republican Natural Resources District, and the Tri-Basin Natural Resources Districts are currently developing integrated surface water and groundwater management plans that will further limit groundwater pumping to 13.5 inches per acre, or less. The DNR and the Middle Republican NRD have just adopted an integrated management plan that will only allow pumping of an average of 13 inches per acre. In the Platte River system, in addition to the existing moratoriums, the DNR and the NRDs are also considering limitations on groundwater pumping and/or requiring that consumptive uses that result from the increase in irrigated acres after 1997 to be offset. To achieve the required sustainability goal, further reductions may also be necessary.

The above restrictions will result in a decrease in consumptive use, an increase in stream flow and an increase in reservoir storage, which will help stabilize the reliability of the basin's long term water supply. However, during dry years, when maintaining stream flow is of paramount importance, further restrictions on water use may be necessary. In order to increase stream flow as quickly as possible in times of low flow, surface water diversions and groundwater pumping in close proximity to the river will have to be reduced. In the Republican River Basin, the DNR has identified an area along the river and its tributaries within which a curtailment of groundwater pumping will result in a relatively quick increase in stream flow. Reductions in irrigated acres are being focused on this "Quick Response Area."



**Please provide a model/matrix of energy conservation goals/objectives for energy saved due to groundwater pumping reductions.**

Based on estimates of DNR personnel in the field, it is felt that 80 percent of the 100,000 acres that might be enrolled in the CREP program would be served with groundwater. Given that assumption and an estimate by the same personnel that about 75 percent of the groundwater wells are powered by electricity, with the remaining being a combination of diesel, propane, and perhaps a minor number utilizing other fuels, some estimates of potential energy savings can be arrived at. The attached table of energy (attachment A) was developed by experts at the University of Nebraska-Lincoln. It takes into consideration per acre application rates of 15, 20, and 25 inches and pumping lifts ranging from 25 feet to 100 feet. An additional table (attachment B) presents the potential total energy savings for electricity and fossil fuels based on the assumption that 75 percent of the wells are powered by electricity and 25 percent by fossil fuels.

Much of the proposed CREP area is fairly level alluvial reaches in close proximity to streams, with some tablelands. Groundwater lifts in existing irrigation wells range from less than 25 feet to 100 feet, or slightly more in some quite limited instances. If an intermediate average lift of 50 feet and an application rate of 20 inches is assumed, a savings of perhaps 10 million kwh and 350,000 gallons of fossil fuels could be realized. However, because of conservation measures instituted by individual operators as a result of drought conditions, and the need to limit costs as well as the potential of restrictions being placed on irrigators to limit groundwater withdrawals, these projected goals might be optimistic.

**Please include and provide justification for expected irrigation requirements to establish vegetative grass and/or trees on CRP practices.**

Given reasonable moisture conditions, we would expect minimal irrigation requirements, if any. Where center pivots or other sprinkler irrigation systems are available, one irrigation application to facilitate germination and initial grass establishment may be utilized, but only in extreme cases where NRCS technical staff determines the stand will not develop on its own or that there is a danger the seed investment will be lost. Most grasses utilized in this area would be native grasses or introduced grasses, both of which would be more tolerant of dry weather conditions. Because most of the land in the proposed CREP area is fairly level or has only moderate slopes, it would be expected that grass establishment would not be difficult.

Again, determination of the need for an irrigation application would be made in consultation with NRCS staff that are providing the technical assistance for the contract holder. If it is determined that an irrigation application is absolutely essential to establishing the cover, the producer would bear the expense of the irrigation and irrigate only at the level recommended by the NRCS.

As outlined in our proposal, a greater preponderance of CREP acres will be devoted to grass and only a minor portion to trees. In some cases, tree plantings would utilize weed barrier material to limit competition from weeds as well as preserve moisture. There may be a few instances where drip irrigation would be used to provide supplemental moisture for tree establishment.

**What is "Quick Response Acres"? What is the relationship to this project?**

The Quick Response Area was delineated by the using the Republican River Compact Administration's groundwater model of the Republican River and its tributaries. This model was developed by the states of Nebraska, Kansas, and Colorado as part of the Settlement of the Republican River Supreme Court Case.

The model has been adopted as the official accounting tool for the Compact. Various scenarios of pumping were run to determine the sensitivity of fully or partially shutting off irrigation well pumping near streams. It was determined that reduced pumping within the area designated as the Quick Response Area would reduce stream depletions in a reasonably short period of time. The rapidity of the response varies depending on the distance of the well and the type of geological formations near the stream. Within the Quick Response Area, increases in stream flows are expected to occur within one to three years. Although reductions in pumping and consumptive use of water almost anywhere in the basin will result in an increase in stream flow at some time in the future, reductions of pumping in the Quick Response Area would produce the most immediate results.

**Please detail and provide justification for including center-pivot corners, high-valued adjacent dry land buffers, small incidental dry land field sections in irrigated fields (high spots, etc.). How will this work with current CRP practice eligibility requirements and CRP practice standards?**

While we have outlined many goals with this program, our main focus is on water quantity. With that point as the backdrop for this answer, we do intend to allow enrollment of irrigated center pivot corners in this program.

Center pivot corners are generally irrigated either by use of end guns or by a separate point of delivery. Information provided by one of the irrigation districts participating in the CREP development indicates that these methods are inefficient. According to their information, producers have difficulty timing water applications on those acres without over-watering, due both to the high variation in row length over short distances and the fact that row end checks are not possible inside the field. Their records show a higher application of water in acre-inches per acre on those corners compared to whole fields irrigated with gated pipe or a center pivot.

If the center pivots corners are submitted as a part of a full field CREP contract, it will need to be clear that the corners meet all the necessary criteria to be considered “irrigated” in order to receive irrigated rental rates.

We do not believe it practical to exclude dry land center pivot corners from the program if a producer is going to enroll the center pivot irrigated acres adjoining the dry land corners; therefore, we propose allowing dry land center pivot corners into the program only if they are enrolled with their adjoining center pivot irrigated acres. In addition, those enrolling the land would only receive dry land CRP rates for those dry land corners.

Irrigated center pivot corners can be submitted for enrollment in the program independent of their adjoining pivot acres, however, the corners will need to meet all the same criteria and go through the same ranking process as all contracts submitted for consideration.

**Do you plan to include a marginal pastureland (MPL) provision? Irrigated MPL rates?**

We do not plan to include marginal pastureland in this program. We do not believe there to be much irrigated pastureland within the program area, and, if there is, it is our understanding that such acres can be enrolled in the Continuous CRP under three practice options.

**Page 23 - How will county committees determine the requirement for irrigated rates - "must exceed half the amount needed to augment growth of the crop on that land four of the six years 1996-2001? Please specify?**

The original intention of this requirement was to ensure that parcels of land were receiving sufficient water allocation for crop irrigation, so the retirement of this land would lead to beneficial water savings. Subsequently, a ranking system has been added for both the Republican and Platte River drainages, which supercedes the usefulness of this requirement. Therefore, it is our intention to drop this requirement on page 23.

**Please indicate incentives required to entice participation. Please list by practice. Sip's, PIP's, 25 percent incentive for wetland restoration.**

<b>PRACTICE</b>	<b>Rental Incentive CREP – Irrigated rental rates on irr. Acres</b>	<b>State additional cost share for CREP*</b>	<b>SIP (1) \$10</b>	<b>PIP (2) %40</b>
CP2 - Native Grasses	Yes	Up to 25%	No	No
CP4d - Wildlife Habitat	Yes	Up to 25%	No	No
CP21 – Filter Strips	Yes		Yes	Yes
CP22 – Riparian Buffers (in cropland)	Yes		Yes	Yes
CP23, CP23A – Wetland Restoration	Yes	Up to 25%, not to exceed \$100/acre	No	No
CP25 - Rare and Declining Habitat	Yes	Up to 25%	No	No

(1) = CRP Signing Incentive Payment (SIP) is a one-time payment of \$10 per acre per year for each eligible acre enrolled.

(2) = Practice Incentive Payment (PIP) is a one-time payment that equals to 40% of the total eligible cost of practice installation.

\* = Up to 25% of cost share for seeding may be available through participating Natural Resource Districts, Pheasants Forever (State office and/or local chapters), and/or Nebraska Game and Parks Commission pending availability of funds, including funds applied for from the Nebraska Environmental Trust for this CREP.

Proposed Acreage Allocations by Practice

85,000 acres – Natural Resource Areas on cropland

- CP2 – Establishment of Native Grasses
- CP4D – Wildlife Habitat
- CP25 – Rare and Declining Habitat

10,000 acres – Filter strips and riparian buffers on cropland

- CP21 – Filter Strips
- CP22 – Riparian Buffers (cropland and marginal pasture)

5,000 acres – Wetland restoration on cropland

- CP23 – Wetland Restoration on floodplains wetlands
- CP23A – Wetland Restoration on playa wetlands

**What is the cost per acre/foot of water reduction? How does this compare to alternative methods to achieve water savings such as calibration of nozzles - releveling, etc.? Will EQIP achieve water savings at a lower rate?**

Based on an economics model for the Republican basin developed by the University of Nebraska, we expect that each acre removed from irrigated production will decrease the value of production by an estimated \$430 to \$490 per year. The anticipated change in pumping rates range from .7 to 1.5 acre feet per acre with an anticipated difference in evapotranspiration of from .64 to 1 acre feet per acre. The differences in economic values tend to be lower on the eastern end of the basins, where rainfall is higher and, therefore, irrigation adds less to the total value of production. The effect of land retirement on water applied and consumptive use also decreases as you move east because higher rainfall means lower irrigation requirements.

Modern application systems that incorporate such tools as calibration of nozzles and releveling are very effective in reducing the amount of water that is pumped and the resulting amount of water that runs off the surface of the field or that leaches as deep percolation past the root zone of the crops. Lower pumping costs and less runoff of agricultural chemicals to streams and leaching to the groundwater are definite benefits of these modern application techniques. However reducing field runoff and deep percolation simply reduces the amount of water that returns to the basin's water supply. Such reductions do not constitute a reduction in the amount of water that is consumed.

To achieve a true water savings, there must also be a reduction in the consumptive use of water by evapotranspiration. More efficient application systems can reduce evaporation to some extent, but this reduction is generally only a small percentage of the total amount of water consumed by an irrigated crop. On the other hand, by increasing the efficiency with which water is applied to the crop, the crop can usually make greater use of the water that is applied resulting in increased water consumption.

The bottom line is that improving system efficiency and increasing the efficiency of water application can be very beneficial. However, this increase in efficiency does not guarantee a decrease in the consumptive use. In fact, these increases in application efficiency often result in an increase the consumptive use of water. Thus, the only really effective way to achieve large reductions in consumptive use is to reduce the number of acres being irrigated and plant those acres with a vegetative cover that does not consume substantial amounts of water.

**Please explain the impacts of land use on hydrology. What additional runoff would be expected from conversion of cropland to CRP?**

A change from irrigated cropland to grass in the CREP Platte-Republican Project Priority Area could be expected to have several effects on hydrology. These are likely to include decreased overall runoff, decreased evapotranspiration, increased base flow, and increased overall flow. Generally, runoff could be expected to decrease as the land acquires a greater amount of average cover versus the cover cycles on cropland. In the first year, or possibly more, runoff in some areas may hold steady or possibly even increase slightly, due to early difficulties in establishing grass on former cropland. Because most of the land in the project area is fairly level or has only moderate slopes, it is unlikely that establishment of grass will be very difficult in most instances.

In addition to medium- and long-term decreasing overland runoff, there is likely to be a relative increase in base flow to streams as groundwater pumping is diminished and evapotranspiration is decreased. In general grass will evapotranspire less water on an annual basis than irrigated corn, resulting in net water savings. There is also likely to be a long-term net increase relative to baseline conditions in total flow. The water that does infiltrate is likely to be of somewhat higher quality than that which infiltrated off of the previous cropped land.

**Do you propose paying a prorated irrigated rate for greater water savings?**

We are not proposing prorated irrigated rates. The working group did actually touch on this subject, but determined that too many individual factors affected quantification of “water savings” to make such a system workable and to justifiably tie payment levels to it. In the alternative, the group proposed additional program criteria (such as “land must have been irrigated four of the six years”) and the contract ranking system as a way to ensure that the land enrolled will offer true water savings.

**What variability is there in the region in terms of crops, water needs, etc? Please detail.**

The region considered is comprised of the following counties: Sioux, Scotts Bluff, Banner, Kimball, Morrill, Cheyenne, Garden, Deuel, Arthur, Keith, Perkins, Chase, Dundy, Lincoln, Hayes, Hitchcock, Frontier, Red Willow, Gosper, Furnas, Phelps, Harlan, Kearney, and Franklin counties. Based on information from Table 23 of the 2002 Census of Agriculture which provides crop acreage numbers for the major crops grown in a state, over 62% of irrigated crop land in 2002 was planted to corn. Irrigated soybeans followed corn and were produced on 16% of irrigated land, followed by forage crops raised on 11% of irrigated land. Soybeans tend to be produced more in the eastern portion of the region, while the forage crops were more common in the western counties. Climatic conditions other than water supply have been a restricting factor in the adoption of soybeans in the western portion of the region. Attachment C provides a summary of the major crops grown in the region, which comprise the production on over 98% of the irrigated land in the region.

Crop water need or use is also referred to as crop evapotranspiration (ET). There are a number of factors which influence crop ET: weather; crop type, variety, and population; tillage practices; and soil water availability among them. Crop yield is directly related to crop ET, thus a major goal of irrigation management is to attempt to supplement rainfall with enough irrigation water to meet full crop ET and, therefore, full crop yield. The amount of precipitation an area receives is a major factor in determining how much irrigation is required to successfully produce a crop (which is often selected based on the availability of markets and other economic considerations in addition to climate).

Average annual precipitation for the region ranges from approximately 16 inches/year on the western edge to approximately 24 inches/year on the eastern edge. On the western edge of the region, the average gross irrigation requirement for corn raised on medium textured soils is 20 to 22 inches/year. On the eastern edge, the average gross irrigation requirement is 10 to 12 inches/year. It should be noted that these gross irrigation estimates consider an application efficiency of 85%. Other crops would have a similar trend. Table I in the *NebGuide* entitled Crop Water Use in Western Nebraska, which is included in attachment D, contains average crop water use requirements for crops grown in western Nebraska.

**What is the current water efficiency for surface irrigation and spray irrigation?**

When evaluating efficiencies for surface water irrigation, two types of efficiencies need to be considered: delivery efficiencies and field application efficiencies. In Nebraska, both delivery efficiencies and field application efficiencies vary greatly across the regions.

Delivery efficiencies can be extremely high for an operation which is pumping directly from a stream or from groundwater through a pipeline and applying it to a field using sprinklers or a gated pipe. While these types of operations do exist in the region, they are not the predominant systems employed. More typical for surface irrigation (or gravity irrigation) is the system in which surface water is diverted into a supply canal and delivered to individual fields via smaller canals and/or laterals. The efficiency of these delivery systems is dependent upon a number of factors: canal construction material, canal lining materials, and the delivery distance. These delivery efficiencies can range from 30% to 70%.

Field application efficiencies also vary widely due in large part to the irrigation practices employed by individual farmers. For surface water users these efficiencies have about the same range as the delivery efficiency range. With the inclusion of tail water recovery systems, application efficiencies typically improve by about 10% over a pre-tail water recovery system installation. These recovery systems are fairly common in Nebraska due in part to a state law dealing with the control of irrigation water runoff.

In contrast to the efficiencies for surface or gravity irrigation, efficiencies for sprinkler irrigation such as a center pivot system are typically close to 85%. Big gun (traveling sprinklers) or boom-type sprinkler systems have a lower efficiency; however, there are only a few of these types of systems in the region.

**Please provide a matrix detailing expected costs of the program and a detailed narrative justifying costs. What are we buying? What are we receiving? This should include, at a minimum, expected acres enrolled by practice and State and Federal contributions, etc.**

The best way to begin answering what federal, state, and local partners are buying and receiving through the proposed CREP is to summarize Nebraska's current situation. A scarcity of water in the Platte and Republican River basins has occurred due to the onset of an extended drought. This drought has highlighted the fact that a number of interests are competing for the same finite resource. It has become imperative to diminish the consumptive demand on the available water and water supplies in a manner that would reduce the long-term environmental and economical impacts to this region. Currently, our state has expended a great deal of effort in maximizing our water use efficiency, especially with irrigated agriculture, which is the primary out-of-stream user of water supplies. Unfortunately, the availability of water continues to diminish and our state maintains its search for employable options that could decrease water demand, including this CREP.

1. Therefore, the first thing being bought with this CREP is a **reduction in demand** for our water resources. The CREP project area targets irrigated lands that are directly connected to reservoir storage and streamflow in regions of our state that have been hardest hit by the drought. A full functioning CREP (100,000 acres) represents approximately nine percent of all irrigated cropland in the project area. Consequently at minimum there would be a nine percent reduction in irrigated water use. However, economic logic would imply that the reduction on water demand should be greater. Landowners should be compelled to sign up marginal cropland with higher associated costs and lower productivity. For instance, one particular cornfield that resides on land with slight hills and mostly sandy soils required nearly 60 inches of water two years ago. The extra costs and labor associated with pumping and nutritional augmentation would make the enrollment of this field more enticing than other land parcels to this landowner.

Ideally, we could provide specific quantities of water that would be conserved on an annual basis in our reservoirs and streams. Unfortunately, we are forced to estimate based on a variety of factors, because the magnitude of daily crop water use varies with atmospheric conditions: air temperature, humidity, solar radiation, and wind. High air temperatures, low humidity, clear skies, and high wind exert a large evapotranspiration demand. Seasonal water use is also affected

by growth stage, length of growing season, soil fertility, water availability, and the interaction of these factors. Efficiency of irrigation application and delivery also varies greatly with these factors and different seed varieties (i.e., 85-day corn or 120-day corn) also require variable amounts of water. To explain our estimates we will share an example that will focus on corn farming since that is the major crop of the CREP proposal area. Information for this example was obtained at <http://ianrpubs.unl.edu/fieldcrops/g1354.htm>.

On average, corn planted in sandy loam soil (predominate along river corridors) requires 12.2 inches and 14.2 inches, respectively in the Central and Western portions of our project area. During the drought, the irrigation requirement has been much higher than this as soil moisture has been reduced and effective rainfall was well below average. The efficiency of water delivery can reach 80-90 percent, but can be <50 percent for furrow irrigation. Delivery of surface water also is inefficient as most irrigation districts range from 30-70 percent delivery efficiency. For this example we will use a delivery efficiency of 70 percent, which would generally be higher than anticipated for the project area. Dividing the required irrigation demand by the delivery efficiency then results in our total anticipated irrigation demand of 17.4 inches and 20.3 inches, respectively in Central and Western portions of our project area. The result is a conservative consumptive savings of 1.45-1.70 acre-foot/retired acre for this CREP. The net return for 100,000 acres would then be 145,000 to 170,000 acre-feet. Remember, we anticipate the marginal land to be more highly represented in this program, which would result in even higher water savings. The water savings would be conserved as annual water storage in reservoirs, as well as increased flows in our streams and rivers, which lead to our reservoirs.

2. The second thing being purchased by this CREP is an **improvement in water quality**. In basic terms, the amount of land receiving triazine products, Nitrogen and Phosphorous will be decreased by nearly nine percent in the project area. Specific details surrounding these improvements are being addressed in another response in this document, which we will refer you to for a more complete description.
3. The third thing being purchased with this CREP is **wildlife habitat**. Our sign-up goals are 85,000 acres of native grass-CP2, wildlife habitat-CP4D, and rare and declining species-CP25; 10,000 acres of filter strips-CP21 and riparian buffers-CP22; and 5,000 acres of wetland restoration-CP23, CP23A.

This CREP is targeting larger tracts of land, an emphasis reflected in our ranking systems for each basin (the Platte ranking system is still in development). The reason for this is two-fold, not only will retiring entire fields maximize program benefits for water savings, but it also provides larger habitat sanctuaries that are more apt to act as a population source. Pheasant populations represent our best indicator and most indexed community of upland game in this region. The long-term trend for pheasants has shown a steady decline since standardized surveys were initiated in 1971. The average number of birds observed in project area July rural mail carrier counts has decreased from 8.2 birds per 100 miles in 1971-1975 to 1.4 birds per 100 miles in 2000-2004. The current populations are only 17 percent of the historic averages. Nebraska Game and Parks Commission biologists conservatively believe the addition of 85,000 acres of habitat within the project area along with specialized management efforts on available public lands can result in a 25 percent increase in pheasant numbers. Because the pheasant is an indicator species for these communities, we would also anticipate other invertebrates and vertebrates connected to this habitat to respond in a similar manner. It is anticipated then that these larger tracts of land will provide additional recruitment, which would then extend to inhabit proximate marginal land.

The 10,000 acres designated toward filter strips and riparian buffers will be effective at removing nutrients and water-borne pesticides. An additional benefit is added cover and habitat for invertebrate and vertebrate communities associated with this habitat. These 10,000 acres will provide marginal habitat that recruited adults can use, but perhaps not be large enough to act as a population source. Populations that build up in this marginal habitat become important in maintaining population diversity and protecting communities from localized suppression due to disease or other factors.

The 5,000 acres of wetland restoration will help address the need for functional wetlands that are lacking throughout the project area. Over 70 percent of historic wetlands in the project area have been lost due to development. The United States Fish and Wildlife Service for three different species have designated much of this wetland area as critical habitat. Millions of birds also rely on this critical habitat during migration. These functional wetlands provide an immense value to our environment by:

- Increasing habitat for fish, wildlife and plants;
- Naturally improving water quality;
- Assisting with maintenance of atmosphere;
- Maintaining traditional hydrologic cycles;
- Providing flood storage;
- Providing bank and shoreline erosion protection;
- Economic benefits associated with wildlife recreation (hunting, fishing, bird watching, and photography);
- Reducing need and rate of home owner's flood insurance coverage; and
- Providing excellent research and teaching sites.

4. A fourth thing being purchased with this CREP is **time to activate water management plans**. The onset of this drought has brought about the realization that water is scarce in this region. The increase in agricultural, energy, and municipality demands over time has reached the limit of our available water supply. The DNR and regional NRDs have arrived at the realization for the need to more intensely manage our available water (specifics of water management plans are provided in other responses). However, a time lag exists between the implementation of management policies and transition by end-users.

Our state is currently in the process of implementing a water plan that will scrutinize the development and efficient use of the available resource. Specific actions associated with this transition include imposing moratoriums on development of irrigated land, metering individual pump use, educating users on water efficiency, providing incentives for improving water-use efficiency as well as a multitude of other changes that are outlined in other responses. The problem is that these actions take time to implement and during the short term a reduction in water demand will be a huge benefit to maintaining and allocating adequate water supplies and not creating long-term economic or environmental impacts.

5. The final thing being purchased by this CREP is **security for our agricultural communities**. The past few years, Nebraska Congressional representatives have been pushing for federal disaster recognition for the ongoing drought. Unfortunately, it is difficult to get this distinction because a drought is not like a hurricane, flood, or earthquake that creates immediate and visible consequences. Instead, a drought slowly strangles communities that rely on available water for their livelihood. Communities in the project area depend on water to drive their agricultural and natural resource based economies.



The slow depletion of available water has initiated an economic downward spiral. Costs to individual farmers increase as they are forced to apply more water to grow similar crops. As costs increase and yields become more variable individual farmers become economically strained and reduce spending within their community. Further stress to local communities arrives as the increased use of water accelerates the depletion of reservoir storage and streamflow. The lack of water available for natural resources diminishes wildlife populations and ultimately decreases the participation and expenditures on wildlife recreation in these rural communities. As rural stores become financially strained, they are forced to raise prices on items they do sell to stay in business and/or eventually go out-of-business. The perpetuation of this cycle is mandated by one simple fact, these communities and their economic health are reliant on the availability of water.

As the drought continues in the project area, we have started to see and hear about economic hardship to individual landowners and rural businesses. Our state and federal elected officials are aware of this economic plight and see this CREP proposal as a valuable tool in our state's struggle to maintain our traditional agricultural production, rural communities, as well as environmental quality and diversity.

Attachment E is an appendix that details steps involved in determining anticipated costs for the CREP project.

**Please provide public support data for the program. Letters of support from environmental, wildlife, agencies, etc., would be helpful.**

Please find the letters enclosed with this response document.

**Is there sufficient technical assistance available? Who will complete the monitoring?**

Officials with the Nebraska Natural Resources Conservation Service have been actively involved in the development of this proposal. Specific to the question above, State Conservationist Steve Chick has indicated sufficient technical assistance will be available for this CREP.

As to the monitoring question, DNR monitors surface water use in conjunction with irrigation districts, and the NRDs monitor groundwater use. All have committed monitoring time for this program as part of the state/local match dollars. Furthermore, one of the responsibilities of the CREP coordinator (see next question response) is to collect monitoring information. In the absence of a CREP coordinator, DNR would assume this function.

**Will the state hire a CREP coordinator, or is there a CREP coordinator?**

We recognize the need for the state to assign specific responsibility to manage and monitor the program on a continuing basis. DNR has agreed to pursue funding and authority to assume that responsibility. It has not been determined if that responsibility will require the full time effort of one employee or if it can be managed as part of an employee's responsibilities. DNR has submitted an application to the Nebraska Environmental Trust for funding for such a position and the success of that application will not be known until March or April of 2005.

**Who develops any allocations of acres to an area/basin? How will this work?**

The CREP working group and advisers already have had discussions regarding allocation of acres. (The working group and advisers include representatives from FSA, NRCS, DNR, NDA, DEQ, Game and Parks, the affected NRDs, and CNPPID.) The allocation of acres is outlined in our proposal under the Project Description section on Page 23. It states that the acres will be evenly divided, with 50,000 allocated to the Republican River basin and 50,000 acres allocated to the North Platte/Platte river basins. Under this thought pattern, acres devoted to specific conservation practices also would be evenly split between the two defined areas (each with 42,500 acres of CP2, CP4D or CP25, each with 5,000 acres of CP21 and CP22 and each with 2,500 acres of CP23 and CP23A).

The working group and advisers during their discussions determined that the 50/50 split would be reassessed after the initial enrollment period. If one of the defined areas did not enroll all its allotted acres and there was demand in the other defined area for additional acres, the working group and advisers would meet to discuss amending the 50/50 split, and if agreed, offer that amendment to USDA for consideration.

Timing of the initial enrollment period could play a part in how this reassessment is actually executed. Agricultural producers would delay consideration of program enrollment if, for instance, the initial signup occurred after they had already purchased all their inputs for the coming crop year. Under those circumstances, the working group and advisers would probably recommend having an additional signup period, with the same allocations in place, in order to give agricultural producers in both defined areas a fair chance at deciding to enroll.

**How will the ranking process work?**

Interested landowners will prepare an application as to which land parcels they would like to enroll and for which practices. Each application will be submitted to the local FSA office where it will be time and date stamped. FSA staff will initially review this application to ensure the proposed land meets required criteria of CREP. Applications that continue to be eligible will then be verified for irrigation history by the appropriate agency. In most cases, this will be the regional NRD and in a few cases DNR. The same entity can then provide information needed to provide a ranking score for each land parcel. In a few cases, an additional contact will be needed to determine the final score for each application. It is anticipated that the ranking process could be completed within an hour on days when necessary staff is available. Land parcels meeting or exceeding the minimum standard scores established for their appropriate ranking scheme are accepted until acreage allotments have been met. The described application process will continue for an established length of time. Any remaining allotted acres would then be filled on a retroactive first-come first-served basis, meaning we would offer contracts based from time and date stamped applications that met program criteria but were ranked below the minimum standard score.

**Quantify the impacts to nitrogen and phosphorus loadings?**

A complete response to this item must include a separate discussion about groundwater and surface water due to the unique nature of nutrient delivery for these two situations. We will first provide a brief description of nutrient application practices and follow with discussions on how these practices relate to groundwater and surface water.

**Background:** Availability of Nitrogen and Phosphorous compounds is necessary for crop production. Corn is the dominant crop in the proposal area and according to University of Nebraska-Lincoln (UNL)

Cooperative Extension Crop Specialists requires on average 220 pounds/acre of Nitrate compounds and 20 pounds/acre of Phosphate compounds when farmed on an annual rotation. These application rates would be higher for land in Western Nebraska and lower in Eastern Nebraska due to soil compactness. Some farmers have chosen to periodically include soybeans within their planting rotation, which increases the Nitrate compound availability due to Nitrogen fixation processes. Soybeans on average leave 40 pounds/acre of Nitrate compounds in the soil. Corn planted the subsequent year after soybeans would require approximately 180 pounds/acre of Nitrate compounds. It was the assessment of UNL Cooperative Extension Crop Specialists that on average corn producing ground in the CREP project area would receive 200 pounds/acre of Nitrate compounds.

Other crops are produced within the CREP project area to a lesser extent. These other crops require less Nitrogen, but may need more Phosphorous. Soybean production does not require any Nitrogen fertilization and actually leaves Nitrogen compounds as a soil residual (approximately at 40 pounds/acre). Soybeans planted on clay or loam soils (more prominent in Eastern CREP area) require no additional Phosphate fertilization, but some users in Western Nebraska on sandy soils will add 30-40 pounds/acre of Phosphate compounds through fertigation. Alfalfa performs Nitrogen fixation and thus requires no additional Nitrogen fertilization, but will increase the availability of Nitrate compounds in the soil similar to soybeans. The Phosphorous requirements of Alfalfa are about twice that of corn and result with on average 40 pounds/acre being applied. Wheat requires both Nitrogen and Phosphorous augmentation at rates of 120 pounds/acre and 30 pounds/acre, respectively.

Leaching of nutrients to groundwater, as well as surface run-off of nutrients is impacted by numerous factors, which make it difficult to quantify future improvements due to the implementation of this CREP. Thus it is difficult for us to anticipate a specific reduction (i.e. 10%) in groundwater or surface water run-off levels. The soil compactness, cropping patterns and history of offered acres, future precipitation patterns, type of irrigation application, individual farmer's management practices, elevation gradient of offered land, plus many other factors will adjust the impact of this CREP. As a baseline, a nearly 9% reduction in irrigated acres would occur throughout the project area, which theoretically should result in a nearly 9% reduction in Nitrate and Phosphate compound application.

**Groundwater Leaching:** Central Nebraska is blessed to have regional information pertaining to leaching of nitrate-N compounds from corn and soybean fields. An extensive research plot with integrated percolation lysimeters has been established near North Platte, Nebraska. This type of set-up is a preferred manner in which to measure leaching of Nitrate compounds and is one of only four such facilities that we are aware of in the nation. The most related research conducted on these plots will provide us with estimates of total leaching to groundwater. These results need to be viewed as conservative estimates of leaching because the research plots employed best available management practices, such as measuring available Nitrogen prior to fertilization, spreading out application of applied Nitrogen compounds and measuring available soil moisture content on a weekly basis and adjusting irrigation rates as necessary. The result from this research was a 6-year average nitrate-N leaching loss of 52 kg/ha/year for continuous corn and 91 kg/ha/year loss for corn-soybean rotation. The average application rate of nitrate-N fertilizer was 195kg/ha/year, meaning approximately 27% of this applied fertilizer would leach to groundwater on an annual basis. A different study from South-Central Nebraska showed losses of 75 kg/ha/year for continuous corn crops in the more conventional disk-plant tillage system with furrow irrigation. The sandier soils found in the Western portion of our CREP project area is subject to higher rates of Nitrate leaching. One study compared leaching associated with 85% and 130% of full evapotranspiration requirements, which would be below and above normal irrigation application rates. This study showed that in sandier Nebraska soil 52-65% of the applied nitrate-N leached to the groundwater.

Predicting the savings from this CREP for annual amount of nitrate-N leaching involves several assumptions. First what portion of the land would have been planted into each particular crop. Our assumption is that land enrolled will be distributed equivalent to the current cropping patterns. In this case, corn comprises 62% of the current irrigated land, soybeans 14%, alfalfa 13% and wheat 2%. The next step is to estimate an average amount of nitrate-N leached per acre in the project area. We have the most knowledge for leaching related to corn production. This literature finds that best management practices leached 27% of the applied nitrate compounds, while more conventional practices leached closer to 45%. Soils in the Western portion of our CREP area leached approximately 60% of the applied nitrate-N. For this CREP we will conservatively use 45% as a single percent average for the amount of nitrate-N leached from corn production. Research on other crops is limited, so we will use the 27% base percentage that was obtained with best management practices. For soybeans and alfalfa no additional nitrate compounds are added, but their natural nitrogen fixation processes leave a nitrogen credit of approximately 40 pounds/acres. Wheat, according to UNL Cooperative Extension crop specialists, has approximately 120 pounds/acre of nitrate-N added annually to augment production.

Table 1 displays our predicted pounds of nitrate-N that would be conserved to our groundwater on an annual basis with the inception of this CREP. We are assured that groundwater quality would be improved by the nearly 6,000,000 pound reduction of nitrate-N on an annual basis. Unfortunately we can not provide a quantifiable percent for improvement of groundwater quality as the leaching process can take between 5-40 years to reach groundwater depending on the location, type of soil, amount of precipitation and depth of water table. The level to which this program has improved groundwater quality may very likely not be realized for 20-30 years.

**Table 1. Summary of information used to estimate overall nitrate-N leaching that would be conserved on an annual basis with the implementation of this CREP.**

Crop	Nitrate-N Application /Credit	Percent Leached per Acre	Estimated Number of Cropland Acres in CREP	Estimated Pounds of Nitrate-N Leaching Conserved
Corn	200 lbs/A	45	62,000	5,580,000
Soybeans	40 lbs/A	27	14,000	151,200
Alfalfa	40 lbs/A	27	13,000	140,400
Wheat	120 lbs/A	27	2,000	64,800
Total				5,936,400

Phosphate compounds tend to attach to the soil and consequently very little is leached to groundwater. The rate of phosphorous leaching is typically measured in parts per billion and moves very slowly in soil. Consequently, loading of phosphate compounds within a system is more pertinent to surface water discussions.

Literature citations of interest used in the above discussion include:

Hergert, G.W. 1986. Nitrate leaching through sandy soil as affected by sprinkler irrigation management. *Journal of Environmental Quality* 15:272-278.

Katupitiya, A., D.E. Eisenhauer, R.B. Ferguson, R.F. Spalding, F.W. Roeth and M.W. Bobier. 1997. Long-term tillage and crop rotation effects on residual nitrate in the crop root zone and nitrate accumulation in the intermediate vadose zone. *Transactions of the American Society of Agricultural Engineers* 40:1321-1327.

Klocke, N.L., D.G. Watts, J.P. Schneekloth, D.R. Davison, R.W. Todd, and A.M. Parkhurst. 1999. Nitrate leaching in irrigated corn and soybean in a semi-arid climate. *Transactions of the American Society of Agricultural Engineers* 42:1621-1630.

Surface Water Loading: Quantifying the impacts of buffer strip programs on Nitrate and Phosphate escapement from cropland is difficult. First of all, specific information on the amount of applied Nitrates and Phosphates escaping cropland through surface run-off is lacking in the Midwest. Instead most literature focuses on the effectiveness of buffer strips in capturing the unintended escape of nutrients, pesticides, herbicides and sediment. Secondly, buffer strip efficiency varies greatly and is dependent on circumstantial factors such as buffer width, landscape gradient, soil integrity, area of run-off being captured, intensity of precipitation events, existing soil moisture during precipitation events, as well as numerous other factors. Thus it is unknown what percent of applied Nitrates and Phosphates would be lost to surface run-off and the efficiency of applied buffer strips at removing these nutrient inputs will vary with each application. The unfortunate reality is that we are unable to state water quality at any specific point will improve by a certain percentage. Additionally many other watershed variables will have a simultaneous impact on these water quality parameters meaning that any noticeable changes could only speculatively be associated with CREP. Perhaps the best approach for clarifying the potential impacts will be to provide a background of how surface water nutrient loading occurs and what magnitude of changes will be associated with this project.

Nitrogen Removal – Buffer strips offer a tremendous advantage for nitrogen removal from cropland run-off. The manner in which buffer strips accomplish nitrogen removal for surface water is by capturing these waters and not allowing them to flow directly into streams systems. Nitrogen is highly water

soluble, thus slowing runoff water increases infiltration into the grass strip. The buffer strips can then remove the nitrogen through sub-soil processes where anaerobic bacteria apply a denitrification process. The end result is the transformation of nitrogen into a gaseous state, which escapes through the rooted pores of the grass and is released into the atmosphere. Additional removal is accomplished by vegetation in the buffer strip taking up nitrogen as a nutrient input. Some particulate organic nitrogen is filtered through the buffer vegetation.

It is important to remember the connectivity between groundwater and surface water when discussing the benefits of buffer strips for reducing nitrogen inputs into surface water. Moisture from groundwater tables and confined saturated soils feed streams throughout the entire CREP project area. A study from Minnesota indicated that a 50-foot wide buffer strip retained about 65% of nitrate-N in surface flow. Therefore, buffer strips capture much of the water flowing from cropland and return this water to associated streams as re-charge over a longer period of time. Water flowing directly from cropland has a much lower nitrate-N level after the buffer strip and soil has filtered it. The same study from Minnesota indicated that buffer strips released or retained 75% of the nitrate-N in subsurface flow.

This CREP proposes to have 10,000 acres of buffer and riparian filter strips. Sign-up activities through other CREP's and conservation programs indicate the average buffer strip width in Nebraska is approximately 50 feet. At this average width we would be able to provide buffer protection for 1,650 miles of stream bank in the CREP project area. We would anticipate that 65% of irrigation and precipitous event run-off would be retained over this 1,650 miles of waterways. Additionally the buffer strips would filter out 75% of the nitrate-N in subsurface flow and prevent it from entering local surface- and groundwater.

Phosphate Removal – Phosphate compounds are not very water soluble, instead they bind to sediment. The principal process involved in phosphorous reduction is particulate filtering of organic material. Eventually the organic materials break down and adsorption bonds break. At this point, available phosphorous product could become mobile again especially when soil saturation occurs. Consequently permanent reduction in total phosphorous by buffer strips is minimal, but the delay caused by transition from particulate to soluble phosphorous serves to dampen the impact on downstream water bodies. Thus, the most beneficial service to reducing and delaying is the entrapment of soil sediment at the point-source. A study conducted in Polk County, Nebraska by the University of Nebraska-Lincoln found buffer strips retained over 80% of the sediment associated with surface water run-off. Therefore while the overall reduction in phosphates may be minimal in the long-term we do anticipate a substantial delay of peak phosphate inputs into our systems due to the presence of buffer strips over 1,650 miles of stream in the project area.

Buffer strips also provide much greater benefits beyond assistance with nutrient cycles. Some of these benefits include; streambank stabilization, strengthening of aquatic food webs, control of stream water temperature, sediment control, wildlife habitat and flood control.

**Resources of interest:**

Arora, K.S. J.L. Baker, D.P. Tierney and C.J. Peters. 1996. Herbicide retention by vegetative buffer strips from run-off under natural rainfall, ASAE Transactions 39(6):2155-2162.

Minnehaha Creek Watershed District Report. Prepared by Emmons and Olivier Resources, Inc. 2001. Benefits of wetland buffers: a study of functions, values and size. 23pp.

<http://www.extension.iastate.edu/Publications/PM1901F.pdf>

<http://bse.unl.edu/clearcreek/>

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## Appendix F: Wetland Basin Information

### 1.1 Rainwater Basin<sup>1</sup>

#### Profile

The Rainwater Basin region occupies a 4,200 mi.<sup>2</sup> area in 17 south-central Nebraska counties. It was named for the abundant natural marshes that formed where clay-bottomed depressions catch and hold rain and runoff water. The region is characterized by flat to gently rolling loess plains formed by deep deposits of silt-loam soil. These wetlands tend to have a northwest to southeast orientation and there frequently is a hill located immediately south or southeast of the basin where the windblown loess was deposited. Wetlands range in size from less than one to over one thousand acres.

#### Loss and Threats

Original soil survey maps from the early 1900's indicate that approximately 4,000 major wetlands totaling nearly 100,000 acres were present at the time of settlement. The Nebraska Game and Parks Commission (1984), estimated that less than 10% (374) of the original major wetlands and 22% (20,942), of the original wetland acres identified on early soil surveys remained in 1982. This trend study did not attempt to estimate the quantity and quality of smaller wetlands that were not identified on early soil surveys. However, it is likely that the proportion of loss documented by the Commission's major wetland trend analysis has occurred for all Rainwater wetlands.

Rainwater Basin wetlands were identified by the US Fish and Wildlife Service as one of nine areas in the U.S. of critical concern for wetland losses (Tiner 1984). These resources were given a priority 1 ranking in the Nebraska Wetlands Priority Plan due to extensive past losses (Gersib 1991). The remaining wetland resources of the Rainwater Basin complex continue to face numerous threats, mostly related to conversion to cropland. Rainwater Basin wetlands face the direct threat of elimination by drainage and/or filling. The construction of concentration pits (also called dugouts or reuse pits) is common and threatens the functions of wetlands by converting the shallow, vegetated portion into a deep and less productive water pit. Water pollution, especially sediment, can seriously reduce the function of Rainwater Basin wetlands.

The spread of purple loosestrife (*Lythrum salicaria*) is an additional threat. Purple loosestrife is an introduced plant of little value to wildlife that out-competes desirable native plants. No information is available on the extent of purple loosestrife abundance or distribution throughout the Rainwater Basin area, however it has been observed.

#### Functions and Values

Rainwater Basin wetlands are most noted for their importance to waterfowl, especially during the spring migration (Gersib et al. 1992, Gersib et al. 1990 (a), US Fish and Wildlife Service and Canadian Wildlife Service 1986). They host 5-7 million spring migrating ducks and geese annually, providing the nutrient reserves necessary for migration and reproduction further to the north. Approximately 90% of the mid-continent population of greater white-fronted geese, 50% of the mid-continent population of mallards and 30% of the continent population of northern pintails use the Basins during the spring migration. Recent surveys have identified that a minimum of 200,000-300,000 shorebirds represented by over 30 different species migrate through the basins during the spring (Adrian Farmer, Pers. Comm.). In some years, the Basins also produce substantial number of ducks (Evans and Wolfe 1967). Basin wetlands are regularly

used by the federally endangered whooping crane, peregrine falcon, and the threatened bald eagle. Forty-two percent of confirmed whooping crane observations in Nebraska have been at Rainwater Basin wetlands. These wetlands have provided more whooping crane use-days during fall migration than any other known migration habitat in the United States' portion of the Central Flyway (C.A. Faanes, unpubl. data).

Rainwater Basin wetlands provide water quality functions in the form of flood storage, nutrient retention, sediment trapping and shoreline anchoring (Gersib et al. 1990 (c)). Because of the impermeable clay pan characteristic of Rainwater Basins and water table elevations that lie more than 50 feet below the wetlands extends beyond the clay lens associated with wetland soils (Keech and Dreeszen 1959).

Nearly all Rainwater Basin wetlands provide for recreation activities, particularly hunting and fur harvest. The public is showing increased interest in using Rainwater Basins for other recreation such as bird watching and nature photography.

## 1.2 Central Platte River<sup>1</sup>

### Profile

The Central Platte River (also called the Big Bend Reach) extends approximately 90 miles from Lexington to Chapman. Historically the Platte was a broad open prairie river with a braided channel and numerous saturated wet meadows adjacent to the river. However, the diversion of approximately 70% of the historic annual flows has changed the Central Platte into a narrower river with a dense band of mature deciduous woodland encroaching on the wet meadows. Numerous islands which at one time were open sandbars have since been overgrown with woody vegetation due to a reduction in high-water scouring flows.

### Loss and Threats

The Platte River Valley epitomizes the struggle between agricultural and development interests, and wildlife, fish recreation, and other values associated with wetlands. American Rivers, a river conservation organization, has listed the Platte as one of the most endangered waterways in the United States.

Since 1860, the Central Platte River has lost up to 73% of active channel areas (Sidle et al. 1989). Upstream from the Central Platte, active channel losses on the river have reached 85%. In many areas, channel width has been reduced to 10-20% of its historic size (U.S. Fish and Wildlife Service 1981). From 1988 through 1994, open-channel areas declined by 4 to 41% due to relatively low summer flows and reduced scouring flows, allowing the establishment of undesirable woody vegetation (Currier 1995). Since settlement, wet meadow acreage in the Central Platte has declined 73% (Currier et al. 1985). Wet meadow acreage declined up to 45% between 1938-1982 (Sidle et al. 1989). An increase of shrub and forested wetland types has occurred at the expense of riverine, emergent wetlands, and wet meadows as a response to decreased scouring flows. The increase in the shrub and forested wetlands has been detrimental to fish and wildlife resources that historically used the river valley (Currier et al. 1985; U.S. Fish and Wildlife Service 1981). Wetlands along the Central Platte were given a priority 1 ranking in the Nebraska Wetlands Priority Plan due to extensive losses in the past (Gersib 1991).

Agriculture (drainage and conversion to grain crops), and sand and gravel mining operations pose the biggest immediate threats to wet meadows adjacent to the Platte River. Loss of instream flows, ground

water depletions, and degradation of the riverbed continue to pose a long-term threat to the remaining wet meadow's source of water. The spread of purple loosestrife is an additional threat. Purple loosestrife is an introduced plant of little value to wildlife that out-competes desirable native plants. Purple loosestrife was only reported west of Kearney in the late 1980's (Gersib 1991), but has since become established throughout the Central Platte.

### **1.3 Lower North Platte River<sup>1</sup>**

#### **Profile**

The lower reach of the North Platte River extends approximately 20 river miles. This wetland complex consists of riverine and marsh-like wetlands lying within the historically active floodplain and channel of the Platte and North Platte rivers. Temporarily and seasonally flooded vegetated wetlands comprise an estimated 80% of all wetlands in this reach.

#### **Loss and Threats**

Sidle et al. (1988) reported that the active river channel width between North Platte and Lake McConaughy has declined 85% since 1860. Since 1938, the active channel width between North Platte and Sutherland has declined by 65% (U.S. Fish and Wildlife Service, unpubl. data). Agricultural conversion, ground water depletions, and sand and gravel mining pose the greatest short-term threats to wet meadows adjacent to the North Platte River. Wet meadow acreage losses along the North Platte River were estimated to be 23-33% since 1938, though much of the farmable meadows already were converted and under gravity irrigation prior to 1938 (Sidle et al. 1989). Lower North Platte River wetlands were given a priority 2 ranking in the Nebraska Wetlands Priority Plan due to extensive losses in the past (Gersib 1991).

#### **Functions and Values**

During the spring, about 100,000 migrating sandhill cranes spend up to 6 weeks feeding and resting on the Lower North Platte River and adjacent wet meadows. Sandhill cranes roost in the river and wet meadows at night and forage in wet meadows, grassland, and cropland during the day. Threatened bald eagles winter along the river and also use it during migration. Endangered whooping cranes occasionally use this stretch of river during both spring and fall migrations. Migrating and wintering waterfowl use the river and associated wet meadows. The North Platte River provides habitat for a variety of other migratory and resident wildlife species (U.S. Fish and Wildlife Service 1981) including 77% of the bird species on the National Audubon Society's Blue List of which all but three nest in the area (Currier et al. 1985).

Waterfowl hunting and fishing occur on the Lower North Platte River (Anderson et al. 1989). A recent survey by the University of Nebraska indicated that Nebraskans as a whole have a keen interest in a variety of recreation activities available on the Lower North Platte River and support further efforts to provide these recreational opportunities (Bureau of Sociological Research 1988).

## 1.4 Republican Basin<sup>2</sup>

### Profile

The most common wetland type in the Basin consists of depressional wetlands (i.e., marshes) and those associated with abandoned stream channels. These wetland types provide similar functions and values and support much of the same types of plants and animals. Common wetland plants important for fish and wildlife include bulrushes, sedges, smartweeds, cattails, and rooted submerged species. Wet meadows supported by high groundwater in the flood plain become more common toward the lower reaches of the Basin.

### Functions and Values

Wetlands in the Basin provide a variety of public benefits. Depending upon their location, wetlands capture floodflows, improve water quality through filtration and percolation, recharge groundwater, stabilize shorelines, provide a multitude of fish and wildlife habitat components, contribute to primary productivity, and provide recreational and educational opportunities. Many of these functions and values contribute to the economic well-being of the Basin. Where wetlands are present in the flood plain, flood damage is reduced. Riparian wetlands eliminate the need for engineered solutions for shoreline protection. Deer and turkey frequent riparian wetlands, and associated hunting provides recreational and economic benefits in the Basin.

Wetlands in the Basin are highly regarded for the fish and wildlife habitats they provide. Wetland habitats provide cover, forage, and loafing areas for migratory waterfowl; cover, forage, and nurseries for aquatic life; and cover, forage, and nesting substrates for nesting migratory songbirds. In addition to providing forage, wetlands are important as cover and thermal regulation for large and small resident mammals.

Riparian communities in the Basin range from grasses and forbs in the more arid headwater areas to communities of cottonwood, willow, green ash, burr oak, American elm, and hackberry in moister, lower reaches. Riparian communities are extremely important as cover, forage, and breeding habitat for neotropical migratory birds. Streamside vegetation also provides food, cover, and shade for fish and other aquatic species. Less riparian vegetation was present in the area before major flooding occurred in the 1930's. The development of irrigation and flood-control impoundments reduced flood flows and promoted colonization of flood-scoured channels by pioneering riparian species.

Of the approximately 65,000 acres of riparian wetlands estimated for the Basin, approximately 5,000 acres are associated with the periphery of federally developed flood control and irrigation impoundments. Because they depend upon moisture associated with the surface of the reservoir, these wetlands are vulnerable to potential changes in reservoir operations. These riparian areas are characterized by herbaceous and woody communities containing grasses, sedges, cattails, cocklebur, smartweed, sunflower, hemp, willows, Russian olive, American elm, and cottonwoods, and include extensive mud and sand flats as impoundment levels are lowered. Approximate acreages for the individual reservoirs within the project area are as follows:

<b>Reservoir riparian vegetation (acres)</b>	
Swanson Lake	<sup>a</sup> 393
Enders Reservoir	<sup>a</sup> 80
Hugh Butler Lake	<sup>a</sup> 297
Harry Strunk Lake	<sup>a</sup> 800

Harlan County Lake

<sup>b</sup>4,030

<sup>a</sup> Nebraska Game and Parks Commission 1998.

<sup>b</sup> U.S. Army Corps of Engineers, 2000.

<sup>1</sup> The Rainwater Basins and profiles, loss and threats, and functions and values condensed from Guide to Nebraska's Wetlands by Ted LeGrange

<sup>2</sup> Republican River FEIS (2000), US Department of Interior, Bureau of Reclamation.

## **Appendix G: Scoping Letters**

## **Appendix H: FSA Handbook Conservation Practices**