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Appendix F Draft Environmental Assessment for the Spring Creek Watershed Project

Custer and Dawson Counties, Nebraska

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Prepared by

U.S. Department of Agriculture- Natural Resources Conservation Service

In cooperation with

Central Platte Natural Resources District, Grand Island, Nebraska

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Contents

Tables

Figures

No table of figures entries found.

1 Purpose and Need for Action

1.1 Purpose

The purpose of this project is to reduce flood damage to rural communities in the Spring Creek Watershed. The PL 83-566 authorized project purpose is flood prevention (flood damage reduction). Based on the location of flood damage in the Spring Creek Watershed, the project will address the following specific areas of need:

- Cozad: Provide protection to minimize the current risk of flooding and reduce flood-related damages to public and private infrastructure
- Lexington: Provide protection to minimize the current risk of flooding and reduce flood-related damages to public and private infrastructure

1.2 Need

The project is needed due to the history of flood damage that has occurred in the watershed and continued risk of flooding and flood-related damages to public and private infrastructure. Flooding has occurred in the project area on multiple occasions and is a significant issue of concern. The worst flooding occurred in 1947. More recently, the watershed was severely impacted by flooding in May 2008, March 2019, and July 2019. Over 9,000 acres of the watershed are within the 100-year floodplain and are at risk of future flood damage.

2 Alternatives

2.1 Alternatives Description

Based on the measure screening process, channel conveyance measures (a combination of channel improvements and associated flood protection berms [dikes] and diversion channels) were evaluated for the rural communities of Cozad and Lexington. Modeling indicates that smaller, more frequent precipitation events cause the most flood damage.

Hydrologic modeling also indicates that at the smaller, more frequent precipitation events, flooding within Lexington occurs routinely in both the northeast and southwest area of the community and is caused by separate and distinct sources. At the smaller, more frequent precipitation events, flooding in the northeast portion of the community is predominately caused by Spring Creek overbanking and runoff restrictions caused by U.S. Highway 30 and UPRR. Flooding in the southwest area of Lexington is caused primarily by Stump Ditch overbanking.

Therefore, channel conveyance measures were considered as alternatives for Cozad, the northeast portion of Lexington (Lexington NE), and the southwest portion of Lexington (Lexington SW).

Channel conveyance includes a combination of channel improvements and associated flood protection berms (dikes) and diversion channels, as necessary. The term “berm” in this document is synonymous with NRCS’s definition of “dike” (NRCS Conservation Practice Standard 356). Channel improvements would increase the conveyance system capacity through modification of the channel alignment and/or geometry and replace undersized drainage structures to provide protection from a defined flood event. Flood protection berms include the implementation of specific flood protection barriers to provide flood damage reduction for certain areas of interest. Berm locations identified based on hydraulic modeling would redirect flows away from flood prone structures. Diversions would redirect excess flows upstream, and a diversion would be constructed around urban areas to reduce flows to no-damage flows. Roads would not need to be resized, but bridges and culverts would need to be resized or replaced..

2.1.1 Alternative 1, No Action/Future Without Federal Investment

This alternative is the most likely course of action if the Sponsor does not receive federal funding for the project. Under this alternative, no federal assistance would be available, and the Sponsor would not pursue further flood reduction measures. While there would be no costs associated with this alternative, flood damages would continue to occur.

2.1.2 Alternative 2, Cozad Channel Conveyance

The flood damage reduction alternative for the Cozad geographic area includes a combination of constructing small earthen flood control berms, creating new drainage conveyance ditches and diversions, and improving existing drainage channel conveyance. The flood damage

reduction alternative for Lexington includes a combination of constructing small earthen flood control berms and improving existing drainage channel conveyance.

Beginning at O Street, and 0.25 mile north of W 24th Street, an earthen flood control berm would be constructed on the south side of an existing tributary to Drainage Ditch No. 4. A gated structure would be installed at ditch No. 4 to maintain normal flows. The berm would divert higher flows through a new diversion ditch that would extend east to Newell Street. On the east side of Newell Street, the existing roadside ditch would be improved to carry flows south. This existing roadside ditch continues along the east side of Newell Street to its confluence with Drainage Ditch No. 4. A gated structure would be installed to maintain normal flows. Just south of E 16th Street, a new drainage diversion would carry higher flows from Drainage Ditch No. 4 to the east. A gated structure would be installed on an existing Drainage Ditch to maintain normal flows. The diverted flow would be carried to an existing drainageway (through a stabilized drop structure) that drains into Stump Ditch just east of Country Club Road. Improvements to the existing drainageway and the existing Stump Ditch would continue to the upstream side of its existing intersection with the Dawson County Canal. A gated structure would be installed at the Stump Ditch transition to a new Drainage Ditch to maintain normal flows in Stump Ditch. From this point, a new drainage diversion ditch would be constructed to carry flow around the east border of the Cozad Country Club through the intersection of County Road 760. An underdrain would be installed for Dawson County Canal to be carried under the new Drainage Ditch.

Earthen flood control berms are typically 3-5 feet in height with 3:1 side slopes. The 3:1 slopes are a conservative estimate for footprint and fill. If future geotechnical exploration of the soils suggests another slope is more appropriate for the berms, the slopes would be modified. New drainage diversions/ditches and improved drainageways would have a maximum 102-foot bottom width and maximum 201-foot top width. A 25-foot right-of-way (ROW) would be maintained on each side of these improvements, where applicable. Borrow/fill material for the berms is expected to be sourced from the excavation for the channel improvements. No off-site borrow areas are anticipated.

Permanent ROW would be used for construction access (including staging and equipment transportation), would be seeded with a certified weed-free native seed mix after construction is complete, and would serve as permanent access for operation and maintenance needs.

Appendix C shows the typical design of channel conveyance and associated berms. As part of the Cozad Channel Conveyance alternative, four new structures would be installed, and three structures would be improved (see Table 2-1).

Table 2-1: Cozad Channel Conveyance Structure Improvements

Location	Intersecting Feature	Existing Structure	New Structure	Notes
County Road 760	New Channel	No	Bridge	
Driveway (E 16th Street)	Drainage Ditch No. 4	Yes	Bridge	

Location	Intersecting Feature	Existing Structure	New Structure	Notes
Newell Street	New Channel	No	Bridge	
Dawson County Canal	New Channel	No	Aqueduct	Dawson County Canal over new channel
Country Club Road	Stump Ditch	Yes	Bridge	
E 8th Street	Stump Ditch	Yes	Bridge	
County Road 762	New Channel	No	Bridge	

2.1.3 Alternative 3, Lexington Northeast Channel Conveyance

On the north side of Lexington, a small earthen flood control berm would begin on the south side of County Road 757 at N Airport Road. It would continue east to Spring Creek east of State Highway 21. Spring Creek capacity would then be improved south to County Road 437. A weir structure to divert flow to Beatty Ditch would be installed.

Earthen flood control berms are typically 2-5 feet in height with 3:1 side slopes. The 3:1 slopes are a conservative estimate for footprint and fill. If future geotechnical exploration of the soils suggests another slope is more appropriate for the berms, the slopes would be modified. Improved drainageways would typically have a maximum 24-foot bottom width and maximum 108-foot top width. A 25-foot ROW would be maintained on each side of these improvements, where applicable. Borrow/fill material for the berms is expected to be sourced from the excavation for the channel improvements. No off-site borrow areas are anticipated. Permanent ROW would be used for construction access (including staging and equipment transportation), would be seeded with a certified weed-free native seed mix after construction is complete. As part of the Lexington Northeast Channel Conveyance alternative, all nine existing structures would be improved (see Table 2-2).

Table 2-2: Lexington Northeast Channel Conveyance Structure Improvements

Location	Intersecting Feature	Existing Structure	New Structure
County Road 436	Spring Creek	Yes	5-Barrel Concrete Culvert
County Road 437	Spring Creek/Drainage Ditch No. 1	Yes	Bridge
Taft Street	Spring Creek	Yes	5-Barrel Concrete Culvert
E 13th Street	Spring Creek	Yes	5-Barrel Concrete Culvert
County Road 755	Spring Creek	Yes	5-Barrel Concrete Culvert
Prospect Road (County Road 754)	Spring Creek	Yes	5-Barrel Concrete Culvert
US 30	Spring Creek	Yes	5-Barrel Concrete Culvert
County Road 435	Spring Creek	Yes	5-Barrel Concrete Culvert
UPRR	Spring Creek	Yes	5-Barrel Concrete Culvert

2.1.4 Alternative 4, Lexington Southwest Channel Conveyance

On the south side of Lexington, a berm on the east side of County Road 431 would be installed to the US 30 and UPRR crossing. From the UPRR crossing, a new Drainage Ditch on the west side of County Road 431 would be installed and would transition to the east side just north of the confluence with Dawson County Drainage Ditch No. 1. County Road 431 would also be raised in the section were the new ditch is placed on the east side. The capacity of Drainage Ditch No. 1 would be improved east to the intersection with County Road 437. Coordination with UPRR would be required.

Earthen flood control berms are typically 2-5 feet in height with 3:1 side slopes. The 3:1 slopes are a conservative estimate for footprint and fill. If future geotechnical exploration of the soils suggests another slope is more appropriate for the berms, the slopes would be modified. Improved drainageways would typically have a maximum 24-foot bottom width and maximum 108-foot top width. A 25-foot ROW would be maintained on each side of these improvements, where applicable. Permanent ROW would be used for construction access (including staging and equipment transportation), would be seeded with a certified weed-free native seed mix after construction is complete, and would serve as permanent access for operation and maintenance needs.

As part of the Lexington Southwest Channel Conveyance alternative, three new structures would be installed, and ten structures would be improved (see Table 2-3).

Table 2-3: Lexington Southwest Channel Conveyance Structure Improvements

Location	Intersecting Feature	Existing Structure	New Structure
Highway 283	Dawson County Drainage Ditch No. 1	Yes	3-Barrel Concrete Culvert
Prospect Road (County Road 754)	Dawson County Drainage Ditch No. 1	Yes	3-Barrel Concrete Culvert
County Road 436	Dawson County Drainage Ditch No. 1	Yes	3-Barrel Concrete Culvert
County Road 435	Dawson County Drainage Ditch No. 1	Yes	3-Barrel Concrete Culvert
County Road 434	Dawson County Drainage Ditch No. 1	Yes	3-Barrel Concrete Culvert
Railroad Spur (County Road 433)	Dawson County Drainage Ditch No. 1	Yes	3-Barrel Concrete Culvert
Pedestrian Bridge	Dawson County Drainage Ditch No. 1	Yes	3-Barrel Concrete Culvert
S Adams Street	Dawson County Drainage Ditch No. 1	Yes	3-Barrel Concrete Culvert
Walnut Road (County Road 755)	Dawson County Drainage Ditch No. 1	Yes	3-Barrel Concrete Culvert
S Airport Road	Dawson County Drainage Ditch No. 1	Yes	3-Barrel Concrete Culvert

Location	Intersecting Feature	Existing Structure	New Structure
County Road 431	New Diversion	No	5-Barrel Concrete Culvert
UPRR	New Diversion	No	5-Barrel Concrete Culvert
US 30	New Diversion	No	5-Barrel Concrete Culvert

3 Affected Environment

The Affected Environment Chapter provides the baseline for National Environmental Policy Act (NEPA) evaluation and planning. The section describes the current ecosystem service flows and physical, biological, ecological, economic, and social environments for the watershed as well as projected future conditions to the extent possible based on reasonably foreseeable trends and actions within the watershed. This section describes the existing conditions of the Spring Creek Watershed project. In general, the study area, or Affected Resource Area, consists of the Spring Creek Watershed (see Appendix B). The Affected Resource Area may be refined based on resource type to the immediate areas that would be affected by the Proposed Action.

3.1 Soils

The study area is located entirely within the Central Nebraska Loess Hills Major Land Resource Area (NRCS 2006) and is split between two Level 4 Ecoregions: Central Nebraska Loess Plains in the north and Platte River Valley in the south (U.S. Environmental Protection Agency [EPA] 2013). Soils in the area consist primarily of silt and sand loams and are derived from loess deposits left after the last glaciation.

3.1.1 Geology

Landforms in the study area consist of rolling hills in the north and flat floodplain in the south, resulting in range, pasture, and grassland being the majority land use in the northern portion of the study area, while irrigated cropland is the majority land use in the southern portion. The region's geologic setting consists of unconsolidated wind-blown loess and clay less than 100 feet deep that overlays alluvial silts, sands, and gravels of the Ogallala Formation (United States Geological Survey [USGS] 2024). The Ogallala Formation consists of clay, silt, sand, and gravel with fine to coarse grained, poorly sorted, fluviatile, arkose deposits. Lithology in the formation varies both laterally and vertically within short distances. The alluvial sands and gravels that make up the Ogallala Formation range from 0 to 430 feet thick and are generally divided into two layers based on the texture of the sediments. The upper layer has a higher percentage of coarse sands and gravels, while the lower layer has a higher predominance of sands, fine sands, silts, and clays (Dreezen et. al 1973).

3.1.2 Erosion

There are 70,025 acres of highly erodible land (HEL) in the study area (USDA NRCS 2021a). This land is located predominantly in the bluffs on the northern side of the study area. Slopes for the HEL soils range generally from 6 to 60 percent. Land in the northern portion of the study area is used for grazing with established ground cover rather than cropland. With managed grazing activities, the vegetative layer protects the HEL soils from erosion. When refining the Affected Resource Area to the perimeter of Cozad and Lexington, there is HEL present southeast of Cozad but none present in close proximity to Lexington. While channel/streambank erosion is of higher concern in the northern portion of the study area, it is of lesser concern in

the southern portion and in the refined Affected Resource Area around Cozad and Lexington. Channel erosion is not a principal concern in the flat topography of the floodplain around Cozad and Lexington. The most common type of erosion within this refined Affected Resource Area is wind-based erosion.

3.1.3 Sedimentation

Minor sedimentation in the study area occurs predominantly in the floodplain on the south and east sides of the Spring Creek Watershed. As discussed in Chapter 3.1.2, soils located in the northern portion of the study area are more susceptible to erosion and result in subsequent sedimentation downstream. Existing dams and water quality basins in the upper reaches of the Spring Creek Watershed help mitigate this process. Sedimentation in the study area is minor due to the vegetative layer over HEL soils in the watershed's northern portion that reduces erosion and thus sedimentation in the watershed. Under normal conditions, natural sediment deposition would occur within the waterways, continuing down the watershed to the Platte River. During flood events, waters overtop stream banks and deposit sediment into the floodplain. Excess sedimentation is not a concern for waterways or the floodplain surrounding Cozad and Lexington.

3.2 Prime and Unique Farmlands

The Federal Farmland Protection Policy Act (FPPA) was enacted to minimize unnecessary conversion of farmland to other uses as a result of federal decisions. In addition, the FPPA states that federal programs should be compatible with state and local policies or programs that protect farmland. Soils that exhibit the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed (including water management) according to acceptable farming methods are designated as prime or unique farmland. Prime and unique farmland can include a variety of land uses, such as active cropland and range land, but does not include urban areas that are in a built environment.

> *"For the purpose of FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance. Farmland subject to FPPA requirements does not have to be currently used for cropland. It can be forest land, pastureland, cropland, or other land, but not water or urban built-up land*" (USDA NRCS 2021b).
>
> *"Prime farmland is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, USDA NRCS recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland*" (USDA NRCS 2021c). *"In some areas, land that does not meet the criteria for prime or unique farmland is considered to be farmland of statewide importance for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable. Farmland of statewide importance may include tracts of land that have been designated for agriculture by State law"* (USDA NRCS 2021c).

The study area contains 115,669 acres of soils identified as prime or unique farmland, respectively. No farmland of statewide importance was documented.

3.3 Water Resources

3.3.1 Surface Water Quality

As outlined in Section 303(d) of the Clean Water Act, the Nebraska Department of Water, Energy, and Environment (DWEE; consolidated from former Nebraska Department of Environment and Energy [NDEE] and Nebraska Department of Natural Resources [NeDNR]) prepares a list of impaired waters that do not meet the standards associated with its assigned use classification. Spring Creek (segment MP2-20300) is currently listed as a category 5 impaired water in the 2022 Water Quality Integrated Report (NDEE 2022). A category 5 water is when one or more beneficial uses are impaired, and no total maximum daily load criteria have been developed. The beneficial uses of recreation and aquatic life in Spring Creek are impaired for *E. coli* (bacteria) and high levels of ammonia. An Aquatic Community Assessment was completed on Spring Creek in 2013, but results were inconclusive due to low flow events during sampling.

DWEE addresses ongoing water quality management through its implementation of Sections 401 and 402 of the Clean Water Act.

- Section 401 provides that the certifying authority (in Nebraska, that authority has been delegated to DWEE) reviews Section 404 permit applications and provides certification that the issuance of a Section 404 permit will comply with applicable water quality standards, effluent limitations, new source performance standards, toxic pollutant restrictions, and/or other appropriate water quality requirements.
- Section 402 establishes the National Pollutant Discharge Elimination System Program, which requires a permit for sewer and stormwater discharges from developments, construction sites, livestock facilities for operations defined in Title 130 – Livestock Waste Control Regulations, or other areas of soil disturbance.

3.3.2 Surface Water Hydrology

The Spring Creek Watershed study area is located entirely in the Middle Platte-Buffalo HUC 8 (10200101) and contains portions of three HUC 10 watersheds (1020010105; 1020010107; 1020010106) (USGS 2020b). Landforms in the study area consist of rolling hills in the north and flat floodplain in the south. Water generally flows from the northwest to the southeast as it enters Spring Creek from the upper watersheds and ultimately ends up in the Platte River. Water in the Platte River's historical floodplain can sheet flow due to the lower elevations. The Spring Creek Watershed is 195,840 acres, while the drainage area for the study area is 196,044 acres to account for sheet flow water contributions.

In the study area, existing surface water hydrology contributes to flooding in Cozad and Lexington.

- In Cozad, the primary sources of flooding were determined to be Drainage Ditch No. 4 and Stump Ditch. Drainage Ditch No. 4 begins north of Cozad and flows south under

County Road 762 (24th Street), south along Newell Street, through town and under the Dawson County Canal, to the north side of U.S. Highway 30 (US 30), and then southeast along US 30 to the confluence with Stump Ditch. Stump Ditch flows east of town, under the Dawson County Canal, and through the Cozad Country Club golf course.

- In Lexington, the primary sources of flooding were determined to be Drainage Ditch No. 1 and Spring Creek. Drainage Ditch No. 1 flows south of town from west to east to the confluence with Spring Creek. Spring Creek flows north of town from northwest to southeast before crossing the US 30 and Union Pacific Railroad (UPRR) corridor and continuing southeast.

Based on the modeling approach detailed in Appendix D, overtopping of the existing stream banks occurs at precipitation events ranging from the 5- to 25-year return interval, depending on the topography at the given location in the watershed. There is significant inundation outside the channel at the 5- and 10-year events.

3.3.3 Groundwater

The Spring Creek Watershed study area is situated atop the Ogallala Formation, also known as the High Plains Aquifer, which provides a large portion of the water used for irrigation and other domestic and municipal needs (Divine and Sibray 2017). The High Plains Aquifer is the most widely used aquifer in Nebraska, consisting of multiple layers of sand, gravel, and sandstone with lesser amounts of silt, siltstone, and clay (Korus et al. 2013). From oldest to youngest, the geologic units of the High Plains Aquifer are the Brule Formation, the Arikaree Group, the Ogallala Group, the Broadwater Formation, and younger unconsolidated sand and gravel units deposited during the Pleistocene epoch (2.6 million to 10,000 years ago).

Across the entire CPNRD and beneath the unconsolidated sand and gravel deposits, the first bedrock unit encountered are the strata of the Ogallala Group. CPNRD manages groundwater within its boundaries and has been collecting data on groundwater levels since the mid-1980s (CPNRD 2021). In recent years, the CPNRD has seen groundwater levels increase. In the study area, groundwater levels have seen an increase ranging from 0.62 foot to 8.01 feet when compared to levels in 1982. In 1987, the CPNRD implemented a Groundwater Quality Management Program to combat high nitrate levels in the region’s groundwater. The area adjacent to Lexington is currently listed as a Phase II area where the average nitrate concentration is 7.6 to 15 parts per million.

3.3.4 Wetlands and Waters of the United States

Wetlands are known to be in the watershed. Alternatives analysis would address NRCS policy (Food Security Act, Swampbuster provisions), EO 11990, and provisions of Section 404 of the Clean Water Act.

Wetlands and water resources were identified using readily available information from USGS National Hydrography Dataset (NHD) and the U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI). The study area contains 770.8 miles of waterways and 3,306.4 acres of wetlands. In general, more wetlands are located in the southern flat floodplain section of the watershed (see Appendix C). These water resources are detailed further in Appendix D. Select portions of the affected resource area around Cozad and Lexington were delineated in accordance with Corps of Engineers' 1987 Wetland Delineation Manual, the Great Plains Regional Supplement to the Corps of Engineers Wetland Delineation Manual, and the National Ordinary High Water Mark Field Delineation Manual for Rivers and Streams. Table 3-1 details delineated aquatic resources, and Appendix E contains the wetland delineation report.

Table 3-1. Delineated Aquatic Resources

Resource Type	Acres	Linear Feet
PEMA/C	16.88	N/A
Open Water	0.13	N/A
Streams	19.86	60,986.40
Total	36.87	60,986.40

Note: PEMA/C = Palustrine emergent temporarily/seasonally flooded wetland

3.3.5 CPNRD Operations and Water Rights

DWEE is responsible for the management of surface water rights throughout the state. These rights are managed through the application of permits for groundwater and surface water wells (NeDNR 2021a). The permits obtained by DWEE track a well's locations and stipulate the amount of water appropriated that can be pumped by the well. The DWEE tracking database reports that there are 1,228 active wells in the Spring Creek Watershed study area. Approximately 65 percent of the wells are designated for irrigation uses (NeDNR 2021b). Additionally, there are four designated wellhead protection areas in the study area: city of Cozad, city of Lexington, Hitch N Rail Mobile Home Court, and Rich Mobile Homes Court (NDEE 2021). These areas are located on the south side of the study area in the vicinity of the Platte River. DWEE and CPNRD work conjunctively to manage surface and groundwater usage in a sustainable and acceptable manner.

3.3.6 Regional Water Management Plans and Agency Programs

DWEE operates agency programs in the Spring Creek Watershed, including water planning, surface water, floodplain management, dam safety, groundwater, and water administration.

The Spring Creek Watershed is located in CPNRD and falls within the interest of the CPNRD Integrated Management Plan. CPNRD's groundwater goals include groundwater moratorium, certification of groundwater uses, groundwater variances and transfers, and municipal and industrial accounting. Surface water goals outlined in the plan include maintaining the moratorium on new surface water appropriations and on expanded surface water uses, subjecting transfers of appropriations to statutory criteria and CPNRD rules, and continuing surface water administration and monitoring of surface water use.

Because the Spring Creek Watershed is part of the Platte River Basin, compliance with the Platte River Recovery Implementation Program Water Management Plan must also be considered. Compliance includes an assessment of potential depletions within the Platte River system and how they may impact species downstream. Anticipated alternatives would not induce depletions and are thus in compliance with the Platte River Recovery Implementation Program, and a consumptive use calculation is not needed.

3.4 Floodplains

The 100-year floodplain relates to the probability of a flood occurring, with the 100-year flood representing a one percent chance of reoccurrence in any given year. In the Spring Creek Watershed study area, there are approximately 9,668 acres within the 100-year floodplain (see Appendix C Figure 1-8). The floodplains in the study area are confined around waterways and do not extend far beyond the waterways. The regulatory floodway is the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge base flood without increasing the water surface elevation more than a designated height downstream. No floodways were identified in the Spring Creek Watershed study area.

3.5 Terrestrial and Aquatic Wildlife

The Spring Creek Watershed study area falls primarily within the Mixedgrass Prairie Ecoregion, identified in the Nebraska Legacy Project. A small northern portion of the study area falls within the Sandhills Ecoregion. The Mixedgrass Prairie contains a variety of native plant communities. Tallgrass prairie species, including big bluestem, Indian grass, switchgrass, and Canada wildrye, tend to dominate in the east and along river floodplains. Short-grass species, including blue grama and buffalo grass, dominate in the western part of the ecoregion. Forbs may include prairie-clovers, alfalfa, deer vetch, leadplant, prairie-coneflower, stiff sunflower, and dotted gayfeather. Most waterways are lined with riparian forests composed of cottonwood, green ash, hackberry, and eastern red cedar. Wet meadows and wet prairies along rivers include a variety of plants, such as woolly sedge, spikerush, and prairie cordgrass. This ecoregion contains an abundance of wetlands, including playas, which are wind-formed, nearly circular depressions whose underlying clay pan holds water from rainfall and run-off. Additionally, two principal plant community types are found in the Sandhills Ecoregion: dune prairie and valley wetlands. Dune prairies consist of a mixture of sand-adapted grasses, including sand bluestem, prairie sandreed, little bluestem, and hairy grama. Blowouts, wind-excavated depressions in dune tops, are uncommon because of improved range management that limits the effects of wind on erosion and decreases fire frequency. Wet meadows occur in the valleys and support sedges, spikerushes, prairie cordgrass, and switchgrass (Schneider et al. 2011).

The Central Loess Hills Biologically Unique Landscape (BUL) occupies the loess hills region of central Nebraska, including approximately 70,388 acres of the northern portion of the study area (Schneider et al. 2011). The landscape consists of rolling to steep loess hills dissected by the valleys of the Loup River system. The hills are a mosaic of mixed-grass prairie and cropland. Lack of grazing managed for biological diversity values, exotic plant invasion, and herbicide

spraying have degraded the majority of prairies. The flatter tablelands of this landscape contain playa wetlands that are used by whooping cranes and numerous other aquatic birds during migration.

The Central Platte River BUL includes the Platte River channel and the floodplain from central Dawson County eastward to central Hamilton County. The Central Platte River BUL comprises 33,488 acres of the southern portion of the study area (Schneider et al. 2011). The central Platte River is a large, shallow, braided stream. Sandbars and wooded islands are common in the channel. Much of the streambank is also wooded, with cottonwood and eastern red cedar as dominant species. Sandpits are common along the river, many with housing developments. Most of the river floodplain is in cropland, though there are scattered wet meadows in areas. Sand dune grasslands occur on the south side of the river in areas. The spring staging of Sandhill cranes on the Platte River is a world-renowned phenomenon. Each spring, more than 500,000 cranes concentrate on the central Platte, roosting in the tens of thousands at scattered sites and foraging in adjacent cornfields and meadows. The loss of Platte River staging habitat is the most significant threat to the mid-continental crane population. The central Platte River is also an important spring waterfowl and shorebird migration stopover point in the central flyway. Five federally and/or state-listed species occur along the central Platte, including the whooping crane, interior least tern, piping plover, bald eagle, and river otter. This reach of the Platte is designated as critical habitat for whooping cranes. The Platte River Whooping Crane Maintenance Trust, Audubon Society, Nature Conservancy, and Nebraska Game and Parks Commission (NGPC) own and manage a number of protected areas within this BUL (Schneider et al. 2011). The southern portion of the study area is within the Central Platte River BUL.

3.5.1 Fish and Aquatic Resources

Waterways within the Spring Creek Watershed study area support a range of small to medium-sized fish species and a range of aquatic species (Hrabik et al. 2015). Common fish species encountered include but are not limited to common carp, a range of minnows (bigmouth shiner, brassy minnow, central stoneroller, creek chub, fathead winnow, flathead chub, golden shiner, plains minnow, red shiner, sand shiner, and western silver minnow), a range of sunfish species (crappie, bluegill, bass), catfish, gar, and sucker species. Northern crayfish, calico crayfish, giant floater, and a variety of snail species are also commonly found within the watershed (NGPC, n.d.).

The Nebraska Natural Legacy Project identifies Tier 1 species, which are those that are globally or nationally most at risk of extinction (Schneider et al. 2018). Tier 1 species are high priority, and more research and conservation efforts are focused on these species. Table 3-2 provides a list of the fish and aquatic species (mollusks) that are included on the Tier 1 species list within the study area.

Table 3-2. Tier 1 Fish and Aquatic Species in the Spring Creek Watershed Study Area

Common Name	Scientific Name	Habitat
Plains minnow	*Hybognathus placitus*	permanent streams and backwaters with sandy substrate and moderate current

Plains topminnow	*Fundulus sciadicus*	vegetative backwaters and headwaters, shallow parts of rivers and streams
Western silvery minnow	*Hybognathus argyritis*	backwaters, pools, and slow-moving waters in medium to large rivers
Niobrara ambersnail	*Oxyloma haydeni*	moist soil by streams

Source: NGPC Conservation and Environmental Review Tool 2024

As documented in Chapter 3.3.1, there are more than 123 miles of perennial streams and 1,015 miles of intermittent streams in the study area, based on USGS NHD data. According to USFWS NWI data, there are more than 56 acres of lakes, 744 acres of ponds, 2,482 acres of freshwater emergent and freshwater forested/shrub wetlands, and 2,225 acres of riverine wetlands. The breakdown per study area is included in Chapter 3.3.4.

3.5.2 Terrestrial Wildlife

Common terrestrial wildlife species that may occur in the study area include coyote, opossum, raccoon, white-tailed deer, beaver, skunk, muskrat, mink, cottontail rabbit, fox squirrel, and red fox. Table 3-3 provides a list of the terrestrial species (insects, mammals, and reptiles) that are included on the Tier 1 species list within the Spring Creek Watershed study area.

Table 3-3. Tier 1 Terrestrial Species in the Spring Creek Watershed Study Area

Common Name	Scientific Name	Habitat
American burying beetle	*Nicrophorus americanus*	variety of habitats including grassland prairie, forest edge, scrubland, and mesic areas such as wet meadows, streams, and wetlands; carrion availability is a more important component of habitat than a specific type of vegetation
Ghost tiger beetle	*Cicindela lepida*	sparsely vegetated areas with open, sandy soils
Iowa skipper	*Atrytone arogos iowa*	tall-grass prairie, mixed-grass prairie along the Niobrara, native prairie with standing grass stems
Kohler's fritillary	*Boloria selene sabulocollis*	Sandhills and stream valley wet meadows with violets
Married underwing	*Catocala nuptialis*	tall-grass and mixed-grass prairie; larvae feed on lead plant (*Amorpha*)
Monarch	*Danaus plexippus*	uses broad range of habitats but requires select species of milkweeds as larval host plants
Nebraska fritillary	*Boloria selene nebraskensis*	wet meadows with violets

Common Name	Scientific Name	Habitat
Ottoe skipper	*Hesperia ottoe*	tall-grass prairie, rolling/hilly prairie, mixed-grass prairie; feed on bluestems
Regal fritillary	*Speyeria idalia*	tall-grass and mixed-grass prairie with violets, wet meadows
Sandy Tiger Beetle	*Cicindela limbata limbata*	sand dunes, blowouts, beaches, and stream sides
Smoky-eyed brown	*Lethe eurydice fumosa*	sedge meadows in Sandhills and along streams and wetlands
Two-spotted skipper	*Euphyes bimacula illinois*	moist environments and wetlands, such as marshes, bogs, wet stream sides, and wet sedge meadows.
Whitney underwing	*Catocala whitneyi*	tall-grass and mixed-grass prairie; larvae feed on lead plant (*Amorpha*)
Eastern red bat	*Lasiurus borealis*	deciduous and pine woodlands, usually associated with water source
Hoary bat	*Lasiurus cinereus*	deciduous and pine woodlands, usually associated with water source in arid landscapes
Northern long-eared bat	*Myotis septentrionalis*	interior of deciduous and coniferous woodlands
Tricolored bat	*Perimyotis subflavus*	deciduous woodlands
Blanding's turtle	*Emydoidea blandingii*	requires proximity to water; Sandhills fens, Sandhills freshwater marsh, northern cordgrass wet prairie, small tributaries, Sandhills prairies (upland habitat), marshes and oxbows in eastern portion of state
Redbellysnake	*Storeria occipitomaculata*	riverbanks and riparian woodlands, often with dense layers of leaf litter providing shelter and moisture

Source: NGPC Conservation and Environmental Review Tool 2024

The northern portion of the study area is dominated by range habitat, and the southern portion is dominated by irrigated and dry cropland. Other land use types—developed land, water resources, riparian forest—are found in the study area in lesser percentages.

3.5.3 Migratory Birds and Eagles

The Migratory Bird Treaty Act (MBTA) of 1918, as amended; EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds; and the Bald and Golden Eagle Protection Act (BGEPA) of 1940, as amended, require NRCS to consider impacts on migratory bird and bald

and golden eagle populations and habitats. Migratory birds are essentially all wild birds found in the United States, with the exception of the house sparrow, starling, feral pigeon, and resident game birds. The protections under MBTA and BGEPA cover the birds and their parts (including eggs, nests, and feathers); therefore, it is unlawful for private individuals or federal agencies to kill, capture, collect, possess, buy, sell, trade, ship, import, or export any migratory bird. BGEPA includes protections for any disturbance to bald and golden eagles and their nests.

Although MBTA and BGEPA are applicable year-round, it is accepted that most migratory bird nesting activity occurs in Nebraska during the period of April 1 to July 15. Some migratory birds nest outside of this range. For example, raptors generally nest in woodland habitats during the period of February 1 to July 15.

Given the size of the study area, many species of migratory birds could be present. Bald eagles can be found in the study area year-round near large bodies of water and rivers. NGPC discontinued annual monitoring of bald eagle nests in 2018 because the agency estimated around 300 breeding pairs in the state (Jorgensen et al. 2018). A winter nesting site (from December to February) of more than 200 bald eagles can be observed at the Nebraska Public Power District J-2 Hydroplant south of Lexington (Lexington Nebraska Chamber of Commerce 2021).

The southern portion of the study area abuts the 80-mile stretch of the Platte River that is important to Sandhill crane migration. Every year from late February to early April, approximately 400,000 to 600,000 Sandhill cranes (representing 80 percent of the population) congregate along the Platte River valley to feed in preparation for their journey to the Arctic nesting grounds.

Common avian species in the study area include but are not limited to turkey, robin, mourning dove, bluejay, cardinal, swallow, chickadee, wren, starling, sparrow, finch, oriole, meadowlark, cowbird, red-tailed hawk, turkey vulture, great blue heron, and several kingbird, flycatcher, woodpecker, owl, kestrel, and duck species. Table 3-4 provides a list of the birds that are included on the Tier 1 species list within the Spring Creek Watershed Study Area

Table 3-4. Tier 1 Bird Species in the Spring Creek Watershed Study Area

Common Name	Scientific Name	Habitat
Baird's sparrow	*Ammodramus bairdii*	native grassland; does not nest in Nebraska
Black-billed cuckoo	*Coccyzus erythropthalmus*	woodlands and thickets, often in proximity to water
Buff-breasted sandpiper	*Tryngites subruficollis*	mixture of agriculture and wetlands; does not nest in Nebraska
Burrowing owl	*Athene cunicularia*	prairie dog towns, short-grass prairie, mixed-grass prairie, heavily grazed grasslands
Interior least tern	*Sternula antillarum athalassos*	present during April 15–August 15 nesting season;

Common Name	Scientific Name	Habitat
		unvegetated or sparsely vegetated sandbars in river channels and sandpits
Loggerhead shrike	*Lanius ludovicianus*	grasslands with at least some scattered small trees or shrubs
Piping plover	*Charadrius melodus*	present during April 15–August 15 nesting season; unvegetated or sparsely vegetated sandbars in river channels and sandpits
Short-eared owl	*Asio flammeus*	open grasslands with standing cover and little disturbance
Whooping crane	*Grus americana*	spring and fall migrant; shallow, sparsely vegetated streams, rivers, and wetlands to feed and roost during their migration; frequently stop over near ponds and lakes; may feed in crop fields or hay meadows that are in close proximity to roosting locations

Source: NGPC Conservation and Environmental Review Tool 2024

3.5.4 Noxious Weeds and Invasive Species

The Nebraska Invasive Species Program develops a “watch list” of noxious and invasive plant species. Category 1 plants are species not known to exist in each ecoregion but pose a significant risk if introduced. Category 2 plant species are top priority for eradication of new and existing populations. Category 3 plants are those that are established invasives, and prevention of spread to new areas is a priority. Table 3-5 lists the Category 1, 2, and 3 plants for the Mixedgrass Prairie Ecoregion.

Table 3-5. Noxious and Invasive Plant Species in the Mixedgrass Prairie Ecoregion

Common Name	Scientific Name
Category 1: Future Invasive Species Giant reed	*Arundo donax L.*
Category 1: Future Invasive Species Flowering rush	*Butomus umbellatus*
Category 1: Future Invasive Species Oriental bittersweet	*Celastrus orbiculatus*
Category 1: Future Invasive Species Brazilian elodea	*Egeria densa*
Category 1: Future Invasive Species Water hyacinth	*Eichhornia crassipes*
Category 1: Future Invasive Species	*Hydrilla verticillata*

Common Name	Scientific Name
Hydrilla	
Category 1: Future Invasive Species Creeping water primrose, floating primrose	*Ludwigia peploides*
Category 1: Future Invasive Species Parrot's feather	*Myriophyllum aquaticum*
Category 1: Future Invasive Species Starry stonewart	*Nitellopsis obtusa*
Category 1: Future Invasive Species Yellow floating heart	*Nymphiodes peltata*
Category 1: Future Invasive Species Water lettuce	*Pistia stratiotes*
Category 1: Future Invasive Species Giant salvinia	*Salvinia molesta*
Category 2: Priority Species Russian knapweed	*Acroptilon repens*
Category 2: Priority Species Garlic mustard	*Allaria petiolata*
Category 2: Priority Species Absinth wormwood	*Artemisia absinthium L.*
Category 2: Priority Species Australian beardgrass (Caucasian bluestem)	*Bothriochloa bladhii (Andropogon bladhii)*
Category 2: Priority Species Queen Anne's lace	*Daucus carota*
Category 2: Priority Species Common teasel	*Dipsacus fullonum*
Category 2: Priority Species Cutleaf teasel	*Dipsacus laciniatus*
Category 2: Priority Species St. Johnswort	*Hypericum perforatum*
Category 2: Priority Species Yellow Flag Iris	*Iris pseudacorus*
Category 2: Priority Species Japanese honeysuckle (also Morrow, Showy Fly) and amur honeysuckle	*Lonicera japonica, morrowii, morrowii x tatarica and maackii*
Category 2: Priority Species Eurasian watermilfoil	*Myriophyllum spicatum*
Category 2: Priority Species Brittle naiad	*Najas minor*
Category 2: Priority Species Wild parsnip	*Pastinaca sativa*
Category 2: Priority Species Sulphur cinquefoil	*Potentilla recta L.*
Category 2: Priority Species	*Rhamnus cathartica*

Common Name	Scientific Name
Common buckthorn, European buckthorn	
Category 2: Priority Species Camphor weed	*Heterotheca latifolia*
Category 2: Priority Species Perennial sow thistle	*Sonchus arvensis*
Category 2: Priority Species Common tansy	*Tanacetum vulgare L.*
Category 3: Established Invasive Species Curly-leaf pondweed	*Potamogeton crispus*

Source: Nebraska Invasive Species Program 2021

3.6 Endangered and Threatened Species

The federal Endangered Species Act of 1973 protects plant and animal species considered to be in danger of extinction and their habitats. USFWS maintains and enforces the national list of threatened and endangered species and assists states in developing conservation programs. In Nebraska, NGPC maintains the state list of threatened and endangered species, as protected by the Nebraska Nongame and Endangered Species Conservation Act. Additionally, this plan is subject to the Fish and Wildlife Coordination Act of 1934, as amended through PL 116-188 and enacted in 2020, which directs USFWS to investigate and report on proposed federal actions and provide recommendations to minimize impacts on fish and wildlife resources.

An endangered species is defined as any species that is in danger of extinction throughout all or a significant portion of its range. A threatened species is defined as any species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Based on coordination with USFWS and NGPC and utilization of USFWS's Information for Planning and Consultation (IPaC) and NGPC's Conservation and Environmental Review (CERT) websites, it was determined there are 15 federally and/or state-listed endangered, threatened, candidate, or proposed species that have the potential to occur in the study area. In addition, approximately 20 miles of the southern border of the study area abuts critical habitat of the whooping crane along the Platte River (Lexington to Elm Creek). The habitat generally parallels I-80, starting at Lexington and extending east to south of Shelton. Table 3-6 summarizes the species and their habitats and assesses whether the study area falls within the or USFWS- or NGPC-estimated range for that species.

Table 3-6. Endangered and Threatened Species with Potential to Occur in the Spring Creek Watershed Study Area

Common Name	Species Name	Listing	Habitat
American burying beetle	*Nicrophorus americanus*	Federal Threatened 4(d) Rule; State Threatened	variety of habitats including grassland prairie, forest edge, scrubland, and mesic areas such as wet meadows, streams, and wetlands; carrion availability is a more important component of habitat than a specific type of vegetation

Black-footed ferret	*Mustela nigripes*	Federal Endangered; State Endangered	prairie dog towns or complexes 1,000 acres or more in size
Blowout penstemon	*Penstemon haydenii*	Federal Endangered, State Endangered	active and open blowouts consisting of bare sand in rangeland landscape
Eastern black rail	*Laterallus jamaicensis jamaicensis*	Federal Threatened, State Threatened	dense vegetative cover, freshwater marsh habitats, sedge meadows
Eskimo curlew	*Numenius borealis*	Federal Endangered; State Endangered	wet meadows, burned-over prairies, newly plowed fields
Gray wolf	*Canis lupus*	Federal Endangered; State Endangered	wide range of habitats including prairie, mountains, temperate forests, wetlands, tundra, and taiga
Interior least tern	*Sternula antillarum athalassos*	State Endangered	present during April 15–August 15 nesting season; unvegetated or sparsely vegetated sandbars in river channels and sandpits
Monarch	*Danaus plexippus*	Federal Proposed Threatened	field, roadside area, open area, wet area, or urban garden; milkweed and flowering plants are needed for monarch habitat
Northern long-eared bat	*Myotis septentrionalis*	Federal Endangered; State Endangered	roost singly or in colonies underneath bark or in cavities, crevices, or hollows of live and dead trees and/or snags (typically ≥ 3 inches diameter at breast height); overwinter in hibernacula that includes caves and abandoned mines, abandoned railroad tunnels, storm sewer entrances, dry wells, and aqueducts
Pallid sturgeon	*Scaphirhynchus albus*	Federal Endangered; State Endangered	prefer large, deep turbid river channels, usually in strong current over firm sand or gravel, such as the Platte River
Piping plover	*Charadrius melodus*	Federal Threatened, State Threatened	present during April 15–August 15 nesting season; unvegetated or sparsely vegetated sandbars in river channels and sandpits
Rufa red knot	*Calidris canutus rufa*	Federal Threatened, State Threatened	open mud flats and/or mud and sandy shorelines free of vegetation
Suckley's cuckoo bumble bee	*Bombus suckleyi*	Federal Proposed Endangered	field edges, roadsides, open areas, or urban gardens; a diversity of flowering plants are needed for bee habitat
Tricolored bat	*Perimyotis subflavus*	Proposed Federal Endangered	similar habitat needs as northern long-eared bat
Western prairie fringed orchid	*Platanthera praeclara*	Federal Threatened, State Threatened	wet prairies and meadows with high soil moisture
Western regal fritillary	*Argynnis idalia occidentalis*	Federal Proposed Threatened	field edges, roadsides, open areas, or urban gardens; violets and flowering plants are needed for butterfly habitat

Whooping crane	*Grus americana*	Federal Endangered; State Endangered	spring and fall migrant; shallow, sparsely vegetated streams, rivers, and wetlands to feed and roost during their migration; frequently stop over near ponds and lakes; may feed in crop fields or hay meadows that are in close proximity to roosting locations; critical habitat located in southern portion of study area
Whooping crane critical habitat	*Grus americana*	Federal Endangered; State Endangered	3-mile-wide, 56-mile-long reach of the Platte River from Lexington to Shelton, Nebraska federally listed as critical habitat for whooping crane

Sources: Sjolie 2020; USFWS 2024; NGPC 2024

3.7 Cultural Resources and Historic Properties

The Area of Potential Effects (APE) of the alternatives described in Chapter 2 includes all areas that may be affected by the undertaking, including grading, excavation, borrow locations, staging areas, access routes, tree removal, alterations to existing irrigation canals and ditches, etc., as well as areas considered for potential visual and other effects to cultural resources.

History Nebraska's State Archaeology Office (SAO) completed cultural resources desktop reviews of the Nebraska Archaeological Sites Geographic Information System database and other online resources for the APE in October 2020 and November 2024. The review included previously performed surveys, recorded archaeological sites, and recorded historic architectural properties.

SAO completed a Class III intensive cultural resource field inventory of the APE between November 2021 and May 2022. Field survey methods included pedestrian visual inspection supplemented by shovel testing in settings with limited ground visibility. The pedestrian inventory included parallel transects of 20 meters intervals and one shovel test. The cultural resources investigation report is available in Appendix E and summarizes previous investigations and previously documented archaeological sites and architectural properties; the methods of the investigation; and describes the resources recorded by the survey in more detail.

The cultural resources investigation did not identify any archeological sites or standing structures within the APE. Six drainage ditches or irrigation canals, two straightened stream channels, and one golf course are located within the APE (Table 3-7). Approximately 50 acres of the APE could not be investigated because landowners denied access to the investigators.

The drainage ditches, irrigation canals, straightened stream channels, and golf course were evaluated for NRHP eligibility following the guidance found in National Register Bulletin No. 15: How to Apply the National Register Criteria for Evaluation. Although most of the resources need additional investigation to make a formal determination of eligibility, they are being treated as eligible for inclusion for the purposes of NHPA Section 106 consultation.

NRCS determined that the proposed action would have no adverse effect on the Dawson County Canal, Drainage Ditch No. 4, Lateral No.1, Cozad Country Club and Golf Course, Beatty Ditch, or Dawson County Drain No. 1. NRCS cannot determine the effects of the undertaking on 50 acres of the APE because landowners would not allow access to their property to identify historic properties. In accordance with 36 CFR 800.4(b)(2), NRCS will defer final identification and evaluation of historic properties on the remaining 50 acres through the development of a Programmatic Agreement executed pursuant to 36 CFR 800.14(b). NRCS invited SHPO and consulting parties to participate in the development and execution of the Programmatic Agreement.

SHPO concurred with the NRCS determination of effect and agreed to participate in the development of the programmatic agreement in an email received May 7, 2025, and a letter received May 16, 2025. The Northern Arapaho Tribe concurred with the determination of effect in a letter dated May 9, 2025. The Northern Cheyenne Tribe concurred with the determination of effect in an email received June 3, 2025. The USACE declined to participate in the Programmatic Agreement in an email received May 2, 2025. The Advisory Council on Historic Preservation declined to participate in the Programmatic Agreement in a letter received by email on June 15, 2025. The Pawnee Nation stated that the project should not adversely affect the cultural landscape of the Pawnee Nation. Copies of NHPA Section 106 consultation correspondence are available in Appendix A.

Table 3-7. Architectural resources within APE.

Name	Location	Description	NRHP Eligibility
Dawson County Canal	Cozad	Irrigation canal built in 1894 by the Farmers and Merchants Canal Company	Eligible (Criterion A – Dawson County agricultural development)
Drainage Ditch No. 4	Cozad	Drainage ditch or irrigation canal built between 1919 and 1951.	Potentially eligible (Criterion A – Dawson County agricultural development)
Stump Slough	Cozad	Straightened stream channel	Not eligible
Cozad Country Club and Golf Course	Cozad	Golf course built between 1938 and 1951. Nine-hole course until 1990s when it was expanded to an 18-hole course.	Potentially eligible (Criterion A – recreation development in Dawson County)
Unnamed drainage ditch	Cozad	Earthen drainage ditch	Not eligible
Lateral No. 1	Lexington	Drainage ditch/irrigation canal built between 1938 and 1951.	Potentially eligible (Criterion A – Dawson County agricultural development)
Spring Creek	Lexington	Straightened stream channel	Not eligible

Name	Location	Description	NRHP Eligibility
Beatty Ditch	Lexington	Irrigation canal constructed between 1938 and 1951.	Potentially eligible (Criterion A – Dawson County agricultural development)
Dawson County Drain No. 1	Lexington	Canal built between 1919 and 1951.	Potentially eligible (Criterion A – Dawson County agricultural development)

3.8 Recreation

Recreation resources in the study area consist of state-owned lands, CPNRD-owned lands, and city parks. No federally owned or tribal recreation lands occur in the study area.

3.8.1 State Lands

The following NGPC properties can be found in or partially in the Spring Creek Watershed study area: Bittern's Call Wildlife Management Area (WMA), Darr Strip WMA, Darr WMA, Dogwood WMA, and Overton WMA. East Cozad WMA is less than 1 mile south of the Spring Creek Watershed study area (Sjolie 2020; NGPC 2021). Details of each WMA follow (NGPC 2021):

- Bittern's Call WMA is a 78-acre parcel in Dawson County that is managed for pheasant and waterfowl hunting and trapping.
- Darr Strip WMA is a 980-acre parcel in Dawson County located immediately south of I-80. It is managed for hunting and/or trapping of deer, dove, quail, squirrel, turkey, and waterfowl.
- Darr WMA is a 13-acre lake located immediately north of I-80 and managed for bluegill, channel catfish, largemouth bass, and rock bass.
- Dogwood WMA is a 407-acre parcel in Dawson County, located immediately south of I-80. The property is managed for hunting and/or trapping of deer, dove, quail, rabbit, turkey, and waterfowl.
- Overton WMA is located in Dawson County, immediately north of I-80.
- East Cozad WMA is located in Dawson County south of I-80 and Road 759.

3.8.2 CPNRD Lands

There are no CPNRD-owned lands in the Spring Creek Watershed study area.

City Parks

Cozad has nine public parks: Muny Park, Centennial Park, Veterans Memorial Park, Bellamy Park, Frenchy Park, Sportsman Field, Stuckey Park and Russ Sheets Recreation Field, Haymaker Park, 100th Meridian Park. Muny Park contains the baseball field, soccer fields, a swimming pool, a hard-surface trail, horseshoe and volleyball courts, frisbee golf, playground equipment, picnic shelter, and RV hookups. Centennial Park contains a splash pad, playground equipment, and picnic shelters. Veterans Memorial Park has playground equipment, picnic shelters, and the Robert Henri Historical Walkway. Bellamy Park, Frenchy Park, Sportsman Field, Stuckey Park, and Russ Sheets Recreation Field contain a variety of sports courts and ball fields. Haymaker Park contains a playground. 100th Meridian Park contains historical information about the 100th Meridian, a renovated UPRR Depot, and a caboose (City of Cozad 2021). Cozad also has a private country club, the Cozad Country Club, with a golf course and events center.

Lexington has eight public parks: Arbor Park, Centennial Park, Memorial Park, Optimist Rec Complex, Patriot Park, Pioneer Park, Plum Creek Park, and Oak Park. Lexington Park facilities include picnic tables, shelters, playground equipment, tennis courts, horseshoe pits, baseball and softball fields, soccer fields, and volleyball and sand volleyball courts (Lexington Nebraska Chamber of Commerce 2021).

3.9 Public Health and Safety

The study area has a risk of flooding and flood-related damage to public and private infrastructure. Flooding has occurred in the study area on multiple occasions and has been a historic issue of concern. This enhanced flood risk has created a public health and safety issue in terms of access to emergency services and emergency service providers during a flood event.

Lexington experiences consistent flooding and damages. Access to and by emergency services in the study area could be limited due to roadways being washed out or covered in water for extended periods; This poses an increased risk to public health and safety as response times could lengthen and other areas could become unreachable.

The study area is serviced predominantly by two highways and is bordered on the south by I-80. Nebraska Highway 21 runs north-south, and US 30 runs east-west. The study area is also serviced by short segments of U.S. Highway 283 south of Lexington, State Link 24A between Lexington and Cozad, and Nebraska Highway 40 in the very north portion of the study area. The remainder of the study area is serviced by a grid network of county roads.

Law enforcement in the study area is provided by Nebraska State Patrol (NSP) Troop D (NSP 2021), the Dawson and Custer County sheriff departments, and the Cozad and Lexington police departments. Medical services are located on the southern side of the study area and include the Cozad Community Hospital and the Lexington Regional Health Center.

3.10 Social and Economic Conditions

The Spring Creek Watershed study area contains the following counties and places:

- Custer County
- Dawson County
- City of Cozad
- City of Lexington

3.10.1 Population

Table 3-8 provides the population estimates for the locations in the study area.

Table 3-8. Population of Counties and Places in the Spring Creek Watershed Study Area

Place	2022 Population
Custer County	10,566
Dawson County	24,037
City of Cozad	3,943
City of Lexington	10,662

Source: American Community Survey 5-Year Estimates (U.S. Census Bureau 2022a).

3.10.2 Local and Regional Economy

The socioeconomic condition of the study area can be defined by the income and the employment for the counties and the places in which the study area lies (see Table 3-9).

Table 3-9. Median Family Incomes of Counties and Places in the Study Area

Place	2022 Dollars
Custer County	$73,039
Dawson County	$77,492
City of Cozad	$68,750
City of Lexington	$70,351

Source: American Community Survey 5-Year Estimates (U.S. Census Bureau 2022a)

The number of persons employed within any given county has been a historically reliable aid in predicting trends for economic growth or decline (see Table 3-10).

Table 3-10. Number of People Employed in Counties and Places in the Study Area

Place	People Employed	Unemployment Rate (%)
Custer County	5,345	1.6
Dawson County	12,664	2.1

Place	People Employed	Unemployment Rate (%)
City of Cozad	2,014	1.0
City of Lexington	5,419	2.7

Source: American Community Survey 5-Year Estimates (U.S. Census Bureau 2022a)

3.11 Scenic Beauty

The viewshed in the study area is dominated by agricultural areas, including corn and soybean crops, rangeland, pastures, and alfalfa fields. Spring Creek, its tributaries, and their associated riparian and wetland areas intersect those agricultural areas throughout the study area. The viewshed in the cities of Cozad and Lexington is primarily urban, consisting of urban and residential properties.

3.12 Land Use

Land use in the study area is primarily agricultural, including grassland and shrubland used for grazing and cultivated cropland. Cultivated crops in the study area include corn, soybeans, and alfalfa. The amount of each cultivated crop varies yearly due to crop rotations and environmental conditions. Approximately 20,682 acres of cropland are irrigated. Landcover in the study area is characterized in Table 3-14.

Table 3-11. Land Use

Land Use Type	Acres
Cultivated	111,418
Pasture / Herbaceous	77,336
Urban	5,240
Forested	1,221
Wetland	553
Open Water	276
Total	196,044

Source: National Land Cover Dataset (2019)

3.13 Ecosystem Services

The resource concerns discussed in the previous sections include all categories of ecosystem services present in the Spring Creek Watershed, which can all be interrupted or otherwise negatively impacted by flooding.

Public scoping comments, planning documents, watershed plans from surrounding areas, and discussions with the project sponsor and federal agencies further suggests the project's primary benefits will result from reducing flood damages to buildings and people in Cozad and Lexington, as well as reducing damages on agricultural land in the surrounding areas.

3.13.1 Provisioning Services

Provisioning services include tangible goods provided for direct human use and consumption. In the Spring Creek Watershed, these include resources directly related to food production (prime and unique farmland) and land use, as well as those that indirectly impact food production (erosion and sedimentation, water quality and quantity).

The provisioning service identified for flood prevention within Spring Creek Watershed is agricultural production, which is directly related to the amount of flood produced for human use and consumption. Reducing the amount of flooding of land used for agricultural production will increase viable farm and range land, and thereby provide an increase in social value of provisioning services within Spring Creek Watershed.

3.13.2 Regulating Services

Regulating services maintain a world in which it is possible for people to live and provide critical benefits that buffer against environmental catastrophe. For the scope of this project's analysis, these include resources that are predominantly related to flood control (water quantity, floodplain management, flood damages, wetlands, riparian areas, and public safety). Additional resources are directly or indirectly related to erosion control (erosion, sedimentation, and riparian areas) and water filtration and disease control (water quality, wetlands, and streams).

The regulating services identified for flood prevention within Spring Creek Watershed are flood damage reduction and water quality. Flood damage reduction is directly related to the amount of viable farm and range lands available for production and a reduction of property damage. Water quality is directly related to having clean water. Controlling flood flows within the Spring Creek Watershed would reduce the amount of damage caused and improve water quality within the watershed. This would lead to an increase in the social value of viable farm and range land as well as clean water and thereby increase regulating services within Spring Creek Watershed.

3.13.3 Supporting Services

Supporting services refer to the underlying processes that maintain conditions for life. Supporting services allow the other ecosystem services to exist and are not evaluated in this plan.

3.13.4 Cultural Services

Cultural services make the world a place in which people want to live. Archaeological and historical resources, floodplain management, and the local and regional economy are important cultural services. Wetlands, streams, recreation, and fish and wildlife habitat are additional resources in the watershed that have aspects related to cultural services.

The cultural services identified for flood prevention within Spring Creek Watershed are culture and heritage, which directly relate to bequest value. In other words, the natural or cultural heritage for future generations and the reduction in damage to property. Therefore, the reduction in damage would increase the bequest value leading to a increase in the social value of culture services within the Spring Creek Watershed.

4 Environmental Consequences

)The environmental consequences analysis considers impacts and their duration, intensity, type, and context; cumulative impacts; and measures to mitigate impacts.

The descriptions of environmental consequences that follow address the potential economic, environmental, and social effects of each alternative. The comparisons include four aspects of assessment: intensity, duration, type, and context, defined as follows:

- **Intensity**: Negligible (slight or not detectable), minor (measurable but small), moderate (measurable and apparent), and substantial (significant).
- **Duration**: Short-term (transitory, days, or months) and permanent.
- **Type**: Direct (caused by the action and occur at the same time and place) or indirect (caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable. Impacts can be either beneficial or adverse.
- **Context**: The circumstances or actions that form the environmental consequence.

The final selected alternatives for the Spring Creek Watershed study area are Alternative 2, Cozad Channel Conveyance; Alternative 3, Lexington Northeast Channel Conveyance; and Alternative 4, Lexington Southwest Channel Conveyance (see Appendix C Figure 5-1 through Figure 5-3).

Affected resource area (ARA) and area of potential effect (APE) maps were created for each component for the final alternatives. Both ARA and APE are the geographic area in which each alternative is evaluated for potential impacts. The APE is utilized for analyzing effects on cultural and historic properties, while the ARA is used to analyze effects on all other environmental resources. Both APE and ARA include areas impacted by the construction of a potential alternative, including areas for construction access, stockpiling of materials, visual effects, etc. However, the ARA also considers lateral effects to wetlands. For reference, Chapter 2 provides a description of the alternatives, and Chapter 2 presents a description of existing conditions. Cumulative impacts are discussed in Chapter 4.15.

4.1 Soils

4.1.1 Alternative 1, No Action/Future Without Federal Investment

Minor streambank erosion and sedimentation would continue to occur. Wind-based erosion would continue to occur. Subsurface geology would remain unchanged. As identified in Chapter 3.1, sedimentation and erosion are not significant issues in the study area due to its range and pastureland land use.

4.1.2 Alternative 2, Cozad Channel Conveyance

Geology

Geological materials are not expected to have an impact on the design of the alternative.

Erosion

Permanent impacts include channel widening along approximately 2 miles of existing streams, which may result in minor beneficial effects on streambank erosion. Widening the channel and flattening channel slopes would help arrest bank failures and bed incision, thereby reducing future erosion. Wind-based erosion would continue to occur.

The Cozad Channel Conveyance alternative would impact 1.14 acres of highly erodible soil, the majority of which is impacted by ROW, and have negligible, temporary impacts due to construction mitigation and restoration measures.

Sedimentation

By reducing the frequency with which the channel overtops the floodplain, the risk of sedimentation in the watershed would be reduced. Construction would result in negligible, temporary impacts but would be mitigated via best management practices and restoration measures.

4.1.3 Alternative 3, Lexington Northeast Channel Conveyance

Geology

Geological materials are not expected to have an impact on the design of the alternative.

Erosion

Permanent impacts include channel widening along approximately 5 miles of existing streams, which may result in minor beneficial effects on streambank erosion. Widening the channel and flattening channel slopes would help arrest bank failures and bed incision, thereby reducing future erosion. Wind-based erosion would continue to occur.

This alternative would have no impact on highly or potentially highly erodible soil.

4.1.4 Alternative 4, Lexington Southwest Channel Conveyance

Geology

Geological materials are not expected to have an impact on the design of the alternative.

Erosion

Permanent impacts include channel widening along approximately 6 miles of existing streams, which may result in minor beneficial effects on streambank erosion. Widening the channel and flattening channel slopes would help arrest bank failures and bed incision, thereby reducing future erosion. Wind-based erosion would continue to occur.

This alternative would have no impact on highly or potentially highly erodible soil.

4.2 Prime and Unique Farmlands

4.2.1 Alternative 1, No Action/Future Without Federal Investment

This alternative would not result in the conversion of any prime or unique farmland or farmland of statewide importance. Flooding would continue to impact existing farmland.

4.2.2 Alternative 2, Cozad Channel Conveyance

This alternative would permanently impact 158 acres of prime farmland. Given that there are a total of 115,700 acres of prime farmland in the study area, impacts on 158 acres would have a minor effect on prime farmland in the study area. Berm, channel modification, and ROW project components would all result in permanent use of prime farmland as grass and/or conveyance. See Table 4-1 for specific impacts by project.

No prime farmland if drained or farmland of statewide importance would be impacted. Given that the study areas are located primarily around existing drainage ditches that are regularly inundated, these areas would be clear of significant FPPA concerns. Additional prime and unique farmland could be temporarily impacted by the placement of fill material, but the impact on farmland use would be negligible.

4.2.3 Alternative 3, Lexington Northeast Channel Conveyance

This alternative would impact 99 acres of prime farmland. Given that there are 115,700 acres of prime farmland in the study area, impacts on 99 acres would have a minor effect on prime farmland in the study area. Berm, channel modification, and ROW project components would all result in permanent use of prime farmland as grass and/or conveyance. See Table 4-1 for specific impacts by alternative.

Similar to Alternative 2, no prime farmland if drained or farmland of statewide importance would be impacted. Additionally, due to Alternative 3 being primarily sited around existing drainage ditches, these areas would be clear of significant FPPA concerns. Additional prime and unique farmland could be temporarily impacted by the placement of fill material, but the impact on farmland use would be negligible.

4.2.4 Alternative 4, Lexington Southwest Channel Conveyance

This alternative would impact 59 acres of prime farmland. Given that there are 115,700 acres of prime farmland in the study area, impacts on 59 acres would have a minor effect on prime farmland in the study area. Berm, channel modification, and ROW project components would all result in permanent use of prime farmland as grass and/or conveyance. See Table 4-1 for specific impacts by alternative.

Similar to Alternative 2, no prime farmland if drained or farmland of statewide importance would be impacted. Additionally, due to Alternative 4 being primarily sited around existing drainage ditches, these areas would be clear of significant FPPA concerns. Additional prime and unique

farmland could be temporarily impacted by the placement of fill material, but the impact on farmland use would be negligible.

Table 4-1. Spring Creek Watershed Prime Farmland Impacts

Map Symbol	Map Unit Name	Alternative 2 Impact Acreage	Alternative 3 Impact Acreage	Alternative 4 Impact Acreage
8810	Cozad fine sandy loam, 0 to 1 percent slopes	31.5	0	0.4
8815	Cozad silt loam, 0 to 1 percent slopes	15.7	52.6	0
8821	Cozad silty clay loam, 0 to 1 percent slopes	0	0.7	0
8816	Cozad silt loam, 1 to 3 percent slopes	1.4		0
8828	Cozad silt loam, wet substratum, 1 to 3 percent slopes	21.9	0	0
8831	Gosper loam, 0 to 1 percent slopes	0	15.6	52.1
8840	Hall silt loam, 0 to 1 percent slopes	2.0	0	0
8846	Hall silt loam, wet substratum, 0 to 1 percent slopes	31.4	0	0
8869	Hord silt loam, 0 to 1 percent slopes	22.6	0	0
8877	Hord silty clay loam, wet substratum, 0 to 1 percent slopes	20.7	0	0
8960	Wood River silt loam, 0 to 1 percent slopes	10.8	0	0
9080	Rusco silt loam, 0 to 1 percent slopes	0	29.9	6.6
	TOTAL	**158.00**	**98.8**	**59.1**

Source: NRCS 2021

4.3 Water Resources

4.3.1 Alternative 1, No Action/Future Without Federal Investment

This alternative would not result in any changes to existing conditions. Streams in the watershed would continue to experience degradation and widening with frequent overtopping events.

4.3.2 Alternative 2, Cozad Channel Conveyance

Surface Water

This alternative is anticipated to have negligible impacts on water quality. There are no existing reports or total maximum daily loads related to the area of interest. This alternative would not improve water quality but is consistent with the statewide strategy to not cause further degradation.

Surface Water Hydrology

This alternative would have permanent, beneficial impacts on surface water paths and drainage. Low flows would still continue through the original drainage pattern, but larger events would be diverted to reduce flooding in developed areas. The new channel would be overtopped during events larger than the 10-year design event, and flooding would be similar to pre-project conditions with a berm redirecting high-flow events through new channel segments that avoid going directly through town and the Cozad Country Club golf course. In total, for a 10-year storm event, there would be approximately 157.3 newly inundated acres post-project; there would be approximately 397.7 acres of newly dry acres post-project (experienced flooding before project, no depth post-project). Depth of inundation differs by location. For the properties that would be adversely affected by inundation, $1,653,939 in increased damages is anticipated (see Appendix D of the Watershed Plan).

Groundwater

The Ogallala Formation would not be affected. The alternative would not intercept or increase groundwater use. The alternative is anticipated to have negligible impacts on groundwater.

Wetlands and Waters of the United States

Wetland delineations were performed in the study area in accordance with the *1987 Corps of Engineers Wetlands Delineation Manual* and the *Great Plans Regional Supplement to the Corps of Engineers Wetland Delineation Manual*. The delineation identified wetlands (PEMA/C, PFOA, PSSA, and WIAS); streams (ephemeral, intermittent, and perennial); and open water habitat (see Appendix E). There are 6.6 acres of impacted delineated features (see Table 4-2).

Wetlands in a floodplain environment can be supported by groundwater in addition to surface water sources. Impacts on wetlands may occur in areas adjacent to new diversion channels due to the potential to lower the water table. This is called a lateral effect. The method used to assess lateral effects is based on the *NRCS National Engineering Handbook Part 650*, Chapter 14 – Water Management (Drainage). A lateral effect buffer was identified based on the soil type and ranged from 300 to 1,000 feet. Within the buffer of lateral effect at the new diversion channel locations, 1.4 acres of PEMA/C wetlands and 0.25 acre (660 linear feet) of intermittent waterway would be affected. Lateral effects on the aquatic resources are anticipated to be minor because hydrology in this area is surface-driven and not sub-irrigated.

Construction would have temporary, minor, adverse impacts on streams due to construction, vehicle traffic, and excavation. Minor permanent fill would be required where proposed berms intersect waterways/wetlands or for new conveyance structures. While fill would be required in select locations along the existing ditch/waterway, the aquatic resources would be realigned or shifted to the east so there would be no net loss of waterway to the landscape. Furthermore, the waterways would be widened and improved, further serving to enhance the aquatic resources in the study area. Wetland and stream mitigation would be determined during the Clean Water Act Section 404 permitting process. Preliminary estimates total approximately 1 to 2 acres. All temporarily affected resources would be restored after the project is constructed.

The project would result in permanent, moderate, beneficial impacts on waterways by stabilizing streambanks and decreasing the number of overtopping events by increasing channel capacity.

CPNRD Operations and Water Rights

This alternative is not expected to impact any well operations or permits. Design has accommodated existing diversion structures to maintain existing water rights. No new water rights would need to be obtained.

Regional Water Management Plans and Agency Programs

The alternative is anticipated to comply with regional water management plans and agency programs. The project is not anticipated to induce depletions to the Platte River. Because the project is improving Spring Creek conveyance and not impounding water causing a depletion to the Platte River, the project is not anticipated to impact the Platte River Recovery Implementation Program (Program), specifically the Program's water plan component. This alternative would enhance existing drainage patterns to improve capacity. There would be no impact on drainage areas. New areas of inundation would be minimized within the city's limits and concentrated to the northeast and south sides of town. In total, for a 25-year storm event, there would be approximately 477.7 newly inundated acres post-project; there would be approximately 471.2 newly dry acres post-project (experienced flooding before project, no depth post project). Depth of inundation differs by location. For the properties that would be adversely affected by inundation, there is an anticipated $477,620 in increased damages (see Appendix D of the Watershed Plan).

Groundwater

The Ogallala Formation would not be affected. This alternative would not intercept or increase groundwater use. The alternative is anticipated to have negligible impacts on groundwater.

Wetlands and Waters of the United States

Wetland delineations were performed in the study area in accordance with the *1987 Corps of Engineers Wetlands Delineation Manual* and the *Great Plans Regional Supplement to the Corps of Engineers Wetland Delineation Manual*. The delineation identified wetlands (PEMA/C, PFOA, PSSA, and WIAS); streams (ephemeral, intermittent, and perennial); and open water habitat (see Appendix E). There are 17.9 acres of impacted delineated features (see Table 4-2).

Wetlands in a floodplain environment can be supported by groundwater in addition to surface water sources. Impacts on wetlands may occur in areas adjacent to new diversion channels due to the potential to lower the water table. This is called a lateral effect. The method used to assess lateral effects is based on the *NRCS National Engineering Handbook Part 650*, Chapter 14 – Water Management (Drainage). A lateral effect buffer was identified based on the soil type and ranged from 300 to 1,000 feet. No new diversion channel is proposed for this alternative; therefore, no lateral effects on wetlands are anticipated.

Construction would have temporary, minor, adverse impacts on streams due to construction, vehicle traffic, and excavation. Minor permanent fill would be required where proposed berms

intersect waterways/wetlands or for new conveyance structures. While fill would be required in select locations along the existing ditch/waterway, the aquatic resources would be realigned or shifted to the east so there would be no net loss of waterway to the landscape. Furthermore, the waterways would be widened and improved, further serving to enhance the aquatic resources in the study area. Wetland and stream mitigation would be determined during the Clean Water Act Section 404 permitting process. Preliminary estimates total approximately 1 to 2 acres. All temporarily affected resources would be restored after the project.

The project would result in permanent, moderate, beneficial impacts on waterways by stabilizing streambanks and decreasing the number of overtopping events by increasing channel capacity.

CPNRD Operations and Water Rights

This alternative is not expected to impact any well operations or permits. Design has accommodated existing diversion structures to maintain existing water rights. No new water rights would need to be obtained.

Regional Water Management Plans and Agency Programs

This alternative is anticipated to comply with regional water management plans and agency programs. The project is not anticipated to induce depletions to the Platte River. Because the project is improving Spring Creek conveyance and not impounding water causing a depletion to the Platte River, the project is not anticipated to impact the Program, specifically the Program's water plan component.

4.3.3 Alternative 3, Lexington Northeast Channel Conveyance

Surface Water

This alternative is anticipated to have similar, negligible impacts consistent to those described in Alternative 2.

Surface Water Hydrology

This alternative would have permanent, beneficial impacts on surface water paths and drainage. Low flows would still continue through the original drainage pattern, but larger events would be diverted to reduce flooding in developed areas. Flood events up to the 25-year event would be maintained within the channel post-project, and flooding would be similar to pre-project conditions. This alternative would enhance existing drainage patterns to improve capacity. There would be no impact on drainage areas. New areas of inundation would be minimized within the city's limits and concentrated to the northeast and south sides of town. In total, for a 25-year storm event, there would be approximately 477.7 newly inundated acres post-project; there would be approximately 471.2 newly dry acres post-project (experienced flooding before project, no depth post project). Depth of inundation differs by location. For the properties that would be adversely affected by inundation, there is an anticipated $477,620 in increased damages (see Appendix D).

Groundwater

The Ogallala Formation would not be affected. This alternative would not intercept or increase groundwater use. The alternative is anticipated to have negligible impacts on groundwater.

Wetlands and Waters of the United States

Wetland delineations were performed in the study area in accordance with the *1987 Corps of Engineers Wetlands Delineation Manual* and the *Great Plans Regional Supplement to the Corps of Engineers Wetland Delineation Manual*. The delineation identified wetlands (PEMA/C, PFOA, PSSA, and WIAS); streams (ephemeral, intermittent, and perennial); and open water habitat (see Appendix E). There are 17.9 acres of impacted delineated features (see Table 4-2).

Wetlands in a floodplain environment can be supported by groundwater in addition to surface water sources. Impacts on wetlands may occur in areas adjacent to new diversion channels due to the potential to lower the water table. This is called a lateral effect. The method used to assess lateral effects is based on the *NRCS National Engineering Handbook Part 650*, Chapter 14 – Water Management (Drainage). A lateral effect buffer was identified based on the soil type and ranged from 300 to 1,000 feet. No new diversion channel is proposed for this alternative; therefore, no lateral effects on wetlands are anticipated.

Construction would have temporary, minor, adverse impacts on streams due to construction, vehicle traffic, and excavation. Minor permanent fill would be required where proposed berms intersect waterways/wetlands or for new conveyance structures. While fill would be required in select locations along the existing ditch/waterway, the aquatic resources would be realigned or shifted to the east so there would be no net loss of waterway to the landscape. Furthermore, the waterways would be widened and improved, further serving to enhance the aquatic resources in the study area. Wetland and stream mitigation would be determined during the Clean Water Act Section 404 permitting process. Preliminary estimates total approximately 1 to 2 acres. All temporarily affected resources would be restored after the project.

The project would result in permanent, moderate, beneficial impacts on waterways by stabilizing streambanks and decreasing the number of overtopping events by increasing channel capacity.

CPNRD Operations and Water Rights

This alternative is not expected to impact any well operations or permits. Design has accommodated existing diversion structures to maintain existing water rights. No new water rights would need to be obtained.

Regional Water Management Plans and Agency Programs

This alternative is anticipated to comply with regional water management plans and agency programs. The project is not anticipated to induce depletions to the Platte River. Because the project is improving Spring Creek conveyance and not impounding water causing a depletion to the Platte River, the project is not anticipated to impact the Program, specifically the Program's water plan component.

4.3.4 Alternative 4, Lexington Southwest Channel Conveyance

Surface Water

This alternative is anticipated to have similar, negligible impacts consistent to those described in Alternative 2.

Surface Water Hydrology

This alternative would have permanent, beneficial impacts on surface water paths and drainage. Low flows would still continue through the original drainage pattern, but larger events would be diverted to reduce flooding in developed areas. Flood events up to the 25-year event would be maintained within the channel post-project, and flooding would be similar to pre-project conditions. This alternative would create one new channel connection segment beginning north of US 30 and UPRR and connecting to Drainage Ditch No. 1. There would be no impact on drainage areas. New areas of inundation would be minimized within the city's limits and concentrated to the south sides of town. In total, for a 25-year storm event, there would be approximately 477.7 newly inundated acres post-project; there would be approximately 471.2 newly dry acres post-project (experienced flooding before project, no depth post project). Depth of inundation differs by location. For the properties that would be adversely affected by inundation, there is an anticipated $703,311 in increased damages (see Appendix D of the Watershed Plan).

Groundwater

The Ogallala Formation would not be affected. This alternative would not intercept or increase groundwater use. The alternative is anticipated to have negligible impacts on groundwater.

Wetlands and Waters of the United States

Wetland delineations were performed in the study area in accordance with the *1987 Corps of Engineers Wetlands Delineation Manual* and the *Great Plans Regional Supplement to the Corps of Engineers Wetland Delineation Manual*. The delineation identified wetlands (PEMA/C, PFOA, PSSA, and WIAS); streams (ephemeral, intermittent, and perennial); and open water habitat (see Appendix E). This alternative would have 14.4 acres of impacts (Table 4-2).

Wetlands in a floodplain environment can be supported by groundwater in addition to surface water sources. Impacts on wetlands may occur in areas adjacent to new diversion channels due to the potential to lower the water table. This is called a lateral effect. The method used to assess lateral effects is based on the *NRCS National Engineering Handbook Part 650*, Chapter 14 – Water Management (Drainage). A lateral effect buffer was identified based on the soil type and ranged from 300 to 1,000 feet. Within the buffer of lateral effect at the new diversion channel locations, 0.4 acre of PEMA/C wetland would be affected. Lateral effects on aquatic resources are anticipated to be minor because hydrology in this area is surface-driven and not sub-irrigated.

Construction would have temporary, minor, adverse impacts on streams due to construction, vehicle traffic, and excavation. Minor permanent fill would be required where proposed berms

intersect waterways/wetlands or for new conveyance structures. While fill would be required in select locations along the existing ditch/waterway, the aquatic resources would be realigned or shifted to the east so there would be no net loss of waterway to the landscape. Furthermore, the waterways would be widened and improved, further serving to enhance the aquatic resources in the study area. Wetland and stream mitigation would be determined during the Clean Water Act Section 404 permitting process. Preliminary estimates total approximately 1 to 2 acres. All temporarily affected resources would be restored after the project.

The project would result in permanent, moderate, beneficial impacts on waterways by stabilizing streambanks and decreasing the number of overtopping events by increasing channel capacity.

Table 4-2. Spring Creek Delineated Resource Impacts

	Permanent Impact	Temporary Impact Acreage
Alternative 2	**0.37 acre/150 linear feet**	**7.48 acres/2,335 linear feet**
PEMA/C Wetland	0.33 acre[1]	6.75 acres[1]
Ephemeral Stream	0 acre/0 linear feet	0.03 acre/450 linear feet
Intermittent Stream	0.04 acre/150 linear feet	0.60 acre/1,885 linear feet
Open Water	0 acre	0.10 acre
Alternative 3	**0.08 acre/172 linear feet**	**15.02 acres/31,513 linear feet**
PEMA/C Wetland	0 acre	2.25 acres
Intermittent Stream	0.01 acre/22 linear feet	0.07 acre/263 linear feet
Perennial Stream	0.07 acre/150 linear feet	12.70 acres/31,250 linear feet
Alternative 4	**0.07 acre/183 linear feet**	**14.30 acre/29,940 linear feet**
PEMA/C Wetland	0.02 acre	8.70 acre
Wetland in Agricultural Setting	<0.01 acre	0.10 acre
Intermittent Stream	0.04 acre/183 linear feet	5.50 acres/29,940 linear feet

Source: HDR 2022
[1] Cozad PEMA/C includes determined wetland due to survey access limitations.

CPNRD Operations and Water Rights

This alternative is not expected to impact any well operations or permits. Design has accommodated existing diversion structures to maintain existing water rights. No new water rights would need to be obtained.

Regional Water Management Plans and Agency Programs

This alternative is anticipated to comply with regional water management plans and agency programs. The project is not anticipated to induce depletions to the Platte River. Because the project is improving Spring Creek conveyance and not impounding water causing a depletion to the Platte River, the project is not anticipated to impact the Program, specifically the Program's water plan.

4.4 Floodplains

4.4.1 Alternative 1, No Action/Future Without Federal Investment

This alternative would not change the 100- or 500-year floodplains.

4.4.2 Alternative 2, Cozad Channel Conveyance

This alternative has components that would take place within FEMA 100- and 500-year floodplains. Berm construction and channel modification would have permanent, minor impacts on the floodplain. The channel modification component may include removing material from the floodplain and adding material via the berms, but there would be negligible net impacts on the floodplain because all excavated material not used in berm construction would be applied to adjacent farmland in the floodplain. Channel modification would have a permanent, beneficial impact on the flood-carrying capacity of the channels. Structure replacement and ROW establishment would have negligible impacts on the floodplain.

There are 36 acres of project work in the 100-year floodplain (see Table 4-3). This alternative exclusively impacts regulatory Zone A. Regulatory floodplains are not defined for all waterways or reaches impacted by this alternative. The floodplain would be temporarily adversely affected during construction due to staging areas, construction equipment, and moving fill material.

A Conditional Letter of Map Revision (CLOMR) from FEMA may be required. The current FEMA mapping reflects a different modelling approach than that used for this Plan-EA. Additionally, local floodplain administrators may require a CLOMR, even if it has been demonstrated through technical analysis that the letter is not necessary. Therefore, the need for a CLOMR is uncertain.

4.4.3 Alternative 3, Lexington Northeast Channel Conveyance

This alternative has components that would take place within FEMA 100- and 500-year floodplains. Berm construction and channel modification would have permanent, minor impacts on the floodplain. The channel modification component may include removing material from the floodplain and adding material via the berms, but there would be negligible net impacts on the floodplain because all excavated material not used in berm construction would be applied to adjacent farmland in the floodplain. Channel modification would have a permanent, beneficial impact on the flood-carrying capacity of the channels. Structure replacement and ROW establishment would have negligible impacts on the floodplain.

There are 158 acres of project work in the 100-year floodplain (see Table 4-3). This alternative impacts regulatory Zone A and Zone AH. Regulatory floodplains are not defined for all waterways or reaches impacted by the alternative. The floodplain would be temporarily adversely affected during construction due to staging areas, construction equipment, and moving fill material.

A CLOMR from FEMA may be required. The current FEMA mapping reflects a different modelling approach than that used for this Plan-EA. Additionally, local floodplain administrators may require a CLOMR, even if it has been demonstrated through technical analysis that the letter is not necessary. Therefore, the need for a CLOMR is uncertain.

4.4.4 Alternative 4, Lexington Southwest Channel Conveyance

This alternative has components that would take place within FEMA 100- and 500-year floodplains. Berm construction and channel modification would have permanent, minor impacts on the floodplain. The channel modification component may include removing material from the floodplain and adding material via the berms, but there would be negligible net impacts on the floodplain because all excavated material not used in berm construction would be applied to adjacent farmland in the floodplain. Channel modification would have a permanent, beneficial impact on the flood-carrying capacity of the channels. Structure replacement and ROW establishment would have negligible impacts on the floodplain.

There are 50 acres of project work in the 100-year floodplain (see **Table 4-3**). This alternative impacts regulatory Zone A and Zone AH. Regulatory floodplains are not defined for all waterways or reaches impacted by this alternative. The floodplain would be temporarily adversely affected during construction due to staging areas, construction equipment, and moving fill material.

Table 4-3. Impacts on the 100-Year Floodplain per Alternative

Alternative	Berm	Channel Modification	ROW/Easements	Total
2	0.2 acre	28.3 acres	7.5 acres	36.0 acres
3	16.2 acres	81.5 acres	60.6 acres	158.3 acres
4	0 acre	25.0 acres	25.0 acres	50.0 acres

A CLOMR from FEMA may be required. The current FEMA mapping reflects a different modelling approach than that used for this Plan-EA. Additionally, local floodplain administrators may require a CLOMR, even if it has been demonstrated through technical analysis that the letter is not necessary. Therefore, the need for a CLOMR is uncertain.

4.5 Terrestrial and Aquatic Wildlife

4.5.1 Alternative 1, No Action/Future Without Federal Investment

Flooding would continue to periodically disrupt aquatic and terrestrial habitat.

4.5.2 Alternative 2, Cozad Channel Conveyance

This alternative is located in the Mixedgrass Prairie Ecoregion and the Platte River Valley BUL. A desktop evaluation of the Mixedgrass Prairie Ecoregion was completed using Nebraska Tier 1 Fish and Aquatic resources and Tier 1 Terrestrial resources. The evaluation assessed the habitat of the specific alternative impact areas and the likelihood of impact on each species (see

Appendix D). Of the fish, aquatic, and terrestrial Tier 1 species evaluated, 12 were determined to have suitable habitat in the project area and a potential for impact. There would be temporary construction impacts, but aquatic habitat would not be significantly permanently altered because no existing channel would be removed. Refer to Chapter 4.3.2 for temporary and permanent wetland and waterway impact quantities. New channel construction would potentially create more suitable habitat for some species.

4.5.3 Alternative 3, Lexington Northeast Channel Conveyance

Like Alternative 2, this alternative is in the Mixedgrass Prairie Ecoregion and the Platte River Valley BUL. Desktop evaluations and habitat assessments determined that 12 fish, aquatic, and terrestrial species have suitable habitat in the project area and have a potential for impact (see Appendix D). There would be temporary construction impacts, but aquatic habitat would not be significantly permanently altered because no existing channel would be removed. Refer to Chapter 4.3.3 for temporary and permanent wetland and waterway impact quantities. New channel construction would potentially create more suitable habitat for some species.

4.5.4 Alternative 4, Lexington Southwest Channel Conveyance

Like Alternative 2, this alternative is in the Mixedgrass Prairie Ecoregion and the Platte River Valley BUL. Desktop evaluations and habitat assessments determined that 12 fish, aquatic, and terrestrial species have suitable habitat in the project area and have a potential for impact (see Appendix D). There would be temporary construction impacts, but aquatic habitat would not be significantly permanently altered because no existing channel would be removed. Refer to Chapter 4.3.4 for temporary and permanent wetland and waterway impact quantities. New channel construction would potentially create more suitable habitat for some species.

4.6 Endangered and Threatened Species

In the development of this Plan-EA, a desktop evaluation of the identified and federally and state-listed endangered and threatened species was completed and input was received from NRCS, USFWS, and NGPC. The evaluation assessed the habitat of the specific alternative impact areas and the likelihood of impact on each species (see Appendix D). Table 4-4 provides the list of those endangered and threatened species evaluated for potential impacts for the geographic area around Cozad and Lexington.

Table 4-4. Endangered and Threatened Species Evaluated for Impacts

Common Name	Species Name	Listing
American burying beetle (ABB)	*Nicrophorus americanus*	Federal Threatened 4(d) Rule; State Threatened
Black-footed ferret	*Mustela nigripes*	Federal Endangered; State Endangered
Blowout penstemon	*Penstemon haydenii*	Federal Endangered, State Endangered
Eastern black rail	*Laterallus jamaicensis jamaicensis*	Federal Threatened, State Threatened

Common Name	Species Name	Listing
Eskimo curlew	*Numenius borealis*	Federal Endangered; State Endangered
Gray wolf	*Canis lupus*	Federal Endangered; State Endangered
Interior least tern	*Sternula antillarum athalassos*	State Endangered
Monarch	*Danaus plexippus*	Federal Proposed Threatened
Northern long-eared bat	*Myotis septentrionalis*	Federal Endangered; State Endangered
Pallid sturgeon	*Scaphirhynchus albus*	Federal Endangered; State Endangered
Piping plover	*Charadrius melodus*	Federal Threatened; State Threatened
Rufa red knot	*Calidris canutus rufa*	Federal Threatened; State Threatened
Suckley's cuckoo bumble bee	*Bombus suckleyi*	Federal Proposed Endangered
Tricolored bat	*Perimyotis subflavus*	Proposed Endangered
Western prairie fringed orchid	*Platanthera praeclara*	Federal Threatened; State Threatened
Western regal fritillary	*Argynnis idalia occidentalis*	Federal Proposed Threatened
Whooping crane	*Grus americana*	Federal Endangered; State Endangered

Further determinations of potential effects from the alternatives are discussed below, with additional information in Appendix D. Where impacts could not be completely avoided, conservation measures were identified to avoid any adverse impacts.

Early coordination was performed with USFWS and input was received through consultation. Additional consultation will be needed with USFWS and NRCS during the next phase, when the designs are 100 percent complete to further analyze impacts on listed or proposed species. A biological assessment will be used at that time to compile and document any impacts, determinations, surveys, or additional information required for each alternative selected as the preferred alternative prior in order to reach concurrence.

4.6.1 Alternative 1, No Action/Future Without Federal Investment

Flooding would continue to periodically disrupt aquatic and terrestrial habitat that may be used by listed species.

4.6.2 Alternative 2, Cozad Channel Conveyance

The project is approximately 13 miles northwest of the federally listed critical habitat area for whooping crane at its closest point; it does not intersect critical habitat and no adverse modifications are expected to occur.

This alternative is within the estimated range for all species listed in Table 5-4. No suitable habitat exists or no known populations occur for black-footed ferret. There have been no documented occurrences of gray wolf or Eskimo curlew within proximity to this alternative within the last 30 years. The Eastern black rail and rufa red knot are transient migrants in Nebraska

with only marginal habitat present in proximity to this alternative. There is no suitable habitat for blowout penstemon within the boundaries of Alternative 2. Therefore, no effects on these species are anticipated.

The pallid sturgeon does not occur within the project area but is known to inhabit large rivers such as the Platte River downstream of the project. The planned conveyance channel will not detain any flows and therefore will result in no effect to the sturgeon. This alternative is within the known range of American burying beetle. However, suitable habitat for the species consisting of perennial vegetation in mesic soils is absent or marginal. Currently, a Determination Key is used to assess impacts as it relates to the status of the species in relation to the 4(d) Rule under the Endangered Species Act. A Determination Key will be used during the design phase to identify the need for conservation measures or consultation to avoid adverse impacts.

The Interior least tern and piping plover both occupy open sandbar habitats in proximity to rivers and lakes in the area for nesting and brood rearing. This type of habitat is extremely limited within the project area but could be temporarily created following construction if areas of bare sand exist near the conveyance channel. Measures can be taken to either survey for the presence of these species prior to disturbing any suitable habitat or avoiding disturbance during the nesting and brood rearing season (April 15 – August 15). Additionally, the planned conveyance channel will not detain any flows and therefore will not cause any detrimental impact to these species downstream on the Platte River.

Suitable habitat for the Western prairie fringed orchid is absent or very limited due to the need for high quality wet meadows to sustain it. If any of these areas are identified during the design phase, a survey for the species during the flowering period by a qualified botanist will be conducted to determine presence or absence prior to initiating construction. Additionally, the planned conveyance channel will not detain any flows and therefore will not cause any detrimental impact to this species.

Whooping cranes may use agricultural fields and wetlands in the study area for foraging because the alternative is near the Platte River. To mitigate effects on the whooping crane, construction activities would not occur during whooping crane migration periods (March 6 – April 29 and October 9 – November 15), to the extent practicable. If construction activities are required during migration periods, surveys will be conducted each morning prior to work being initiated. If species are present, the contractor would be required to stop work and follow protocol as provided by USFWS to determine when work can resume. Post-construction, herbaceous species used for re-seeding would be native grasses and forbs and also shrubs or woody species reaching no more than 4 feet in height. Additionally, the planned conveyance channel will not detain any flows and therefore will not cause any detrimental impact to this species by altering downstream whooping crane habitat, including designated critical habitat.

The Northern long-eared bat and the proposed tricolored bat may have suitable habitat in adjacent woodland areas or in the form of culverts/bridges, which could be temporarily impacted by construction but would not be permanently altered. The project would be modified, to the

extent practicable, to avoid tree removal in excess of what is required to implement the project safely. Tree removal and modifications to culverts and bridges would be limited to that specified in project plans, and contractors would understand clearing limits and how they are marked in the field. Tree removal and culvert/bridge modifications would occur between November 1 and March 31 to mitigate effects on the species. Limitations on the use of lighting or working with heavy equipment during evening hours may also be used during the active period as needed. Surveys for presence/absence of the species could also be used where necessary.

The proposed listed species, monarch butterfly, Western regal fritillary, and Suckley's cuckoo bumble bee, may be present in the study area due to areas of perennial vegetation where flowering forbs occur that may be used for reproduction and foraging. These areas are relatively small and of marginal quality and may be disturbed temporarily by construction but would be restored after project completion. The project impact footprint would be reduced to the maximum extent possible prior to construction. Best Management Practices would be employed during construction. Following construction, all temporarily impacted areas would be returned to their pre-project conditions and seeded with mixtures that contain native forb species.

As described for the species above, this alternative may affect, but is unlikely to adversely affect the American burying beetle, Interior least tern, piping plover, Western prairie fringed orchid, whooping crane, and Northern long-eared bat. See Appendix D for a review of each species.

4.6.3 Alternative 3, Lexington Northeast Channel Conveyance

The project is approximately 2.4 miles north of the federally listed critical habitat area for whooping crane at its closest point; it does not intersect critical habitat and no adverse modifications are expected to occur.

Similar to Alternative 2, this alternative is within the estimated range for all species listed in Table 5-4. No suitable habitat exists or no known populations occur for black-footed ferret. There have been no documented occurrences of gray wolf or Eskimo curlew within proximity to this alternative within the last 30 years. The Eastern black rail and rufa red knot are transient migrants in Nebraska with only marginal habitat present in proximity to this alternative. There is no suitable habitat for blowout penstemon within the boundaries of Alternative 3. Therefore, no effects on these species are anticipated.

The pallid sturgeon does not occur within the project area but is known to inhabit large rivers such as the Platte River downstream of the project. The planned conveyance channel will not detain any flows and therefore will result in no effect to the sturgeon.

This alternative is within the known range of American burying beetle. However, suitable habitat for the species consisting of perennial vegetation in mesic soils is absent or marginal. Currently, a Determination Key is used to assess impacts as it relates to the status of the species in relation to the 4(d) Rule under the Endangered Species Act. A Determination Key will be used

during the design phase to identify the need for conservation measures or consultation to avoid adverse impacts.

The Interior least tern and piping plover both occupy open sandbar habitats in proximity to rivers and lakes in the area for nesting and brood rearing. This type of habitat is extremely limited within the project area but could be temporarily created following construction if areas of bare sand exist near the conveyance channel. Measures can be taken to either survey for the presence of these species prior to disturbing any suitable habitat or avoiding disturbance during the nesting and brood rearing season (April 15 – August 15). Additionally, the planned conveyance channel will not detain any flows and therefore will not cause any detrimental impact to these species downstream on the Platte River.

Suitable habitat for the Western prairie fringed orchid is absent or very limited due to the need for high quality wet meadows to sustain it. If any of these areas are identified during the design phase, a survey for the species during the flowering period by a qualified botanist will be conducted to determine presence or absence prior to initiating construction. Additionally, the planned conveyance channel will not detain any flows and therefore will not cause any detrimental impact to this species.

Whooping cranes may use agricultural fields and wetlands in the study area for foraging because the alternative is near the Platte River. To mitigate effects on the whooping crane, construction activities would not occur during whooping crane migration periods (March 6 – April 29 and October 9 – November 15), to the extent practicable. If construction activities are required during migration periods, surveys will be conducted each morning prior to work being initiated. If species are present, the contractor would be required to stop work and follow protocol as provided by USFWS to determine when work can resume. Post-construction, herbaceous species used for re-seeding would be native grasses and forbs and also shrubs or woody species reaching no more than 4 feet in height. Additionally, the planned conveyance channel will not detain any flows and therefore will not cause any detrimental impact to this species by altering downstream whooping crane habitat, including designated critical habitat.

The Northern long-eared bat and the proposed tricolored bat may have suitable habitat in adjacent woodland areas or in the form of culverts/bridges, which could be temporarily impacted by construction but would not be permanently altered. The project would be modified, to the extent practicable, to avoid tree removal in excess of what is required to implement the project safely. Tree removal and modifications to culverts and bridges would be limited to that specified in project plans, and contractors would understand clearing limits and how they are marked in the field. Tree removal and culvert/bridge modifications would occur between November 1 and March 31 to mitigate effects on the species. Limitations on the use of lighting or working with heavy equipment during evening hours may also be used during the active period as needed. Surveys for presence/absence of the species could also be used where necessary.

The proposed listed species, monarch butterfly, Western regal fritillary, and Suckley’s cuckoo bumble bee, may be present in the study area due to areas of perennial vegetation where flowering forbs occur that may be used for reproduction and foraging. These areas are relatively

small and of marginal quality and may be disturbed temporarily by construction but would be restored after project completion. The project impact footprint would be reduced to the maximum extent possible prior to construction. Best Management Practices would be employed during construction. Following construction, all temporarily impacted areas would be returned to their pre-project conditions and seeded with mixtures that contain native forb species. As described for the species above, this alternative may affect, but is unlikely to adversely affect the American burying beetle, Interior least tern, piping plover, Western prairie fringed orchid, whooping crane, and Northern long-eared bat. See Appendix D for a review of each species.

4.6.4 Alternative 4, Lexington Southwest Channel Conveyance

The project is approximately 1.6 miles north of the federally listed critical habitat area for whooping crane at its closest point; it does not intersect critical habitat and no adverse modifications are expected to occur.

Similar to Alternative 2, this alternative is within the estimated range for all species listed in Table 5-4. No suitable habitat exists or no known populations occur for black-footed ferret. There have been no documented occurrences of gray wolf or Eskimo curlew within proximity to this alternative within the last 30 years. The Eastern black rail and rufa red knot are transient migrants in Nebraska with only marginal habitat present in proximity to this alternative. There is no suitable habitat for blowout penstemon within the boundaries of Alternative 4. Therefore, no effects on these species are anticipated.

The pallid sturgeon does not occur within the project area but is known to inhabit large rivers such as the Platte River downstream of the project. The planned conveyance channel will not detain any flows and therefore will result in no effect to the sturgeon.

This alternative is within the known range of American burying beetle. However, suitable habitat for the species consisting of perennial vegetation in mesic soils is absent or marginal. Currently, a Determination Key is used to assess impacts as it relates to the status of the species in relation to the 4(d) Rule under the Endangered Species Act. A Determination Key will be used during the design phase to identify the need for conservation measures or consultation to avoid adverse impacts.

The Interior least tern and piping plover both occupy open sandbar habitats in proximity to rivers and lakes in the area for nesting and brood rearing. This type of habitat is extremely limited within the project area but could be temporarily created following construction if areas of bare sand exist near the conveyance channel. Measures can be taken to either survey for the presence of these species prior to disturbing any suitable habitat or avoiding disturbance during the nesting and brood rearing season (April 15 – August 15). Additionally, the planned conveyance channel will not detain any flows and therefore will not cause any detrimental impact to these species downstream on the Platte River.

Suitable habitat for the Western prairie fringed orchid is absent or very limited due to the need for high quality wet meadows to sustain it. If any of these areas are identified during the design phase, a survey for the species during the flowering period by a qualified botanist will be

conducted to determine presence or absence prior to initiating construction. Additionally, the planned conveyance channel will not detain any flows and therefore will not cause any detrimental impact to this species.

Whooping cranes may use agricultural fields and wetlands in the study area for foraging because the alternative is near the Platte River. To mitigate effects on the whooping crane, construction activities would not occur during whooping crane migration periods (March 6 – April 29 and October 9 – November 15), to the extent practicable. If construction activities are required during migration periods, surveys will be conducted each morning prior to work being initiated. If species are present, the contractor would be required to stop work and follow protocol as provided by USFWS to determine when work can resume. Post-construction, herbaceous species used for re-seeding would be native grasses and forbs and also shrubs or woody species reaching no more than 4 feet in height. Additionally, the planned conveyance channel will not detain any flows and therefore will not cause any detrimental impact to this species by altering downstream whooping crane habitat, including designated critical habitat.

The Northern long-eared bat and the proposed tricolored bat may have suitable habitat in adjacent woodland areas or in the form of culverts/bridges, which could be temporarily impacted by construction but would not be permanently altered. The project would be modified, to the extent practicable, to avoid tree removal in excess of what is required to implement the project safely. Tree removal and modifications to culverts and bridges would be limited to that specified in project plans, and contractors would understand clearing limits and how they are marked in the field. Tree removal and culvert/bridge modifications would occur between November 1 and March 31 to mitigate effects on the species. Limitations on the use of lighting or working with heavy equipment during evening hours may also be used during the active period as needed. Surveys for presence/absence of the species could also be used where necessary.

The proposed listed species, monarch butterfly, Western regal fritillary, and Suckley's cuckoo bumble bee, may be present in the study area due to areas of perennial vegetation where flowering forbs occur that may be used for reproduction and foraging. These areas are relatively small and of marginal quality and may be disturbed temporarily by construction but would be restored after project completion. The project impact footprint would be reduced to the maximum extent possible prior to construction. Best Management Practices would be employed during construction. Following construction, all temporarily impacted areas would be returned to their pre-project conditions and seeded with mixtures that contain native forb species.

As described for the species above, this alternative may affect, but is unlikely to adversely affect the American burying beetle, Interior least tern, piping plover, Western prairie fringed orchid, whooping crane, and Northern long-eared bat. See Appendix D for a review of each species.

4.7 Cultural Resources and Historic Properties

4.7.1 Alternative 1, No Action/Future Without Federal Investment

There would be no federal action, and no immediate change to the surrounding lands. Historic properties in the watershed, both known and undocumented, would continue to be at risk of damage due to flooding. Structures could be inundated or destroyed completely, and archaeological sites could be scoured away by floodwaters or buried by sediment deposition.

4.7.2 Alternative 2, Cozad Channel Conveyance

The Dawson County Canal is eligible for inclusion in the NRHP under Criterion A. The project calls for installing an underdrain to carry water from the canal under the diversion channel. There are no existing gates or other original features of the canal at this location that would be modified. NRCS has determined that the underdrain will have no adverse effect on the Dawson County Canal. The underdrain will not alter any of the characteristics of the canal that make it eligible for the NRHP under Criterion A.

Gated structures would be installed where Drainage Ditch No. 4 intersects the new diversion channel. The gates would direct high flows through the new diversion channel but allow normal flows to pass through Drainage Ditch No. 4. NRCS has determined that the proposed gates will have no adverse effect on Drainage Ditch No. 4. The gates will allow the ditch to operate as normally designed. Although the gates are a new feature, they do not alter any of the characteristics that make the ditch potentially eligible for inclusion in the NRHP.

The alternative calls for a new diversion channel along the eastern edge of the Cozad Country Club and Golf Course. There will be no physical changes to the golf course, but the channel may be visible from the golf course. The channel will be shallow and vegetated with grass, and the change in view is unlikely to alter any characteristics of the golf course that make it potentially eligible for inclusion in the NRHP. This undertaking will have no adverse effect on the Cozad Country Club and Golf Course.

This undertaking will have no effect on the Mormon Pioneer National Historic Trail. The Trail is ½ mile south of the APE. No trail related archeological sites or features were identified during the cultural resources inventory.

NRCS determined that Alternative 2 would have no adverse effect on the Dawson County Canal, Drainage Ditch No. 4, or Lateral No. 1. However, approximately 50 acres of Alternative 2 have not been investigated for historic properties. Historic properties, if present, may be damaged, altered, or destroyed by construction. In accordance with 36 CFR 800.4(b)(2), NRCS will defer identification and evaluation of historic properties within these 50 acres of the APE until the design phase through the execution of a Programmatic Agreement with SHPO and consulting parties (Appendix E). Prior to construction, NRCS will complete a survey of the remaining portions of the APE to identify historic properties. NRCS will make a determination of effect following the investigation and consult with SHPO and consulting parties. Mitigation needs, if any, will be determined during consultation.

4.7.3 Alternative 3, Lexington Northeast Channel Conveyance

The undertaking will have no adverse effect on Lateral No. 1. There are no gates or other features where the diversion channel intersects Lateral No. 1. The undertaking will not alter any of the characteristics of Lateral No. 1 that make it potentially eligible for inclusion in the NRHP.

The diversion to the Beatty Ditch will be replaced with a new weir. NRCS has determined that the new weir will have no adverse effect on Beatty Ditch. Replacement of the weir will be in kind and will not alter any of the characteristics that make the ditch potentially eligible for inclusion in the NRHP.

This alternative will drain into Dawson County Drain No. 1. A gate may be installed to control flows. There are no existing gates or other original features of the drain at this location that would be modified. The undertaking will not alter any of the characteristics of Dawson County Drain No. 1 that make it potentially eligible for inclusion in the NRHP. NRCS has determined that the alterations will have no adverse effect on Dawson County Drain No. 1.

This alternative will have no effect on the Mormon Pioneer National Historic Trail. No trail related archeological sites or features were identified during the cultural resources inventory. The trail route is over a mile away from the APE.

4.7.4 Alternative 4, Lexington Southwest Channel Conveyance

This alternative will widen Dawson County Drain No. 1 to increase capacity and install new culverts along the length of the drainage ditch. This alternative may have an adverse effect by altering features original to the drainage ditch.

This alternative will have no effect on the Mormon Pioneer National Historic Trail. The trail is more than ½ mile away from the APE of this alternative.

4.8 Recreation

4.8.1 Alternative 1, No Action/Future Without Federal Investment

Flooding would continue to periodically disrupt access to recreational areas and damage recreational properties.

4.8.2 Alternative 2, Cozad Channel Conveyance

Project construction for this alternative would have no direct impact on recreational areas. However, reductions in water surface elevation resulting from the alternative could indirectly impact several city parks. Based on model results detailed in Appendix D, Veterans Memorial Park, Frenchy Park, Sportsman Field, and the Cozad Country Club would all experience a reduction in flood inundation for the 10-year event.

Overall, the reduction in flooding at recreational facilities would have a moderate, beneficial impact on recreation because flooding can limit recreational use of these parks and facilities.

4.8.3 Alternative 3, Lexington Northeast Channel Conveyance

Project construction for this alternative would have no direct impact on recreational areas. However, reductions in water surface elevation resulting from the alternative could indirectly impact city parks. Based on model results detailed in Appendix D, Memorial Park and Plum Creek Park in Lexington would experience a reduction in flood inundation for the 25-year event.

Overall, the reduction in flooding at recreational facilities would have a moderate, beneficial impact on recreation because flooding can limit recreational use of these parks and facilities.

4.8.4 Alternative 4, Lexington Southwest Channel Conveyance

Project construction for this alternative would have no direct impact on recreational areas. However, reductions in water surface elevation resulting from the alternative could indirectly impact city parks. Based on model results detailed in Appendix D, Oak Park would see a slight increase in depth (0.1–0.25 foot).

Overall, the reduction in flooding at recreational facilities would have a moderate, beneficial impact on recreation because flooding can limit recreational use of these parks and facilities.

4.9 Public Health and Safety

4.9.1 Alternative 1, No Action/Future Without Federal Investment

Under this alternative, flooding would continue to impact access to emergency services and emergency service providers.

4.9.2 Alternative 2, Cozad Channel Conveyance

Overall, improvements to flood inundation in urban areas should increase access to the public health and safety resources identified in Chapter 3.9 and increase mobility during flooding events (10-year return period). Preliminary hydraulic modeling results indicate that the Proposed Alternative would improve inundation depths around the Cozad Community Hospital by 0.1 foot more than 3 feet and improve access to these critical resources.

4.9.3 Alternative 3, Lexington Northeast Channel Conveyance

Overall, improvements to flood inundation in urban areas should increase access to the public health and safety resources identified in Chapter 3.9 and increase mobility during flooding events (25-year return period). Preliminary hydraulic modeling results indicate that the alternative would improve inundation depths around the Lexington Regional Health Center by 0.1 foot to more than 3 feet and improve access to these critical resources.

4.9.4 Alternative 4, Lexington Southwest Channel Conveyance

Overall, improvements to flood inundation in urban areas should increase access to the public health and safety resources identified in Chapter 3.9 and increase mobility during flooding events (25-year return period). Preliminary hydraulic modeling results indicate that the

alternative would improve inundation depths around the Lexington Regional Health Center by 0.1 foot to more than 3 feet and improve access to these critical resources.

4.10 Social and Economic Conditions

4.10.1 Alternative 1, No Action/Future Without Federal Investment

Under this alternative, regular flood damage would continue and negatively impact the local and regional economy.

4.10.2 Alternative 2, Cozad Channel Conveyance

Population

There would be no direct impact on population and demographic trends in the counties or watersheds from this alternative.

Local and Regional Economy

This alternative would reduce the potential for flooding and support local producers in maximizing cropland productivity, which in turn would support local and regional economies. Additionally, project construction may provide short-term economic benefits if local residents are hired to work on the project.

4.10.3 Alternative 3, Lexington Northeast Channel Conveyance

Population

There would be no direct impact on population and demographic trends in the counties or watersheds from this alternative.

Local and Regional Economy

This alternative would reduce the potential for flooding and support local producers in maximizing cropland productivity, which in turn would support local and regional economies. Additionally, project construction may provide short-term economic benefits if local residents are hired to work on the project.

4.10.4 Alternative 4, Lexington Southwest Channel Conveyance

Population

There would be no direct impact on population and demographic trends in the counties or watersheds from this alternative.

Local and Regional Economy

This alternative would reduce the potential for flooding and support local producers in maximizing cropland productivity, which in turn would support local and regional economies.

Additionally, project construction may provide short-term economic benefits if local residents are hired to work on the project.

4.11 Scenic Beauty

4.11.1 Alternative 1, No Action/Future Without Federal Investment

Under this alternative, land use, and its associated viewshed, would remain primarily agricultural, including fields of corn and soybeans, rangeland, pastures, and alfalfa fields. Spring Creek, its tributaries, and their associated riparian and wetlands areas would remain unchanged. Therefore, Alternative 1 would have no impact on scenic beauty.

4.11.2 Alternative 2, Cozad Channel Conveyance

Construction of this alternative's berm, channel modifications, and ROW project components would all result in permanent conversion of farmland into grass and/or conveyance. The viewshed would remain dominated by agricultural fields and the project improvements would be consistent with other elements of the existing landscape. Therefore, this alternative would have no permanent impact on scenic beauty.

The presence of heavy construction equipment and machinery would result in minor, short-term, direct, adverse impacts on the scenic beauty. Following construction, equipment and machinery would be removed.

4.11.3 Alternative 3, Lexington Northeast Channel Conveyance

Alternative 3 would have the same impacts on scenic beauty as those outlined for Alternative 2. This alternative would have no permanent impact on scenic beauty.

4.11.4 Alternative 4, Lexington Southwest Channel Conveyance

Alternative 4 would have the same impacts on scenic beauty as those outlined for Alternative 2. This alternative would have no permanent impact on scenic beauty.

4.12 Land Use

4.12.1 Alternative 1, No Action/Future Without Federal Investment

Under this alternative, land use would remain primarily agricultural, including grassland and pasture used for grazing. Therefore, the alternative would have no impact on land use.

4.12.2 Alternative 2, Cozad Channel Conveyance

Construction of the alternative's berm, channel modification, and ROW project components would all result in permanent use of prime farmland as grass and/or conveyance. There would be minor, permanent, direct, adverse impacts on land use due to the conversion of agricultural land to channel conveyance because those areas would no longer be used for cultivated crops or grazing. See Chapter 4.2 for prime and unique farmland impacts.

4.12.3 Alternative 3, Lexington Northeast Channel Conveyance

Alternative 3 would have the same impacts on land use as those outlined for Alternative 2.

4.12.4 Alternative 4, Lexington Southwest Channel Conveyance

Alternative 4 would have the same impacts on land use as those outlined for Alternative 2.

4.13 Ecosystem Services

This section provides a description of the impacts related to ecosystem services. See Appendix D and the Watershed Plan for additional information about ecosystem service trade-offs.

4.13.1 Alternative 1, No Action/Future Without Federal Investment

Provisioning Services

This alternative would have a minor, long-term impact on provisioning services. Continued flooding would lead to disruptions in supply chains used for food production. Erosion and sedimentation would continue to due to flooding. The erosion would scour landscapes and sedimentation would inundate fields during flood events. In addition, due to the flat topography in the lower reaches of the Spring Creek Watershed, flooding has the potential to deposit sediment in crop ground covering crops during seed germination and early plant growth.

Regulating Services

This alternative would have a moderate, long-term effect on regulating services. Continued flooding would lead to increased flood damage and concerns for public health and safety. Additionally, this alternative could increase erosion from overland flow, which could threaten water quality through increased sedimentation.

Cultural Services

Spring Creek would continue to be affected by flooding. Residents would continue to be displaced during flood events and would continue to be burdened with damage to their homes and belongings. Flooding would continue to cause impacts on human health and safety with continued stress and the financial hardships caused by displacement and disruption.

Supporting Services

Supporting services refer to the underlying processes that maintain conditions for life. Supporting services allow the other ecosystem services to exist and are not evaluated in this plan.

4.13.2 Alternative 2, Cozad Channel Conveyance

Provisioning Services

Flood reduction would allow highways and roadways important for commerce to stay open, which is integral for commercial traffic and food production. Flood reduction would additionally reduce erosion and sedimentation, resulting in improved water quality and improved production for farms and ranches.

Regulating Services

Flood reduction and the subsequent prevention of highway closures and traffic disruptions would provide a long-term benefit to regulating services. Flood protection would contribute to improvements in public health and safety as well as decrease flood damage. Flood protection would provide secondary benefits as well, including improving water quality by reducing sedimentation from overland flow and reducing threats to wetlands, streams, and riparian areas.

Cultural Services

This alternative would provide a positive benefit to cultural services. Stress and the financial hardships caused by displacement and disruption from flooding would be alleviated with implementation of the project.

Supporting Services

Supporting services refer to the underlying processes that maintain conditions for life. Supporting services allow the other ecosystem services to exist and are not evaluated in this plan.

4.13.3 Alternative 3, Lexington Northeast Cozad Channel Conveyance

Provisioning Services

Alternative 3 would have the same impacts on Provisioning Services as those outlined for Alternative 2.

Regulating Services

Alternative 3 would have the same impacts on Regulating Services as those outlined for Alternative 2.

Cultural Services

Alternative 3 would have the same impacts on Cultural Services as those outlined for Alternative 2.

Supporting Services

Alternative 3 would have the same impacts on Supporting Services as those outlined for Alternative 2.

4.13.4 Alternative 4, Lexington Southwest Channel Conveyance

Provisioning Services

Alternative 4 would have the same impacts on Provisioning Services as those outlined for Alternative 2.

Regulating Services

Alternative 4 would have the same impacts on Regulating Services as those outlined for Alternative 2.

Cultural Services

Alternative 4 would have the same impacts on Cultural Services as those outlined for Alternative 2.

Supporting Services

Alternative 4 would have the same impacts on Supporting Services as those outlined for Alternative 2.

4.14 Indirect Impacts

Indirect impacts are caused by a project after installation and can occur at any time or any distance from the project. They are predictable, can be linked back to the project installation, and can be positive or negative.

A negative indirect impact of the No Action/Future Without Federal Investment would be continued threat of flood damage to Cozad and Lexington.

One beneficial indirect impact due to Alternatives 2, 3, and 4 is improved water quality. Creating a more stable stream channel and establishing buffers would reduce erosion, the mobilization of sediment, and the pollutants and excess nutrients attached to these soil particles.

No other indirect impacts by either alternative are anticipated.

4.15 Cumulative Impacts

In accordance with the PR&G, cumulative impacts include both direct and indirect impacts of a proposed project along with any other past or future projects. Reasonable, foreseeable actions should be carried through planning or design. This Plan-EA is the only current NRCS watershed plan for the area, and no other foreseeable actions were identified during scoping. The proposed alternatives are conveyance-based alternatives that do not increase or decrease runoff volume or change discharge locations to the Platte River. The action alternatives direct (convey) runoff for the 10- to 25-year flood frequency event around the areas that experience the most damage during this storm event (structures within the communities). Therefore, there

are no anticipated cumulative impacts on NRCS channel projects (Spring, Elm-Turkey, and Lower Wood) downstream.

4.15.1 Past Project

Past projects in the study area include development of flood reduction projects. The projects include a Watershed Work Plan for Watershed and Flood Prevention (1965), a Supplemental Watershed Work Plan for Watershed and Flood Prevention (1978), and a Project Application and Feasibility Report (1980). In addition, CPNRD records show that approximately 14 miles of channel in the lower reaches of Spring Creek were part of CPNRD channel snagging and clearing projects in 1993, 1994, and 1995. This does not include past channelization work on Spring Creek.

4.15.2 Current Projects

The Plan EA is the only current NRCS watershed plan for the area, and no other current projects were identified during scoping.

4.15.3 Reasonably Foreseeable Future Actions

There were no specific reasonably foreseeable future actions identified during scoping. Generally, existing flood reduction practices would continue for the reasonably foreseeable future. The current existing community practices for flood reduction would continue in the Lexington and Cozad communities.

4.15.4 Cumulative Effects

Alternatives 2, 3, and 4, combined with other past, present, and reasonable foreseeable future actions would have a beneficial, permanent, direct effect on the reduction of flooding within their respective geographic areas.

4.16 Possible Conflicts with Plans and Policies

No potential conflicts between land use plans or regional water resource management plans, policies, or controls were identified for the study area.

4.17 Risk and Uncertainty

The proposed alternatives could change in estimated cost and benefit in coming years due to local, regional, or world economics. Further uncertainties in economic calculations are detailed in Appendix D. The cost and benefits were evaluated based on an estimated life of 104 years.

Uncertainty is also involved in the hydrology and hydraulics analysis, including limited terrain and hydraulic structure data. Further uncertainties in the hydrology and hydraulics analysis are detailed in Appendix D.

4.18 Precedent for Future Actions with Significant Impacts

The proposed alternatives do not set a precedent for future actions that would have significant impacts. Future projects to mitigate flood damages in the study area would be analyzed on their own and evaluated for effects on resources of concern identified during a separate scoping process.

4.19 Controversy

The existing landowners and agencies largely support the implementation of the project. During alternatives development, public scoping comments were taken into consideration and addressed. There are no areas of controversy associated with the proposed alternatives.

4.20 Alternative Summary and Comparison

Table 4-5 provides a summary and comparison of the alternatives selected for detailed study.

Table 4-5. Summary and Comparison of Selected Alternatives' Impacts on Resource Concerns

Resource Topic	No Action/Future Without Federal Investment	Alternative 2, Cozad Channel Conveyance	Alternative 3, Lexington Northeast Channel Conveyance	Alternative 4, Lexington Southwest Channel Conveyance
Soil – Erosion	No change	No adverse effects. 1.14 acres of HEL impacted temporarily during construction. Decreased bank erosion from stabilization measures.	No adverse effects. Decreased bank erosion from stabilization measures.	No adverse effects. Decreased bank erosion from stabilization measures.
Soil – Sedimentation	No change	Minor, permanent impact on sedimentation in floodplain with decreased overtopping frequency.	Minor, permanent impact on sedimentation in floodplain with decreased overtopping frequency.	Minor, permanent impact on sedimentation in floodplain with decreased overtopping frequency.
Soil – Prime and Unique Farmland	No change	158 acres of permanent impact on prime and unique farmland for use as conveyance and ROW.	99 acres of permanent impact on prime and unique farmland for use as conveyance and ROW.	59 acres of permanent impact on prime and unique farmland for use as conveyance and ROW.
Water Resources – Wetlands and Waters of the United States	No change	Minor effects. Total of 0.33 acre of permanent impact to delineated features. There would be minor adverse impacts due to construction, and permanent, moderate beneficial impacts due to streambank stabilization and decreased overtopping frequency.	Minor effects. Total of 0.08 acre of permanent impact to delineated features. There would be minor adverse impacts due to construction, and permanent, moderate beneficial impacts due to streambank stabilization and decreased overtopping frequency.	Minor effects. Total of 0.07 acre of permanent impact to delineated features. There would be minor adverse impacts due to construction, and permanent, moderate beneficial impacts due to streambank stabilization and decreased overtopping frequency.
Water Resources – Surface Water Hydrology	No change	Project would have permanent, beneficial impact on surface water paths and flood inundation.	Project would have permanent, beneficial impact on surface water paths and flood inundation.	Project would have permanent, beneficial impact on surface water paths and flood inundation.
Water Resources – Water Quality	No change	No adverse effects. Negligible impact.	No adverse effects. Negligible impact.	No adverse effects. Negligible impact.
Water Resources – Groundwater	No change	No adverse effects. Negligible impact.	No adverse effects. Negligible impact.	No adverse effects. Negligible impact.
Water Resources – Regional Water Management Plans and Agency Programs	No change	No adverse effects. Negligible impact. Compliant with regional water management plans.	No adverse effects. Negligible impact. Compliant with regional water management plans.	No adverse effects. Negligible impact. Compliant with regional water management plans.

Resource Topic	No Action/Future Without Federal Investment	Alternative 2, Cozad Channel Conveyance	Alternative 3, Lexington Northeast Channel Conveyance	Alternative 4, Lexington Southwest Channel Conveyance
Water Resources – Floodplains	No change	Project takes place in regulatory Zone A. Need for FEMA Map revision would be evaluated.	Project takes place in regulatory Zones A and AH. Need for FEMA Map revision would be evaluated.	Project takes place in regulatory Zones A and AH. Need for FEMA Map revision would be evaluated.
Terrestrial and Aquatic Wildlife	No change	Minor effects. The project has the potential to impact four Tier 1 species.	Minor effects. The project has the potential to impact four Tier 1 species.	Minor effects. The project has the potential to impact four Tier 1 species.
Endangered and Threatened Species	No change	Minor effects. The project has the potential to impact four threatened and endangered species. Relevant conservation measures would be observed.	Minor effects. The project has the potential to impact four threatened and endangered species. Relevant conservation measures would be observed.	Minor effects. The project has the potential to impact four threatened and endangered species. Relevant conservation measures would be observed.
Noxious and Invasive Species	No change	Minor effects. Measures would be taken to avoid invasive species introduction or spread.	Minor effects. Measures would be taken to avoid invasive species introduction or spread.	Minor effects. Measures would be taken to avoid invasive species introduction or spread.
Riparian Areas	No change	Minor effect on riparian areas. Change in habitat from trees to grass.	Minor effect on riparian areas. Change in habitat from trees to grass.	Minor effect on riparian areas. Change in habitat from trees to grass.
Forest Resources	No change	Minor effect on woodlands.	Minor effect on woodlands.	Minor effect on woodlands.
Grasslands	No change	Minor effect on grasslands. Minor loss of grassland due to construction is anticipated.	Minor effect on grasslands. Minor loss of grassland due to construction is anticipated.	Minor effect on grasslands. Minor loss of grassland due to construction is anticipated.
Fish and Aquatic Resources	No change	No adverse effect. Temporary construction impacts but no permanent effects because no suitable habitat exists.	No adverse effect. Temporary construction impacts but no permanent effects because no suitable habitat exists.	No adverse effect. Temporary construction impacts but no permanent effects because no suitable habitat exists.
Terrestrial Wildlife	No change	No adverse effect. Temporary construction impact but no permanent effects because limited suitable habitat exists.	No adverse effect. Temporary construction impact but no permanent effects because limited suitable habitat exists.	No adverse effect. Temporary construction impact but no permanent effects because limited suitable habitat exists.
Migratory Birds and Eagles	No change	No adverse effect.	No adverse effect.	No adverse effect.
Ecologically Critical Areas	No change	No adverse effect.	No adverse effect.	No adverse effect.

Resource Topic	No Action/Future Without Federal Investment	Alternative 2, Cozad Channel Conveyance	Alternative 3, Lexington Northeast Channel Conveyance	Alternative 4, Lexington Southwest Channel Conveyance
Flood and Damage Costs	Continued flood risk and potential for damage costs.	Minor effect on agricultural land downstream. Reduced flooding damages.	Minor effect on agricultural land downstream. Reduced flooding damages.	Minor effect on agricultural land downstream. Reduced flooding damages.
Cultural Resources and Historic Properties	No change	Approximately 50 acres of the APE have not been investigated for historic properties. Additional investigation required.	This alternative will have no adverse effect on historic properties. Effects to historic properties within the APE have been evaluated through consultation with SHPO and consulting parties, and the proposed alterations will not make any properties ineligible for inclusion in the NRHP.	This alternative may have adverse effects on the Dawson County Drain No. 1. Additional investigation required.
Recreation	No change	No adverse effects.	No adverse effects.	No adverse effects.
Social and Economic Conditions	Continued threats from flooding.	Reduced threats from flooding.	Reduced threats from flooding.	Reduced threats from flooding.
Public Health and Safety	Continued threats from flooding.	Reduced threats from flooding.	Reduced threats from flooding.	Reduced threats from flooding.

5 Other Environmental Reviews

5.1 Consultation

5.1.1 USFWS and NGPC Consultation (Section 12 of Public Law 83-566, Section 7 of the Endangered Species Act, and Nebraska Nongame and Endangered Species Conservation Act)

Communication and coordination with USFWS and NGPC were initiated concurrently with other agency coordination in October 2020. Communication and coordination have been conducted throughout the planning process. A review of the watershed and the project areas for the alternatives was conducted using the Information for Planning and Conservation (IPaC) web-based tool for USFWS on July 14, 2025. The Conservation and Environmental Review Tool (CERT) hosted by NGPC was also used to complete a review of the watershed and the project areas for the alternatives on the same date. This information, along with communication with both agencies, was used to identify the endangered and threatened species and associated habitats which required assessment for the Plan/EA.

The NRCS submitted a Section 12 Consultation letter to USFWS on November 25, 2024 (Appendix A). NRCS initiated informal consultation with USFWS and NGPC by letter on August 18, 2025. {INSERT RESPONSES}

No adverse effects are anticipated, and no mitigation was identified. Correspondence can be found in Appendix A.

5.1.2 National Historic Preservation Act Section 106 Consultation

Consultation with the State Historic Preservation Officer (SHPO) and nation-to-nation consultation with appropriate federally recognized Tribal governments regarding cultural resources and sacred and cultural sites and other resource and economic concerns has taken place throughout the development of this Plan-EA under the National Historic Preservation Act, Section 106, as amended. The Federally Recognized Tribes consulted from the inception of the project include:

- Lower Brule Sioux Tribe
- Omaha Tribe of Nebraska
- Ponca Tribe of Nebraska
- Northern Arapaho Tribe
- Mandan, Hidatsa, and Arikara Nation
- Ponca Tribe of Indians of Oklahoma
- Cheyenne & Arapaho Tribes of Oklahoma
- Northern Cheyenne Tribe

- Ogalala Sioux Tribe
- Rosebud Sioux Tribe
- Pawnee Nation of Oklahoma

During the scoping phase of the project, NRCS sent letters to the Nebraska State Historic Preservation Office (NeSHPO) and representatives of the Tribes listed above on October 20, 2020, to inform them of the project, invite them to participate in the agency scoping meeting, and to initiate NHPA Section consultation with them on concerns related to cultural resources. The Pawnee Nation of Oklahoma responded by email on November 30, 2020, identifying the watershed as one used by the Pawnee biannually to access hunting areas. The Northern Cheyenne Tribe requested copies of any Class I or Class III surveys for the project area and requested to participate in the project.

After the cultural resources inventory was complete, NRCS sent NHPA Section 106 consultation request letters to NeSHPO, the Tribes listed above, and USACE on April 15, 2025. The consultation letter presented the area of potential effect, the proposed alternatives, the historic property identification efforts, determinations of eligibility, the determinations of effect, and invited the recipient to participate in the development of the Programmatic Agreement. USACE is a cooperative agency on this watershed plan and was invited to participate in the programmatic agreement as a concurring party. Copies of the cultural resource inventory report, site forms, and maps of the APE were submitted with the consultation letter to support the determination of effect.

SHPO concurred with the NRCS findings and determinations of effect and agreed to be a signatory on the Programmatic Agreement in an email received May 7, 2025, and a letter received May 16, 2025. The Northern Arapaho Tribe concurred with the determination of effect in a letter dated May 9, 2025. The Northern Cheyenne Tribe concurred with the determination of effect in an email received June 3, 2025. The USACE declined to participate in the Programmatic Agreement in an email received May 2, 2025. The Advisory Council on Historic Preservation declined to participate in the Programmatic Agreement in a letter received by email on June 15, 2025. The Pawnee Nation stated that the project should not adversely affect the cultural landscape of the Pawnee Nation.

5.1.3 USACE Consultation

USACE consultation included invitations to scoping meetings and draft plan development meetings. USACE was invited to be a cooperative agency in letters sent April 20, 2021, and August 27, 2024. USACE accepted the invitation and assigned Project Number NWO-2021-00836-WEH.

NRCS, CPNRD, and NRCS conducted Clean Water Act Review meetings on September 20, 2024, and November 12, 2024. The meetings discussed the project and design, alternative analysis process, aquatic resource impacts, and proposed potential mitigation requirements.

All consultation correspondence is provided in Appendix A.

5.1.4 Farmland Protection Policy Act

Coordination with the NRCS State FPPA Coordinator was completed in November 2024. The combined Farmland Conversion Impact Rating for the project totaled 145. Therefore, no further consideration for protection and no additional evaluation was deemed necessary. Coordination with the NRCS State FPPA Coordinator is provided in Appendix A.

5.2 Other Reviews

NRCS has determined that it has fulfilled its responsibilities under the laws, regulations, policies, and guidance shown in Table 5-1. All necessary permits would be secured during the design phase of the project.

Table 5-1. Compliance with Federal Laws and Responsibilities

Laws, Regulations, Policies, and EOs	Compliant
Section 7(a)(2) of the ESA, PL 93-205, ESA	Yes
PL 94-265 provisions of the Magnuson-Stevens Act, Essential Fish Habitat	N/A
Section 12 PL 83-566	Yes
Section 106 of the National Historic Preservation Act (NHPA)	Yes
Tribal Interests: PL 89-655, NHPA; PL 95-341, American Indian Religious Freedom Act Agencies (AIRFA); PL 101-601, Native American Graves Protection and Repatriation Act; PL 103-344, AIRFA Amendments of 1994; PL 92-203, Alaska Native Claim Settlement Act; PL 93-638, Indian Self-Determination and Education Assistance Act; EOs 13007 and 13175; Secretarial Orders 3206 and 3403; Office of Science and Technology Policy 30 / Council on Environmental Quality Joint Memoranda, Indigenous Knowledge; PM, Government-to- Government Relations; PM, Uniform Standards; 230-General Manual (GM), Part 403, Special Emphasis Programs; 410-GM, Part 405, American Indians and Alaska Natives; 190-NI, Part 315, Tribal Ancestral Lands Consultation; Departmental Regulation 1350-001, Tribal Consultation; Department Regulation (DR) 1340-007, Policies on American Indians and Alaska Natives	Yes
PL 92-583, Coastal Zone Management Act	N/A
Wild and Scenic Rivers Act, PL 90-542	N/A
Section 408 – 33 U.S. Code 408	N/A
PL 99-198, Title XII, The Food Security Act of 1985	Yes
Prime and Unique Farmland, Farmland of Statewide or Local Importance: Farmland Protection Policy Act, PL 97-98	Yes
Waters of the United States, including Wetlands: PL 112-328, Federal Water Pollution Control Act, Clean Water Act	Yes

Laws, Regulations, Policies, and EOs	Compliant
Water Quality: PL 112-328	Yes
NRCS Wetland and Highly Erodible Land Policy (PL 99-198, Title XII, The Food Security Act of 1985), Highly Erodible Soil	Yes
Other	N/A

5.3 Mitigation of Potential Effects

During construction, site mitigation measures would include erosion and sediment control, dust control, and other practices identified during the design process. Best management practices during construction would be implemented to minimize the mobilization of sediment into stream systems, including silt fencing, bank stabilization, construction entrances, sediment storage, matting, and grassing/vegetative cover.

Impacts on existing natural resources and cultural resources/historic properties due to the installation of this project were identified in Chapter 4. Adverse impacts were avoided and minimized to the maximum extent practicable. Remaining adverse impacts, while still minor in nature, would be mitigated. In-field surveys, paired with other existing data, were utilized to determine mitigation needs. Mitigation quantities for each resource would be based on input from NRCS resource specialists and USACE regulatory requirements. Permanent aquatic resource impacts would likely require around one to two acres of mitigation. Mitigation would occur on-site and within the channel conveyance improvement areas. No off-site mitigation areas are anticipated. All necessary mitigation plans would be developed as part of the design phase, prior to construction.

The project may be permitted with a Clean Water Act Section 404, Nationwide Permit 43: Stormwater Management Facilities (determination is at the discretion of USACE). This project complies with the Food Security Act by not making wetland areas easier to farm than they currently are, nor does it convert any wetlands to farmland. This project complies with EO 11990 by adequately replacing impacted wetlands with new wetlands, which would result from increasing the channel capacity, creating wetland benches and gentler, stable banks.

The Programmatic Agreement was developed in accordance with 36 CFR 800.4(b)(2) for a phased identification and evaluation of effects to historic properties and will include treatments to resolve adverse effects, should they be determined to occur. As required, NRCS would conduct further consultations with the Section 106 consulting parties to seek ways to avoid, minimize, or mitigate adverse effects on those discoveries. The Sponsor would bear the costs of the mitigation of adverse effects to historic properties under the National Historic Preservation Act. No costs for such mitigation have been explicitly included in the economic analysis because these costs are as yet undetermined.

6 Agencies and Persons Consulted

- Center for Rural Affairs
- City of Cozad, Nebraska
- City of Lexington, Nebraska
- Cozad Ditch Company
- Custer County
- Dawson County
- Drainage Districts No. 1, 2, and 4
- Environmental Protection Agency
- Federal Emergency Management Agency
- Nebraska Department of Environment and Energy
- Nebraska Department of Transportation
- Nebraska Public Power District
- Nebraska Department of Natural Resources
- Nebraska Game and Parks Commission
- State Emergency Management Agency
- State Historic Preservation Office
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- Lower Brule Sioux Tribe
- Omaha Tribe of Nebraska
- Ponca Tribe of Nebraska
- Northern Arapaho Tribe
- Mandan, Hidatsa, and Arikara Nation
- Ponca Tribe of Indians of Oklahoma
- Cheyenne & Arapaho Tribes of Oklahoma
- Northern Cheyenne Tribe
- Ogalala Sioux Tribe
- Rosebud Sioux Tribe
- Pawnee Nation of Oklahoma

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8 List of Preparers

Name	**Title (Years of Experience)**	**Education (Degree, field of study)**	**Other (licenses, etc.)**
USDA NRCS			
Melissa Baier	Watershed Planning Coordinator (4 years); Archaeologist (16 years)	M.A. Anthropology; B.A. Anthropology; B.S. Biology	
Doug Christensen	Economist (45 years)	B.S. Agricultural Business (ISU); PhD. Economics (ISU)	
Joseph Debebe	NEPA Specialist (13 years)	BSC., Plant Science, Ethiopia; MSC. Soil Chemistry, Bulgaria; PHD, in Agronomy, UNL	Seed technology, Integrated Pest Management (Federal Certified)
Merceidez Fabok	Natural Resource Specialist (2 Years)	B.S. (WNMU)	
Allen Gehring	Ag / Civil Engr. (30+ years)	B.S. Agricultural Engineering	PE; COR
Thomas Mountford	Watershed Project Specialist 1½ yrs (NE Natural Resources Districts – 36 yrs.)	Assoc. Arts (SCC)/ B.S. Agriculture- (UNL)/ Natural Resources & Accounting (UNL, NWU)	
Ritch Nelson	Wildlife Biologist (32 years)	B.S. Fisheries and Wildlife (UNL)	
Arlis Plummer	Civil Engineer (43 years)	B.S. Civil Engineering	PE
Jordan Rodriguez	Economist (1 year)	B.S. Economics	
Alessandra Sealander	Geologist (2 years)	M.S. Geosciences (UT Dallas); B.S., Geosciences (UT Dallas).	Geologist in Training (G.I.T.), Certificate # –614 (Texas)
Robert Sullivan	Civil Engineer (36 years)	B.S. Civil Engineering	PE

Name	**Title (Years of Experience)**	**Education (Degree, field of study)**	**Other (licenses, etc.)**
Nicole Zimmerman	Hydrology & Hydraulics Engineer (3 years)	B.S. Geology (UNL); M.S. Environmental Engineering (UNL)	
HDR			
Matt Hodgson	Technical Editor (18 years)	M.A. Composition Theory and Rhetoric; B.A. English and Education	
Matt Pillard	Environmental Project Manager (27 years)	B.S. Agricultural Science and Natural Resources; M.S. Community and Regional Planning	AICP
Matt Wray	Sr. Environmental Planner (25 years)	B.S. Environmental Science	
Shannon McKinley	Environmental Scientist (3 years)	B.S. Biology	
Taylor Hackbart	Economist (8 years)	B.S. Natural Resources and Environmental Economics; M.S. Agriculture Economics	
Creighton Omer	Sr. Water Resources Engineer (23 years)	B.S. Civil Engineering; M.S. Civil Engineering	PE
Joshua Jackson	Water Resources Engineer (8 years)	B.S. Civil Engineering; M.S. Civil Engineering	PE
Nebraska State Historical Society			
Dave Williams	Principal Investigator; Archaeologist	B.A. Anthropology; M.A. Anthropology	MA, RPA