



Natural Resources Conservation Service  
U.S. DEPARTMENT OF AGRICULTURE



## Draft Supplemental Watershed Plan No. 3 for the Spring Creek Watershed Improvement Project

Custer and Dawson Counties, Nebraska

November 2025

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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# **Draft Supplemental Watershed Plan for the Spring Creek Watershed Improvement Project**

## **Custer and Dawson Counties, Nebraska**

**AUTHORITY:** This watershed work plan has been prepared under the authority of the Watershed Protection and Flood Prevention Act of 1954 (Public Law 83-566) as amended. The construction of this Project is authorized under Public Law 83-566 (as amended) and in accordance with Section 102(2) of the National Environmental Policy Act of 1969, Public Law 91-190, as amended (42 U.S.C. 4321 et seq.).

**Lead Agency:** U.S. Department of Agriculture, Natural Resources Conservation Service (USDA NRCS), Nebraska

**Sponsoring Local Organization (SLO):** Central Platte Natural Resources District (CPNRD)

**Congressional District:** 3rd

**Abstract:** Flooding is a significant concern in the Spring Creek Watershed, with repeated and significant flood related damages. Recently, the March and July 2019 flooding caused severe damage to public and private property, disrupted utility services, and endangered the health and safety of citizens in Custer and Dawson County. The local project sponsor, Central Platte Natural Resources District (CPNRD), is investigating Proposed Actions with the purpose to reduce damages caused by flooding in the study area, predominantly in the two communities of the city of Cozad and the city of Lexington. The recommended project includes channel conveyance improvements in these two communities. Total estimated project costs are \$56,568,330 of which \$36,446,164 would be paid by the sponsors and other non-federal funding sources. The estimated amount to be paid through NRCS PL 83-566 funds is \$20,353,091.

**Comments and Inquiries:** USDA-NRCS has completed this Draft Plan-EA in accordance with the NEPA and USDA-NRCS guidelines and standards. Reviewers should provide comments to NRCS during the allotted Draft Plan-EA review period. Comments need to be submitted by December 5, 2025, to become part of the Administrative Record.

To submit comments, send in by U.S. Mail to:

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## Summary OMB Fact Sheet

### Supplemental Watershed Plan No. 3 for the Spring Creek Watershed Project Custer and Dawson Counties, Nebraska 3rd Congressional District

**Prepared by:** United States (U.S.) Department of Agriculture (USDA), Natural Resources Conservation Services (NRCS).

**Authorization:** The original Spring Creek Watershed Work Plan was prepared in 1965 under Public Law 566, and no works of improvement identified in the plan were constructed. A Supplemental Watershed Work Plan was authorized in 1978 under Public Law 566, and only one work of improvement was constructed. This Supplement Watershed Plan is authorized under Public Law 83-566 Stat. 666, as amended (16 USC Section 1001 et. seq.).

**Sponsor:** Central Platte Natural Resources District (CPNRD)

**Proposed Action:** The Proposed Action for Spring Creek Watershed would include channel conveyance improvements and berm (dike) construction. The term “berm” in this document is synonymous with NRCS’S definition of “dike” (NRCS Conservation Practice Standard 356).

**Purpose and Need for Action:** The purpose of the project is to provide flood damage reduction within the Spring Creek Watershed, including the urbanized areas. The project is needed due to the current risk of flooding and flood related damages to public and private infrastructure. Flooding has occurred within the Watershed on multiple occasions and has been a significant issue of concern.

Implementation of the Proposed Action would meet PL 83-566 Authorized Project Purpose, Flood Prevention (Flood Damage Reduction), through channel conveyance improvements and berm construction.

Federal assistance through PL 83-566 would support the CPNRD in addressing the concerns with flooding in the Spring Creek Watershed.

Implementing the Proposed Action would help prevent or reduce future damages caused by floodwater. The Proposed Action includes measures to address the purpose and need for the project.

#### **Preferred Alternative:**

The Preferred Alternative includes a combination of constructing small earthen flood control berms and new drainage conveyance ditches and diversions, as well as improving existing drainage channel conveyance in Cozad, Nebraska. The preferred alternative also includes

construction of a small earthen flood control berm, weir, and improved drainage conveyance through Lexington, Nebraska.

**Resource Information:**

**Latitude and Longitude:** 40.96304441 Decimal Degrees North, -99.93967133 Decimal Degrees West

**Hydrologic Unit Code (HUC):** Middle Platte-Buffalo – 10200101

**Watershed Size and Drainage Area:** 196,044 acres

**Topography and Climate:** The project resides within the Valleys and Dissected Plains topographic regions. The Valleys region consists of flat-lying land along the major streams. The materials of the Valleys region are stream-deposited silt, clay, sand, and gravel. The Dissected Plains region consists of hilly land with moderate to steep slopes, sharp ridge crests, and remnants of the old, nearly level plain. The Dissected Plains region is old plains eroded by water and wind. The climate is characterized by mild and wet springs, hot summers, mild and dry autumns, and cold winters.

**Land Use:** Landcover in the drainage is characterized in Table S-1.

**Table S-1 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)

**Land Ownership:** Land ownership consists of approximately 99 percent privately owned and 1 percent state, county, or locally owned. State-local lands are concentrated around the towns of Cozad and Lexington. There are no federal or Tribal lands present.

**Economics and Demographics:** Indicators are presented in the following tables.

**Table S-2 Population of Counties and Places in the 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).

**Table S-3 Percentages of Minority and Low-Income Persons in the Study Area and Custer and Dawson Counties**

|                                   | <b>Custer County Census Tract 9718</b> | <b>Dawson County Census Tract 9680</b> | <b>Dawson County Census Tract 9681</b> | <b>Dawson County Census Tract 9683</b> | <b>Dawson County Census Tract 9684</b> | <b>Dawson County Census Tract 9685</b> | <b>Dawson County Census Tract 9686</b> | <b>Custer and Dawson Counties</b> |
|-----------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|-----------------------------------|
| Total Population                  | 2,826                                  | 2,634                                  | 1,302                                  | 3,992                                  | 5,065                                  | 5,771                                  | 1,682                                  | 34,603                            |
| White, Not Hispanic               | 2,708                                  | 2,170                                  | 1,171                                  | 3,444                                  | 1,095                                  | 989                                    | 1,314                                  | 23,348                            |
| Black                             | 2                                      | 5                                      | 0                                      | 123                                    | 360                                    | 1,067                                  | 2                                      | 1,618                             |
| American Indian, Alaska Native    | 0                                      | 22                                     | 0                                      | 0                                      | 0                                      | 6                                      | 0                                      | 86                                |
| Asian                             | 0                                      | 0                                      | 0                                      | 63                                     | 17                                     | 85                                     | 0                                      | 194                               |
| Native Hawaiian, Pacific Islander | 0                                      | 0                                      | 0                                      | 0                                      | 99                                     | 0                                      | 0                                      | 99                                |
| Hispanic <sup>1</sup>             | 92                                     | 355                                    | 108                                    | 346                                    | 3,494                                  | 3,491                                  | 344                                    | 8,628                             |
| Total Minority                    | 94                                     | 382                                    | 108                                    | 532                                    | 3,970                                  | 4,649                                  | 346                                    | 10,625                            |
| Percent Minority <sup>2</sup>     | 3.3                                    | 14.5                                   | 8.3                                    | 13.3                                   | 78.4                                   | 80.6                                   | 20.6                                   | 30.7 <sup>3</sup>                 |
| Low Income                        | 155                                    | 157                                    | 165                                    | 579                                    | 936                                    | 1,238                                  | 86                                     | 4,555                             |
| Percent Low Income                | 5.5                                    | 6.0                                    | 12.7                                   | 14.9                                   | 18.6                                   | 21.8                                   | 5.1                                    | 13.3 <sup>3</sup>                 |

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

Notes:

<sup>1</sup> Includes all Hispanic, regardless of race.

<sup>2</sup> Based on Federal Highway Administration definition of minority; does not include "Not Hispanic, two or more races."

<sup>3</sup> Based on identifying a minority or low-income population as 130 percent of the Custer and Dawson Counties average, thresholds for identifying minority or low-income populations were determined at 39.9 and 17.3 percent, respectively. Bold font denotes a value above the threshold identifying a minority (equal to or greater than 39.9 percent) or low-income population (equal to or greater than 17.3 percent).

**Table S-4 Median Family Incomes of Counties and Places in the Study Area**

| <b>Place</b>      | <b>2022 Dollars</b> |
|-------------------|---------------------|
| 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)

**Table S-5 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                   |
| 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)

### Alternative Plans Considered:

Alternative 1 – No Action/FWOFI (Future Without Federal Investment). Alternative would result in no federal assistance and no further action would be initiated by the Sponsor.

The Preferred Alternative, Channel Conveyance, includes a combination of channel improvements and associated flood protection berms and diversion channels, as necessary. Channel conveyance measures were considered to address the purpose and need for flood damage reduction in the developed areas of Cozad and Lexington. 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. Two independent alternatives would address areas northeast and southwest of Lexington.

Other alternatives considered but ultimately eliminated included on-channel storage, existing off-channel storage, new off-channel storage, levee systems, floodplain connectivity, physical non-structural measures, non-physical non-structural measures, and agricultural best management practices (conservation measures).

**Table S-6 Relevant Resource Concerns and Impacts of the Preferred Alternative**

| Resource Concern                   | Impacts/Effects                                                                                                                                                          |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Geology                            | No impact                                                                                                                                                                |
| Erosion                            | Minor beneficial effects on streambank erosion.                                                                                                                          |
| Sedimentation                      | Negligible, temporary impacts due to construction.                                                                                                                       |
| Prime and Unique Farmland          | 257 acres of impact to prime farmland. Given quantity of prime farmland in study area, minor effect anticipated.                                                         |
| Surface Water Quality and Quantity | Negligible impacts. No existing reports or total maximum daily loads related to the area of interest. Permanent, beneficial impacts on surface water paths and drainage. |
| Ground Water Quality and Quantity  | Negligible impacts                                                                                                                                                       |
| Wetlands and other Waters          | Approximately 0.45 acre of permanent wetlands and other waters impacts and 22.50 acres of temporary impacts associated with construction.                                |

| Resource Concern                                    | Impacts/Effects                                                                                                                                                                                                                                          |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Regional Water Management Plans and Agency Programs | No effect                                                                                                                                                                                                                                                |
| Floodplain Management                               | 194.3 acres of impact to the 100-year floodplain. A Conditional Letter of Map Revision (CLOMR) from FEMA may be required.                                                                                                                                |
| Endangered and Threatened Species                   | Per consultation with USFWS/NGPC, may affect, not likely to adversely affect with the implementation of conservation measures.                                                                                                                           |
| Invasive Species                                    | No effect                                                                                                                                                                                                                                                |
| Riparian Areas                                      | Minor effect due to tree removal                                                                                                                                                                                                                         |
| Fish and Wildlife Habitat                           | Minor effect due to tree removal. No significant effect on aquatic habitat.                                                                                                                                                                              |
| Migratory Birds                                     | Per coordination with USFWS/NGPC, adversely effects have been avoided and minimized where necessary.                                                                                                                                                     |
| Bald and Golden Eagles                              | Per coordination with USFWS/NGPC, adverse effects avoided and minimized where necessary.                                                                                                                                                                 |
| Flood Damages                                       | Beneficial effects by reducing likelihood of flood damage events.                                                                                                                                                                                        |
| Cultural Resources and Historic Properties          | May be adverse effects to historic properties. Additional cultural resource investigations are needed prior to implementation. NRCS executed a Programmatic Agreement with consulting parties to allow for phased identification of historic properties. |
| Local and Regional Economy                          | Beneficial effect since reducing the potential for flooding would support local and regional economies.                                                                                                                                                  |
| Public Health and Safety                            | Beneficial effect by increasing access to public health and safety resources and increased mobility during flooding events.                                                                                                                              |
| Recreation                                          | No direct impact on recreational areas. Moderate, beneficial impact on recreation because flooding can limit recreational use of these parks and facilities.                                                                                             |
| Ecosystem Services                                  | See Table S-8                                                                                                                                                                                                                                            |

#### **Mitigation, Minimization, and Avoidance Measures:**

- Historic Properties: Investigate 50 acres for historic properties prior to construction. If historic properties are identified, the stipulations of the Programmatic Agreement (PA) and treatment plan would be followed during construction.
- Wetlands/Streams: Coordinate with USACE once final design is completed and Clean Water Act Section 404 permitting is initiated. Mitigation would be required for approximately 0.50 acre of permanent aquatic resource impacts.
- Woodlands: No mitigation measures required.

- Conservation conditions include construction timing and surveys to avoid adverse impacts to threatened and endangered species.
- Obtain a National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Construction Activity from Nebraska Department of Environment and Energy.
- Reseeding of grasses would occur in disturbed areas.

**Table S-7 Project Cost (Dollars)**

| Works of Improvement                                            | NRCS Percent | NRCS Cost    | Sponsor Percent | Sponsor Cost | Total Cost   |
|-----------------------------------------------------------------|--------------|--------------|-----------------|--------------|--------------|
| <b>Cost-Sharable Items<sup>1</sup></b>                          |              |              |                 |              |              |
| Channel Conveyance Construction Costs                           | 100%         | \$13,441,149 | 0%              | \$0          | \$13,441,149 |
| Relocation <sup>2</sup>                                         | 100%         | \$0          | 0%              | \$0          | \$0          |
| <b>Subtotal: Cost-Sharable Costs</b>                            |              | \$13,441,149 | 0%              | \$0          | \$13,441,149 |
| <b>Non-Cost-Sharable Items<sup>3</sup></b>                      |              |              |                 |              |              |
| NRCS Technical Assistance/Engineering                           | 100%         | \$4,618,710  | NA              | \$0          | \$4,618,710  |
| Project Administration <sup>4</sup>                             | 100%         | \$2,062,307  | 100%            | \$2,234,166  | \$4,296,474  |
| Federal, State, and Local Permits                               | NA           | \$0          | 100%            | \$2,148,237  | \$2,148,237  |
| Real Property Rights <sup>5</sup>                               | NA           | \$0          | 100%            | \$31,832,836 | \$31,832,836 |
| Real Estate Appraisal Fees, Legal Fees, Survey Costs            | N/A          | \$0          | 100%            | \$230,925    | \$230,925    |
| Relocation, beyond required decent, safe, sanitary <sup>6</sup> | NA           | \$0          | 100%            | \$0          | \$0          |
| <b>Subtotal: Non-Cost-Share Costs</b>                           |              | \$6,681,017  |                 | \$36,446,164 | \$43,127,181 |
| <b>Total:</b>                                                   |              | \$20,122,166 |                 | \$36,446,164 | \$56,568,330 |

**Notes:**

- 1/ The cost-share rate is the percentage of the average cost of installing the practice in the selected plan for the evaluation unit. During project implementation, the actual cost-share rate must not exceed the rate of assistance for similar practices and measures under existing national programs.
- 2/ Investigation of the watershed project area indicates that no displacements will be involved under present conditions. However, in the event that displacement becomes necessary at a later date, the cost of relocation assistance and payments will be cost-shared in accordance with the associated authorized purpose of 100% for flood damage reduction.
- 3/ If actual non-cost-sharable item expenditures vary from these figures, the responsible party will bear the change.
- 4/ The sponsors and NRCS will each bear the costs of project administration that each incurs. Sponsor costs for project administration include relocation assistance advisory service.
- 5/ The sponsors will acquire with other than Watershed Protection and Flood Prevention Act funds, such real property will be needed in connection with the works of improvement. Costs displayed include construction costs associated with public infrastructure improvements.
- 6/ Relocation payments for the cost of improvements beyond decent, safe, and sanitary requirements is a non-project cost ineligible for assistance under the act.

**Average Annual Costs:** The total annual average cost is \$2,086,330 that includes average annual operation, maintenance, and replacement costs of \$429,647.

**Project Benefits:** The planning policy employed for this plan/environmental document (Principles, Requirements, and Guidelines [PR&G]) states that Federal investments in water resources should aim to maximize public benefits, with appropriate consideration of costs. Public benefits (i.e., positive ecosystem services) encompass environmental, economic, and

social goals, including monetary and non-monetary benefits, and allow for the consideration of both quantified and unquantified measures.

Direct beneficiaries of the project are the population at reduced risk from flooding in Cozad and Lexington. This amounts to approximately 1,303 residential structures in Cozad and 712 residential structures in Lexington. Offsite beneficiaries include people who use roads that are protected from flooding by the project. Based on Nebraska Department of Transportation figures available for U.S. Highway 30 in the area, this could include as many as 4,000 vehicles per day (NDOT 2024). Other beneficial effects include providing improvements to the existing drainageways by increased capacity and generating more stable slopes for reduced bank erosion. The project would have a permanent benefit by reducing flash flooding risk.

**Damage Reduction Benefits:**

- Agricultural: \$2,930,831
- Non-agricultural (Structures): \$0
- Total Average Annual Cost: \$2,086,330
- Benefit to Cost Ratio: 1.40

**Period of Analysis:** 104 years (4-year installation period and 100-year project life)

**Funding Schedule:**

- Year 1 (35%)
  - PL 83-566 – \$7,123,582
  - Sponsor – \$12,675,334
  - Total – \$19,798,916
- Year 2 (25%)
  - PL 83-566 – \$5,088,272
  - Sponsor – \$9,053,810
  - Total – \$14,142,082
- Year 3 (25%)
  - PL 83-566 – \$5,088,272
  - Sponsor – \$9,053,810
  - Total – \$14,142,082
- Year 4 (15%)
  - PL 83-566 – \$3,052,964
  - Sponsor – \$5,432,286
  - Total – \$8,485,250

**Table S-8 Environmental Effects/Impacts and Ecosystem Services Trade-offs (positive impacts (+), negative impacts (-), and intensity of impact (e.g. number of symbols))**

| Ecosystem Service Trade-Offs | Item or Concern                         | Alt 1 – FWOFI/No Action | Preferred Alternative                    |
|------------------------------|-----------------------------------------|-------------------------|------------------------------------------|
| Provisioning                 | Soils Resources, Erosion, Sedimentation | No change               | Minor benefits to streambank erosion (+) |

| <b>Ecosystem Service Trade-Offs</b> | <b>Item or Concern</b>                     | <b>Alt 1 – FWOI/No Action</b>                                               | <b>Preferred Alternative</b>                  |
|-------------------------------------|--------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------|
| Provisioning                        | Prime and Unique Farmland                  | No change                                                                   | Conversion of prime and unique farmland (--)  |
| Regulating                          | Floodplain Management                      | No flood control benefits (- - -)                                           | Improved flood control benefits (+++)         |
| Regulating/Cultural                 | Regional Water Resource Plans              | No flood control benefits to broader watershed flood control system (- - -) | Improved flood control benefits (+++)         |
| Supporting                          | Surface and Groundwater                    | No change                                                                   | No change                                     |
| Supporting                          | Wetlands and Waters of U.S.                | No change                                                                   | Loss of aquatic resources (-)                 |
| Regulating                          | Water Quality                              | No change                                                                   | Maintain water quality benefits (+)           |
| Supporting                          | Vegetation Communities and Habitat         | No change                                                                   | Minor conversion of grassland (-)             |
| Regulating                          | Wetlands                                   | No change                                                                   | Minor conversion (-)                          |
| Regulating                          | Riparian Areas                             | No change                                                                   | Minor conversion (-)                          |
| Cultural                            | Federal and State Listed Species – Plants  | No change                                                                   | No change                                     |
| Supporting                          | Invasive Species                           | No change                                                                   | No change                                     |
| Regulating                          | Fish and Wildlife Species                  | No change                                                                   | Minor increase in aquatic habitat quality (+) |
| Regulating                          | Migratory Birds and Eagles                 | No change                                                                   | No change                                     |
| Cultural                            | Federal and State Listed Species – Animals | No change                                                                   | No change                                     |
| Cultural                            | Fish and Wildlife Conservation Act         | No change                                                                   | Minor conversion (-)                          |
| Cultural                            | Cultural/Historical Resources              | No change                                                                   | No change                                     |
| Cultural                            | Natural Areas and Parklands                | Loss of recreational habitat (- -)                                          | Maintain recreational use (+)                 |
| Regulating                          | Public Health and Safety                   | Public safety threats downstream and along the roadway (- - -)              | Improve public safety (+++)                   |
| Regulating                          | Transportation/Infrastructure              | No transportation access and loss of infrastructure (- - -)                 | Maintain access (++)                          |

**Major Conclusions:** Implementation of this Plan would result in no significant negative impacts to the environment after mitigation actions have been implemented. The preferred alternative has the greatest benefit to cost ratio, would provide flood damage reduction within the watershed, and achieves the federal objectives and meets the guiding principles.

**Areas of Controversy and Issues to be Resolved:** The planning process included public meetings, coordination with interested agencies and groups, and printed public information to raise issues, resolve conflicts, and recommend the most desirable plan features. No significant unresolved controversy remains.

**Evidence of Unusual Congressional or Local Interest:** There was no evidence of unusual congressional or local interest in this project.



Is this report in compliance with executive orders, public laws, and other statutes governing the formulation of water resource projects?      Yes ☒      No ☐

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Appendix E. Other Supporting Information  
Appendix F. Environmental Assessment



# 1 Changes Requiring the Preparation of a Supplemental Watershed Plan

As the lead federal agency, the United States Department of Agriculture-Natural Resources Conservation Service (NRCS), along with the Sponsoring Local Organizations (SLOs) (Central Platte Natural Resources District; Dawson County; City of Lexington), are proposing to provide additional flood prevention measures in the Spring Creek Watershed. This Supplemental Watershed Plan No. 3 and Environmental Assessment (Plan-EA) for the Spring Creek Watershed Improvement Project (Project) addresses the changed conditions within the Spring Creek Watershed and the proposed measures to address these changes.

Federal funding for the Project is being authorized through the Watershed and Flood Prevention Operations Program, which helps urban and rural communities protect, improve, and develop land resources in watersheds up to 250,000 acres in size. This Plan-EA was prepared by NRCS to comply with the requirements of the National Environmental Policy Act (NEPA) of 1969; the Principles and Requirements for Federal Investments in Water Resources (2013) established pursuant to the Water Resources Development Act of 2007 (P.L. 110-114); and NRCS policy and guidelines. The format of this document follows the plan format outline that must be followed for Supplemental Watershed Project Plans as outlined in the NRCS National Watershed Program Manual (NWPM) Parts 500 through 506 (NRCS 2015), and as guided by the NRCS National Watershed Program Handbook (NWPH), Parts 600 through 606 (NRCS 2014). The Plan-EA assists NRCS in determining if the selected alternative would have a significant impact on the quality of the environment and if preparation of an Environmental Impact Statement is required.

## 1.1 Project Background

The lower portion of the Spring Creek Watershed has a demonstrated history of flooding concerns. Officials in Custer and Dawson County, where the study area is located, obtained anecdotal information about historical flood events (Pepplitsch 2020). Based on these accounts, the following provides a general time frame for flood events in the watershed project area: 1947, 2008, and March and July 2019. In response, a number of studies and plans discussed below have been completed.

A Watershed Work Plan for Watershed and Flood Prevention was developed and authorized by NRCS (known as the Soil Conservation Service [SCS] when the plan was developed) in 1965 for the Spring Creek Subwatershed under the Public Law 566 Program. Eleven dams, 33.7 miles of channel improvement, and 1.8 miles of dike were proposed (SCS 1965). Ultimately, no structures from the original plan were built.

A Supplemental Watershed Work Plan for Watershed and Flood Prevention was developed and authorized by NRCS (known as SCS when the plan was developed) in 1978 for the Spring Creek Watershed under the Public Law 566 Program. This supplemental work plan eliminated channel improvements, the dike, and six dams. These six eliminated sites were replaced with a

single dam, creating a revised plan with six dams (SCS 1978). The final six dams constructed are 9A, 9B, 11A, 18A, 19B (replacement structure), and 25A.

In 1980, a Project Application and Feasibility Report was submitted to SCS to address flood control in Lexington and agricultural land along Spring Creek (Schemmer 1980). With assistance from SCS, channel improvements were constructed from County Road 431 (Airport Road) to County Road 445 because of this report.

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 would not have included any channelization work (Mintken 2020).

In July 2019, the CPNRD requested assistance from the USDA NRCS under the Watershed and Flood Prevention Operations program to develop a watershed plan for the Spring and Buffalo Creeks Watersheds. CPNRD is one of 23 Natural Resource Districts (NRD) in Nebraska organized under state law to conserve and protect the state's natural resources. The NRDs are locally controlled, tax-funded, and watershed-based entities that were created to solve flood control, soil erosion, irrigation run-off, and groundwater quantity and quality issues. State law provides the NRDs with authority to conduct, operate, and maintain works of improvement related to flood control and soil erosion, making the CPNRD an eligible sponsor as defined in Section 2 of P.L. 83-566.

The project area, as presented in the July 2019 application, contained a total of 266,870 acres and encompassed the Spring and Buffalo Creeks Watersheds. After project initialization, the contributing drainage area, identified through 1-meter-resolution LiDAR terrain data and preliminary hydrologic/hydraulic modeling, was analyzed. Based on this analysis, the study area was found to be 354,658 acres, exceeding the Watershed and Flood Prevention Operations program's 250,000-acre limit. The Spring and Buffalo Creeks Watersheds were divided into two separate project areas and analyzed separately. This supplemental plan-environmental assessment evaluates alternatives and solutions for the Spring Creek Watershed (see Appendix B).

The study area consists of the Spring Creek Watershed. The purpose and need for the Proposed Action and range of alternatives will be identified and evaluated using this study area. The Spring Creek project area includes the Spring Creek Watershed; the Upper, Lower, and West Stump Creek Watersheds; and additional contributing drainage areas west of Cozad along U.S. Highway 30. Concentrated areas of development include the cities of Lexington and Cozad (see Figure 1-2).

The Spring Creek Watershed Supplemental Plan and Environmental Assessment (Plan-EA) has been prepared under the authority of the Watershed Protection and Flood Prevention Act of 1954 (Public Law 83-566) and in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended (42 United States Code [U.S.C.] 43221 et seq.). This Plan-EA will address the Flood Prevention (Flood Damage Reduction) purpose listed in Title 390, National Watershed Program Manual, Part 500, Subpart A, 500.3.

### **1.1.1 Current Flood Risk**

#### **Regulatory Floodplain Areas**

The Federal Emergency Management Agency (FEMA) published a Flood Insurance Study (FIS) and corresponding Flood Insurance Rate Map for Custer and Dawson County in 2011 (FEMA 2011). This study establishes special flood hazard areas associated with the base flood (see Figure 1-3). The base flood is the 1 percent annual chance flood event, meaning the event has a 1 percent probability of occurring in any given year. The base flood is commonly referred to as the 100-year flood. A total of approximately 9,668 acres within the project area are in the regulatory 100-year floodplain (see Figure 1-3). These floodplain areas are used to manage development in flood prone areas and identify which properties are required to purchase flood insurance.

The FIS documents approximate and detail studies that have been performed for flooding sources. In Dawson County, detailed studies have been performed for portions of the North Channel Platte River, Platte River, and Spring Creek. Approximate studies were performed for streams having a drainage area of 1 square mile or greater. Because of the complexity of irrigation and drainage systems in the area, these streams do not include all waterways.

#### **Modeling Effort**

In support of the watershed plan development, hydrologic and hydraulic modeling was performed to further understand drainage patterns in the study area. The shallow topographic relief and complex drainage patterns between the foothills and the Interstate 80 corridor adjacent to the Platte River in the lower portion of the study area required modeling effort to utilize excess rainfall for multiple storm events, including the 10-year and 100-year events. This approach provides additional insight into the current flood risks because (1) the FIS does not include all waterways, and (2) in some cases, flooding does not follow natural drainage patterns. Areas of flood inundation identified by the modeling effort are shown in Figure 1-4 and Figure 1-5.

### **1.1.2 Flood Damages**

The March and July 2019 flood events provide examples of the flood-related damages that can be expected from flood events in the watershed project area. In March 2019, flooding from the statewide bomb cyclone impacted Cozad and Lexington in the Spring Creek Watershed project area as the creeks and rivers became swollen during the rain-on-ice conditions.

Dawson County experienced severe flooding beginning July 8, 2019, which continued for 13 days. The Lexington Municipal Airport reported 5.47 inches of rainfall, and Cozad reported between 3.8 and 4 inches. Not including the monetary damages to agricultural land, this flood event caused severe damage to public and private property, disrupted utility services, and endangered the health and safety of Dawson County citizens (Lexington Clipper-Herald 2019).

After a federal disaster declaration (March 12 to July 15, 2019), Dawson County applied for FEMA and Nebraska Emergency Management Agency (NEMA) funding assistance. Dawson



County reported approximately \$433,000 in 2019 flood damages to NEMA that were related to damages that occurred at more than 270 roadway culverts (FEMA Damage Inventory 2019).

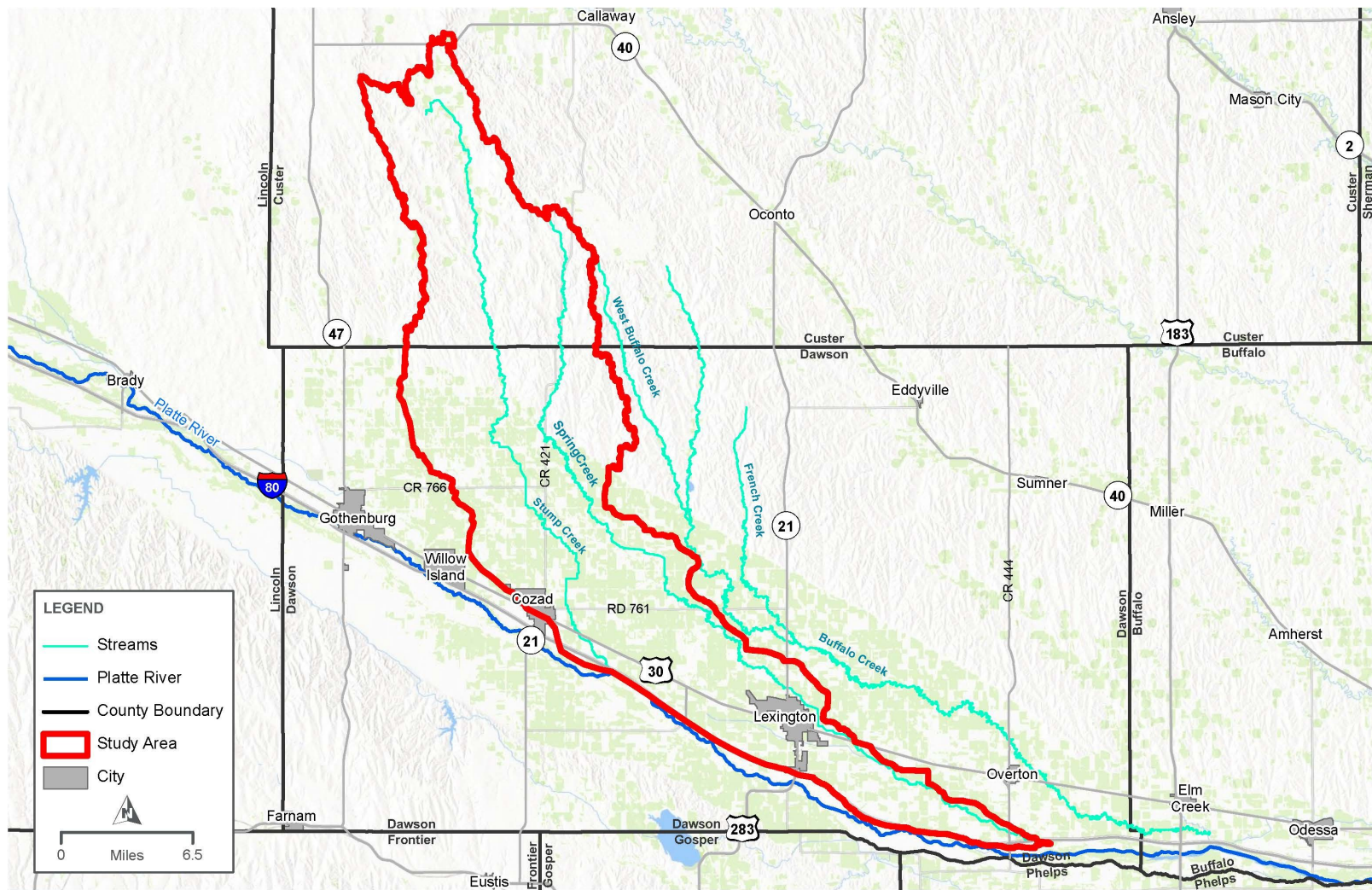
In addition to these large events, smaller but more frequent precipitation events create flood damage and local roadway closures in Cozad and Lexington. Modeling was performed to approximate flood inundation for these events (see Appendix D). Figure 1-4 and Figure 1-5 show areas inundated by the smaller but more frequent precipitation events (the 5-year, 10-year, and 25-year events). Modeling was also performed to show the flood inundation area associated with the 100- and 500-year events (see Appendix C).

Lexington routinely experiences flood damages at regular locations. Figure 1-6 shows common flooding locations that result in property and infrastructure damage in the city (Pepplitsch 2020).

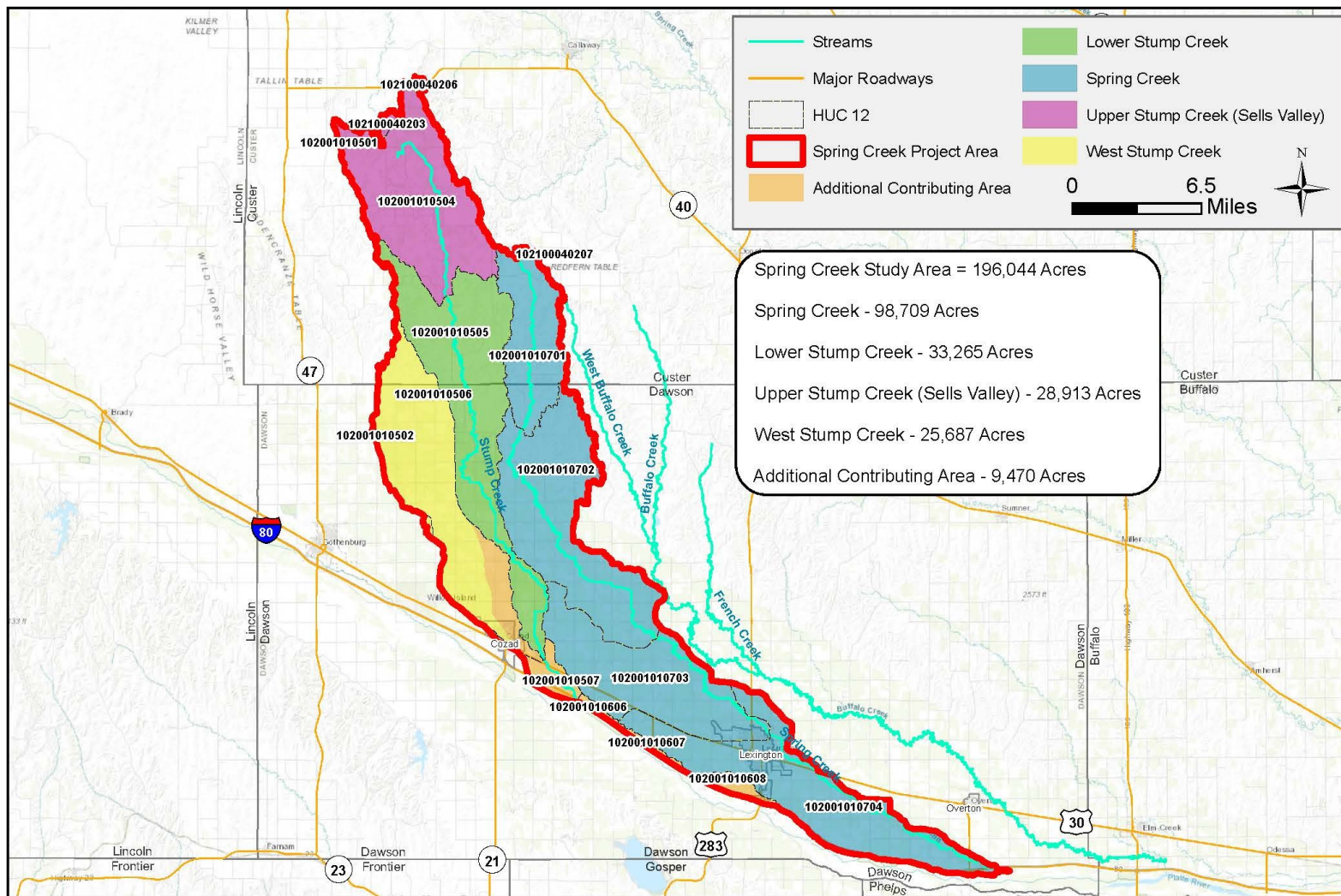
Dawson County roads experienced significant damage throughout the watershed project area. A total of 160 sites were reported with some level of flood-related damage (see Figure 1-7).

Modeled flood inundation areas associated with the 100- and 500-year events for Cozad and Lexington areas are provided in Appendix C, Figures 1-8, 1-9, 1-10, and 1-11.



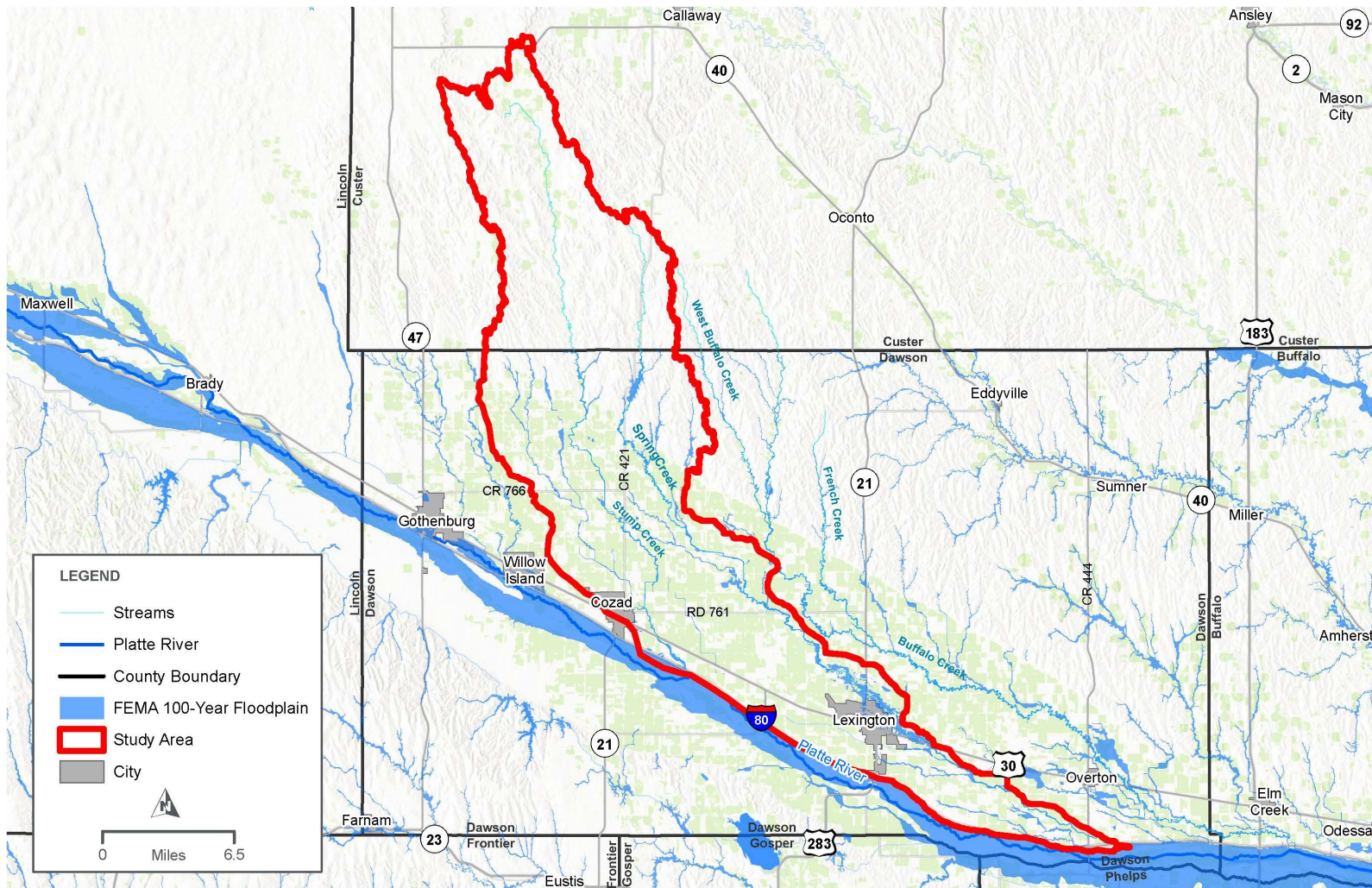


**Figure 1-1. Study area**



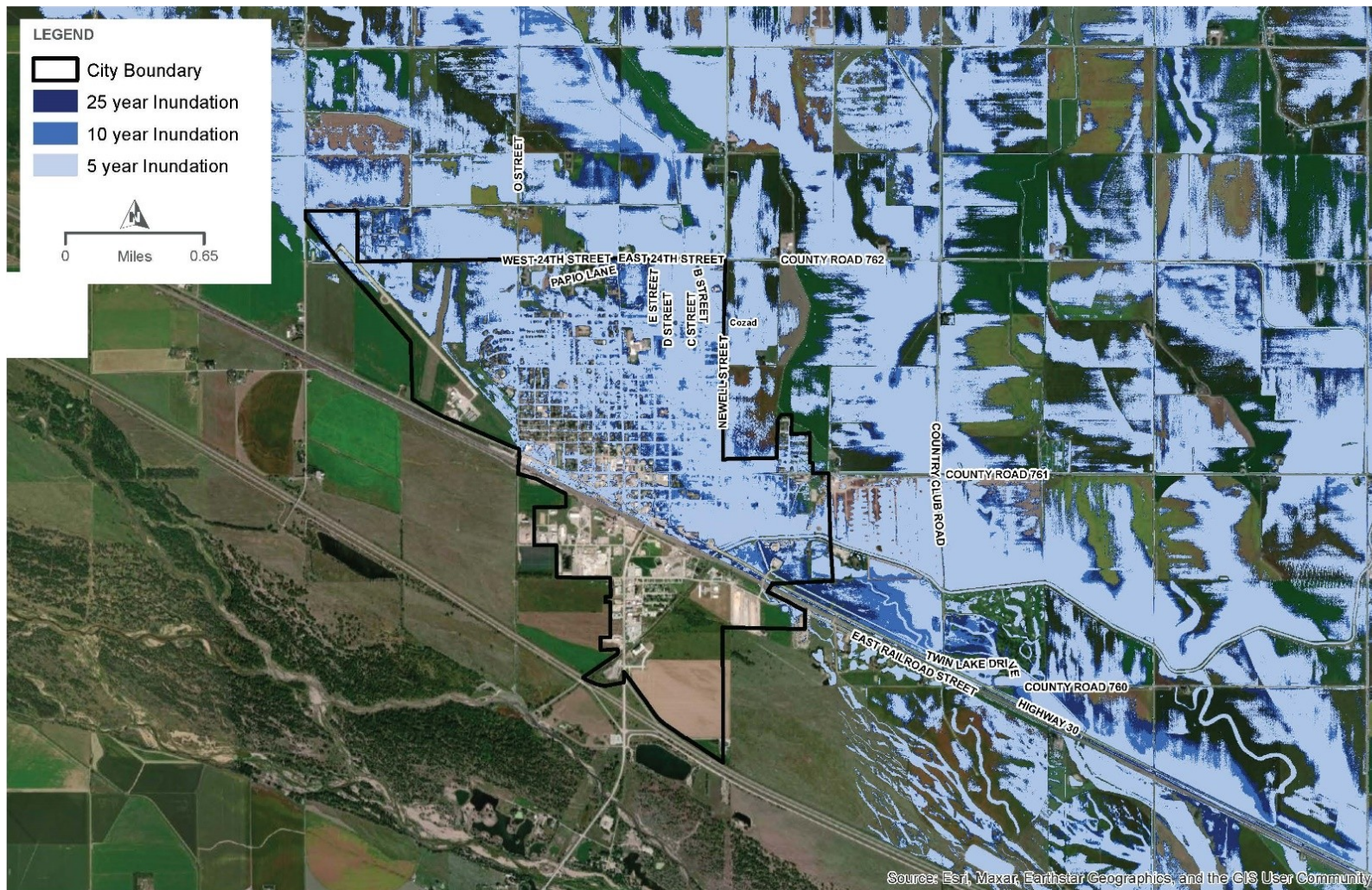
**Figure 1-2. Project area**





**Figure 1-3. FEMA 100-year floodplain**





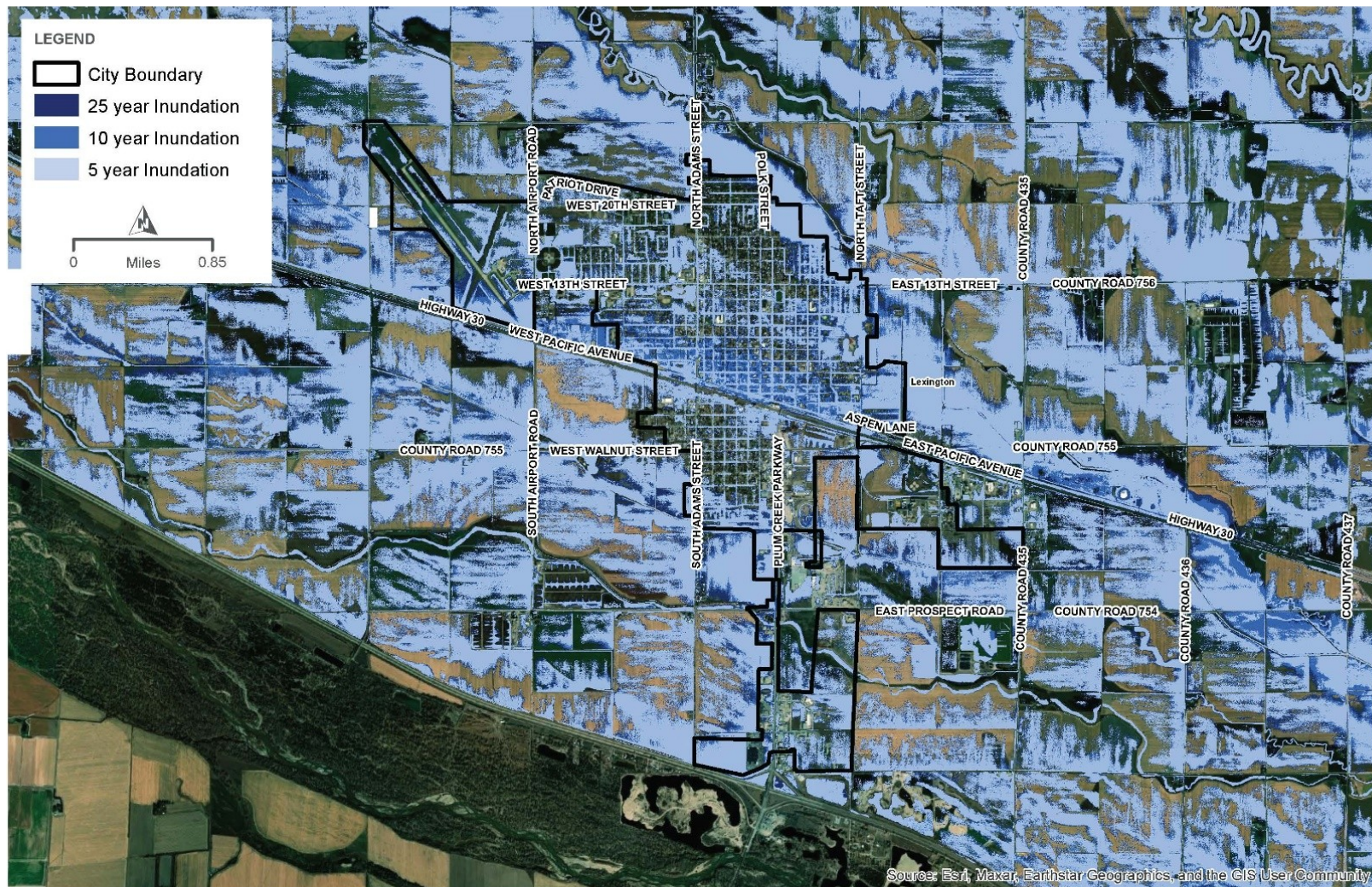
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

**COZAD INUNDATION AREAS MODEL RESULTS**  
**SPRING CREEK WATERSHED PLAN-EA**

**FIGURE 1-4**

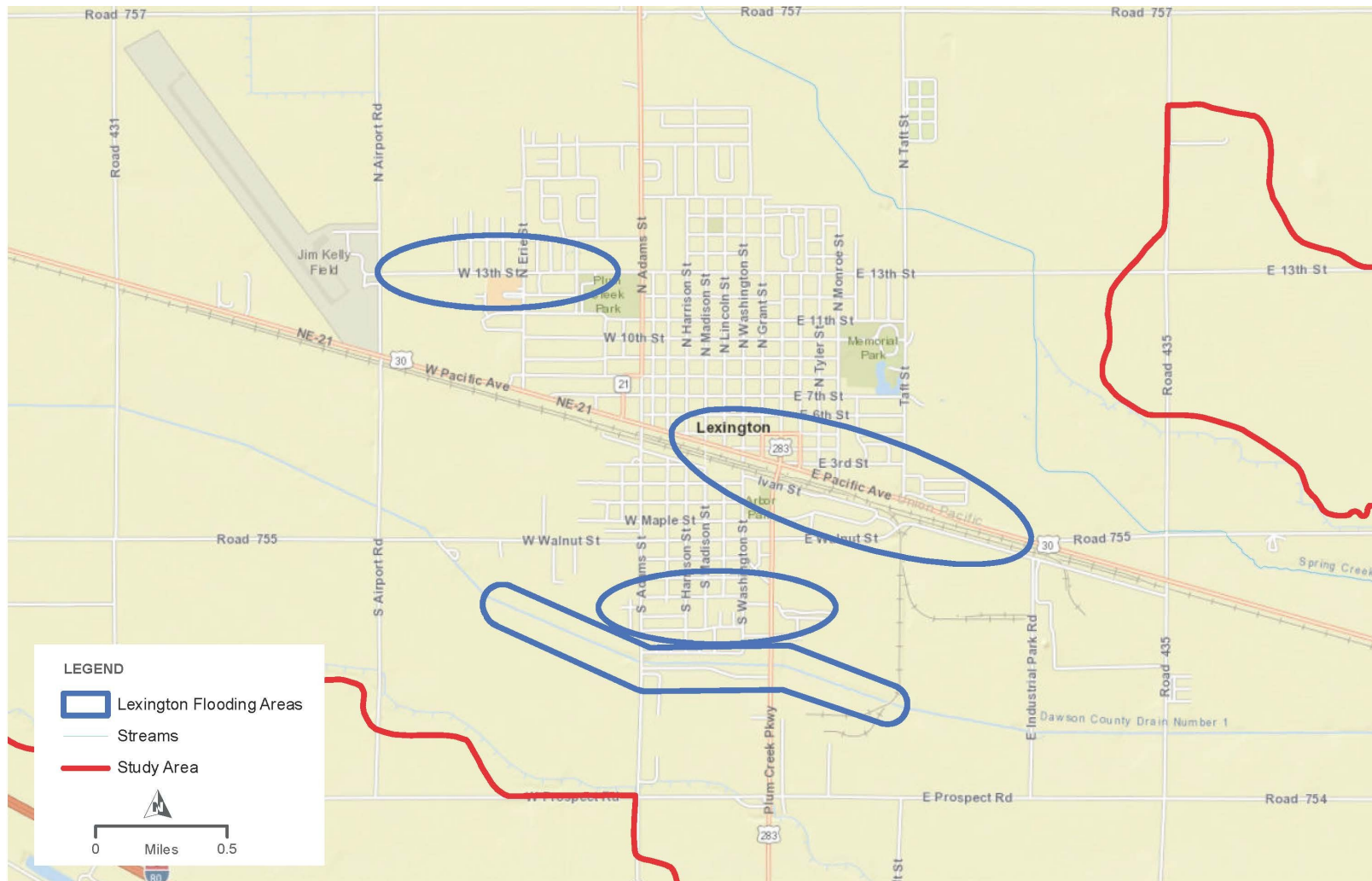
**Figure 1-4. Model results for Cozad inundation areas**





**Figure 1-5. Model results for Lexington inundation areas.**



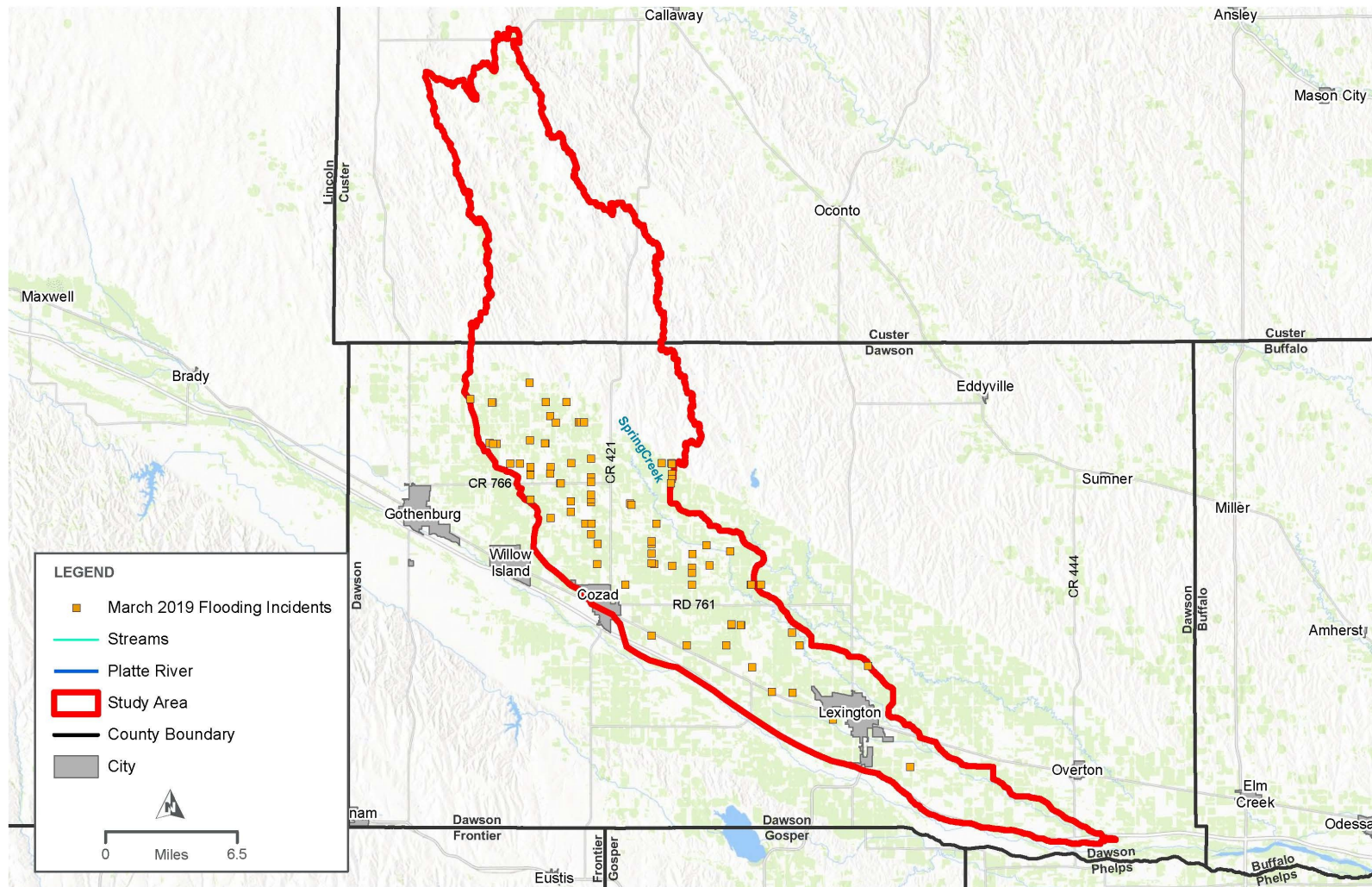


**COMMON FLOODING AREAS - CITY OF LEXINGTON**

SPRING CREEK WATERSHED PLAN-EA

FIGURE 1-6

**Figure 1-6. Common flooding areas – Lexington**



**Figure 1-7. 2019 Flood-related County Road damage.**



## 2 Purpose and Need for Action

### 2.1 Purpose and Need

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

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.



**Figure 2-1. Flooding in Lexington**

Source: KRVN Radio, Lexington, Nebraska. July 8-12, 2019

## **2.2 Problems and Opportunities**

### **2.2.1 Problems**

The problems identified include, but are not limited to:

- Inadequate flood damage protection to private and public infrastructure in rural communities,
- Increased travel time due to roadway detours during flooding,
- Increased risk to human health and public safety due to flooded roads,
- Loss of services, including water, wastewater, electricity, natural gas, and telecommunications.

### **2.2.2 Opportunities**

There are several opportunities to consider in the project area associated with the development and implementation of this project. These opportunities include:

- Providing reliable flood damage reduction to private and public infrastructure in rural communities;
- Decreasing travel time and accessibility issues during flooding events;
- Maintaining services to utilities and infrastructure (water, wastewater, electricity, natural gas, and telecommunications) during flooding events;
- Improving stream and aquatic habitat.

## **2.3 Objectives and Constraints**

This study has two sets of objectives: The Federal Objective, which every NRCS planning study shares, and the project objectives, which are developed on a per-project basis and detailed below.

### **2.3.1 Federal Objective and Guiding Principles**

To meet NRCS requirements for federal investment in a water resources project, the project must meet the Federal Objective set forth in the Water Resources Development Act of 2007 and promote the guiding principles as stated in the Principles, Requirements, and Guidelines (PR&G) for water and land related resources implementation studies and federal water resource investments. The Federal Objective specifies that federal water resources investments shall reflect national priorities, encourage economic development, and protect the environment by:



1. seeking to maximize sustainable economic development;
2. seeking to avoid the unwise use of floodplains and flood-prone areas, and minimizing adverse impacts and vulnerabilities in any case in which a floodplain or flood-prone area must be used;
3. protecting and restoring the functions of natural systems and mitigating any unavoidable damage to natural systems.

Additionally, the project should seek to achieve the guiding principles identified by the federal government: healthy and resilient ecosystems, sustainable economic development, floodplain risk management, public safety, and watershed approach.

### **2.3.2 Project Objectives**

Project objectives were developed to address the problems and realize opportunities in the watershed. In coordination with the public and stakeholder agencies, NRCS and the sponsors established the following objectives for this project:

- Address damage reduction related to flood damage associated with public and private infrastructure in urban areas and public roadways.
- Reduce flooding and associated damages in agricultural areas.
- Maintain access to emergency services and emergency service providers during flooding.
- Identify improvements to drainage structures to increase conveyance and reduce overtopping.

### **2.3.3 Constraint Considerations**

Constraints in addressing flood damage reduction in the study area include the following:

- Lack of topographic relief.
- Drainage patterns influenced by features such as roadways, railroads, irrigation canals, and laterals.
- Localized drainage in Lexington that is restricted from entering Spring Creek.
- Identification of measures that are appropriate in scale relative to the magnitude of public and private infrastructure damages.
- Availability of data related to location and extent of flood damages on agricultural land.
- Land use and dispersal of residential housing outside city centers.
- Lack of riparian buffers along major streams.

### 3 Scope of the Environmental Assessment

The scope of the environmental assessment is based on identification and the re-evaluation of resources and potential concerns discovered during scoping by NRCS, CPNRD (the Sponsor), and interested agencies and individuals. This chapter identifies the resources of concern deemed relevant to decision-making and resources that were considered but not studied in detail.

A coordination meeting was held with the Sponsor and NRCS on June 17 and again on September 11, 2020, to discuss problems and opportunities in the watershed and identify potential resource concerns. On October 29, 2020, project information and a map showing the project area were distributed to agencies and tribes with potential interest in the project. An online public scoping meeting was available from October 28, 2020, to December 12, 2020, where additional information was provided and additional scoping comments were received. Further information about public participation is included in Chapter 8.

As discussed in Chapter 2, the PR&G require alternatives to be evaluated through an ecosystem services framework. Ecosystem services are the benefits (both tangible and intangible) that natural ecosystems provide to humans. There are four broad categories of ecosystem services:

- **Provisioning:** Benefits to people that can be extracted from nature, such as food, drinking water, timber, gas, oils, medicine, etc.
- **Regulating:** Benefits provided by ecosystem processes that moderate natural phenomena, such as air quality, water quality, erosion prevention, flood control, pollination, climate regulation, etc.
- **Cultural:** Non-material benefits that contribute to the development and cultural advancement of people. Cultural services make the world a place in which people want to live and address people's basic needs for a good, fulfilling life, such as aesthetics, recreation, tourism, spirituality, etc.
- **Supporting:** Benefits provided by underlying natural processes, such as photosynthesis, nutrient cycling, soil formation, water cycling, etc.

An ecosystem services framework provides for an integrated approach that allows consideration and transparent evaluation of the benefits and trade-offs of potential alternatives. Ecosystem service flows can be expressed in both monetary and non-monetary metrics, which are then used to describe the magnitude of changes from each alternative. These metrics are developed based on each service evaluated in terms that are unique and appropriate to the watershed area and alternatives analysis. Appropriate metrics should be based on current methodology to quantify impacted services over time and project- and region-specific information and values. The primary services impacted by flood mitigation projects are regulating and cultural. Supporting services, such as nutrient cycling, underlie all regulating and provisioning services.

A summary of scoping is provided in Table 3-1, which identifies resources relevant to the project and those not studied further in this Plan-EA.

**Table 3-1. Summary of Scoping**

| Item/Concern                                                            | Relevant to Proposed Action? (Yes or No)        | Rationale                                                                                                                                                                                                                      |
|-------------------------------------------------------------------------|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Soil-Related Concerns</b>                                            | <b>Relevant to Proposed Action? (Yes or No)</b> | <b>Rationale</b>                                                                                                                                                                                                               |
| Geology                                                                 | Yes                                             | Geological conditions may impact design alternatives.                                                                                                                                                                          |
| Erosion                                                                 | Yes                                             | The watershed has continued stream bank erosion from heavy flow events. Proposed alternatives may reduce stream bank erosion, storm runoff, and sedimentation of downstream areas.                                             |
| Sedimentation                                                           | Yes                                             | The watershed has continued sedimentation from upstream heavy flow events. Proposed alternatives may reduce stream bank erosion, storm runoff, and sedimentation of downstream areas.                                          |
| Prime and Unique Farmland and Farmland of Statewide or Local Importance | Yes                                             | Proposed alternatives have the potential to affect prime farmland.                                                                                                                                                             |
| <b>Water-Related Concerns</b>                                           | <b>Relevant to Proposed Action? (Yes or No)</b> | <b>Rationale</b>                                                                                                                                                                                                               |
| Surface Water Quality                                                   | Yes                                             | Proposed alternatives may reduce nutrients in agricultural runoff. Pollutants and sediment may be trapped in upland areas.                                                                                                     |
| Surface Water Quantity                                                  | Yes                                             | Proposed alternatives may affect the quantity of surface water in a given stream or floodplain. Surface and groundwater in the watershed are managed by NRDs and Nebraska Department of Water, Energy, and Environment (DWEE). |
| Ground Water Quality                                                    | Yes                                             | Proposed alternatives may affect the quality of groundwater.                                                                                                                                                                   |
| Ground Water Quantity                                                   | Yes                                             | Proposed alternatives may affect the quantity of groundwater.                                                                                                                                                                  |



| Item/Concern                                            | Relevant to Proposed Action? (Yes or No) | Rationale                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------------------------|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Waters of the U.S., Wetlands, and Special Aquatic Sites | Yes                                      | Addresses NRCS policy and Executive Order (EO) 11990, Protection of Wetlands. Historically, wetlands and other waters were filled to create additional farmland and for development. Waters of the U.S. are likely to be impacted in the project area. Screening will be required for Section 303(d), 401, 402, and 404 of the Clean Water Act (CWA) and Nebraska State Title 117 compliance. |
| Wild and Scenic Rivers                                  | No                                       | The watershed does not include any portion of a river designated as such (National Park Service 2025).                                                                                                                                                                                                                                                                                        |
| Regional Water Management Plans and Agency Programs     | Yes                                      | Watershed is located in the 2019 CPNRD and Nebraska Department of Natural Resources Integrated Management Plan.                                                                                                                                                                                                                                                                               |
| Floodplain Management                                   | Yes                                      | Proposed alternative actions are located in the 100-year floodplain.                                                                                                                                                                                                                                                                                                                          |
| Sole Source Aquifers                                    | No                                       | No sole source aquifers in the watershed (EPA 2025).                                                                                                                                                                                                                                                                                                                                          |
| Coral Reefs                                             | No                                       | No coral reefs occur in the watershed (U.S. Coral Reef Task Force Restoration Working Group 2023).                                                                                                                                                                                                                                                                                            |
| Coastal Zone Management                                 | No                                       | Proposed alternative actions do not intersect any coastal areas.                                                                                                                                                                                                                                                                                                                              |
| Air-Related Concerns                                    | Relevant to Proposed Action? (Yes or No) | Rationale                                                                                                                                                                                                                                                                                                                                                                                     |
| Air Quality                                             | Yes                                      | Proposed alternative actions are in attainment for air quality. Dust emissions during construction would be controlled. Open burning of cleared vegetation would not occur without approval from the county.                                                                                                                                                                                  |
| Plant- and Animal-Related Concerns                      | Relevant to Proposed Action? (Yes or No) | Rationale                                                                                                                                                                                                                                                                                                                                                                                     |
| Endangered and Threatened Species                       | Yes                                      | Proposed alternative actions have the potential to affect endangered and threatened species and their habitats in the watershed.                                                                                                                                                                                                                                                              |
| Essential Fish Habitat                                  | No                                       | No essential fish habitat occurs in the watershed (NOAA 2025b).                                                                                                                                                                                                                                                                                                                               |





| Item/Concern                               | Relevant to Proposed Action? (Yes or No) | Rationale                                                                                                                                                                                        |
|--------------------------------------------|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Invasive Species                           | Yes                                      | Invasive species occur in the watershed, and the proposed alternative actions have the potential to introduce invasive species.                                                                  |
| Natural Areas                              | No                                       | No natural areas in the watershed would be affected negatively.                                                                                                                                  |
| Riparian Areas                             | Yes                                      | Proposed alternative actions would occur in riparian areas.                                                                                                                                      |
| Fish and Wildlife Habitat                  | Yes                                      | Proposed alternative actions have the potential to affect fish and wildlife habitats in the watershed and is subject to the U.S. Fish and Wildlife Service's Fish and Wildlife Coordination Act. |
| Forest Resources                           | No                                       | No forested areas occur in the watershed.                                                                                                                                                        |
| Ecologically Critical Areas                | No                                       | No ecologically critical areas occur in the watershed.                                                                                                                                           |
| Forest Resources/Woodlands                 | No                                       | No forested areas occur in the watershed.                                                                                                                                                        |
| Migratory Birds                            | Yes                                      | Proposed alternative actions have the potential to affect migratory birds in the watershed.                                                                                                      |
| Bald and Golden Eagles                     | Yes                                      | Proposed alternative actions have the potential to affect bald or golden eagles in the watershed.                                                                                                |
| Human Use-Related Concerns                 | Relevant to Proposed Action? (Yes or No) | Rationale                                                                                                                                                                                        |
| Flood Damages                              | Yes                                      | Flood damage reduction is anticipated.                                                                                                                                                           |
| Cultural Resources and Historic Properties | Yes                                      | Archeological and historical resources have the potential to be affected by flood damage and the proposed alternative actions.                                                                   |
| Local and Regional Economy                 | Yes                                      | Proposed alternative actions have the potential for both negative and positive effects on the local and regional economies.                                                                      |
| Public Health and Safety                   | Yes                                      | The flooding conditions have the potential to affect public health and safety.                                                                                                                   |
| Social Issues                              | No                                       | No social issues are anticipated with the proposed alternative actions.                                                                                                                          |
| Scientific Resources                       | No                                       | Proposed alternative actions would not affect scientific resources as there have been none identified within the project area (see Appendix C Figure 2-1).                                       |



| Item/Concern             | Relevant to Proposed Action? (Yes or No) | Rationale                                                                                                                                |
|--------------------------|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Recreation and Parklands | Yes                                      | Proposed alternative actions have the potential to affect recreation in the watershed.                                                   |
| Scenic Beauty            | Yes                                      | There are viewsheds in the watershed that are representative of rural, agricultural landscapes.                                          |
| Land Use                 | Yes                                      | Land use impacts flooding characteristics and damages in the watershed.                                                                  |
| Ecosystem Services       | Relevant to Proposed Action? (Yes or No) | Rationale                                                                                                                                |
| Provisioning Services    | Yes                                      | The project area is agricultural, and food production activities may be affected by flooding and the proposed alternative actions.       |
| Regulating Services      | Yes                                      | The project area experiences flooding. Agricultural land, buildings, and residences may be affected by the proposed alternative actions. |
| Supporting Services      | Yes                                      | Supporting services may be affected by flooding and the proposed alternative actions.                                                    |
| Cultural Services        | Yes                                      | Cultural services may be affected by flooding and the proposed alternative actions.                                                      |

## 4 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. The Affected Environment provides the context for the formulation of alternatives (Chapter 5) and for the determination of tradeoffs among ecosystem services and impacts to the environment (Chapter 6) that will ultimately lead to the selection of a plan (Chapter 7). 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.

Overall, land use in the study area is greater than 95 percent agricultural, split between dry crops, irrigated crops, and rangeland (see Figure 4-1 and Chapter 4.12). Readily available aerial imagery indicates that land use has remained relatively unchanged in the study area since the mid-1980s. The developed centers in the study area include the cities of Lexington and Cozad, which are situated along the south boundary near Interstate 80 (I-80).

### 4.1 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.

#### 4.1.1 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, fluvial, 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).

#### **4.1.2 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 (see Figure 4-2). 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.

#### **4.1.3 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 4.1.2, 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.



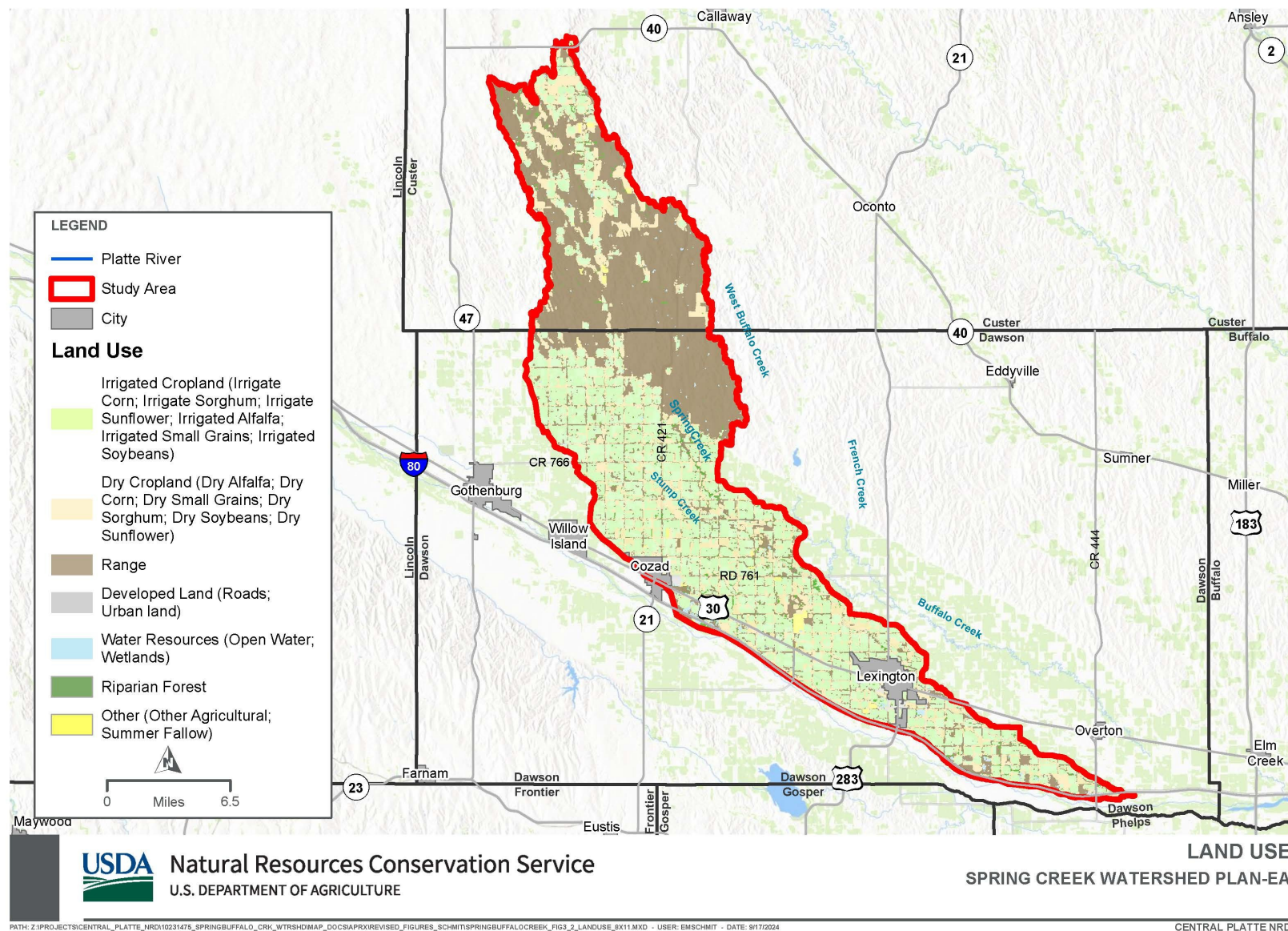


Figure 4-1. Land use

## 4.2 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. The soils are listed in Table 4-1 and shown in Figure 4-2. No farmland of statewide importance was documented.



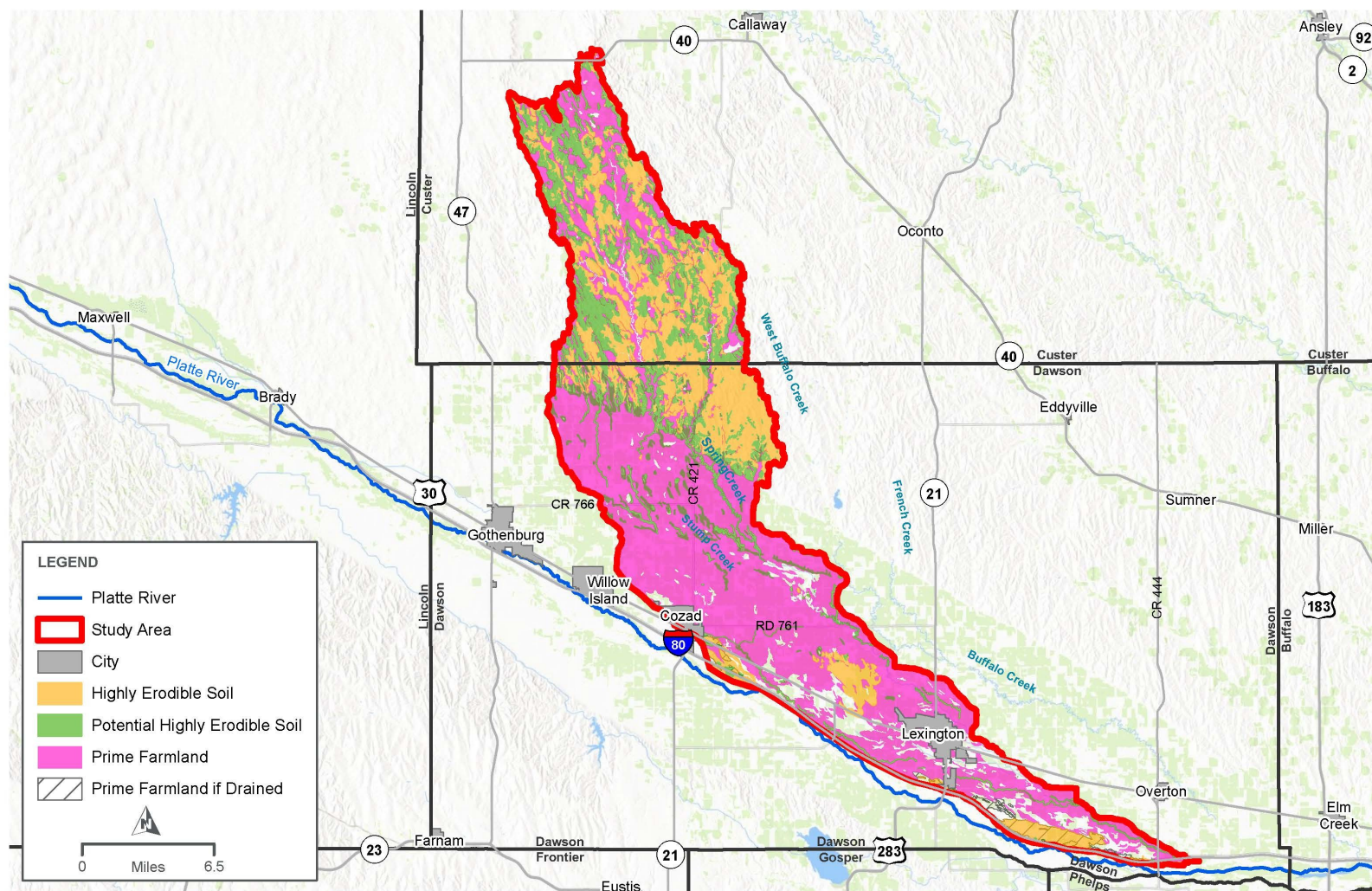


Figure 4-2. Soils

**Table 4-1. Prime and Unique Farmland in Spring Creek Watershed**

| Map Unit Symbol | Map Unit Name                                           | Rating                       | Study Area (acres) |
|-----------------|---------------------------------------------------------|------------------------------|--------------------|
| 2595            | Hersh fine sandy loam, 0 to 3 percent slopes            | All areas are prime farmland | 393.8              |
| 2596            | Hersh fine sandy loam, 3 to 6 percent slopes            | All areas are prime farmland | 496.0              |
| 2666            | Holdrege silt loam, 0 to 1 percent slopes, cool         | All areas are prime farmland | 95.5               |
| 2668            | Holdrege silt loam, 1 to 3 percent slopes               | All areas are prime farmland | 1,046.7            |
| 2670            | Holdrege silt loam, 3 to 7 percent slopes               | All areas are prime farmland | 1,058.2            |
| 2671            | Holdrege silt loam, 3 to 7 percent slopes, eroded       | All areas are prime farmland | 435.5              |
| 2672            | Holdrege silty clay loam, 3 to 7 percent slopes, eroded | All areas are prime farmland | 4,369.8            |
| 3562            | Hobbs silt loam, occasionally flooded, cool             | All areas are prime farmland | 3,390.7            |
| 3949            | Fillmore silt loam, drained, occasionally ponded        | All areas are prime farmland | 211.5              |
| 8402            | Alda loam, rarely flooded                               | Prime farmland if drained    | 150.8              |
| 8465            | Gibbon loam, rarely flooded                             | Prime farmland if drained    | 1,304.9            |
| 8502            | Lex loam, rarely flooded                                | Prime farmland if drained    | 2,802.7            |
| 8585            | Wann loam, rarely flooded                               | Prime farmland if drained    | 92.4               |
| 8810            | Cozad fine sandy loam, 0 to 1 percent slopes            | All areas are prime farmland | 5,034.8            |
| 8815            | Cozad silt loam, 0 to 1 percent slopes                  | All areas are prime farmland | 24,660.4           |
| 8816            | Cozad silt loam, 1 to 3 percent slopes                  | All areas are prime farmland | 8,778.8            |
| 8817            | Cozad silt loam, 3 to 6 percent slopes                  | All areas are prime farmland | 4,389.4            |
| 8821            | Cozad silty clay loam, 0 to 1 percent slopes            | All areas are prime farmland | 64.3               |
| 8827            | Cozad silt loam, wet substratum, 0 to 1 percent slopes  | All areas are prime farmland | 21.3               |
| 8828            | Cozad silt loam, wet substratum, 1 to 3 percent slopes  | All areas are prime farmland | 568.3              |
| 8830            | Gosper fine sandy loam, 0 to 1 percent slopes           | All areas are prime farmland | 177.6              |
| 8831            | Gosper loam, 0 to 1 percent slopes                      | All areas are prime farmland | 8,679.1            |
| 8840            | Hall silt loam, 0 to 1 percent slopes                   | All areas are prime farmland | 4,204.2            |
| 8841            | Hall silt loam, 1 to 3 percent slopes                   | All areas are prime farmland | 3,997.8            |



| Map Unit Symbol | Map Unit Name                                               | Rating                       | Study Area (acres) |
|-----------------|-------------------------------------------------------------|------------------------------|--------------------|
| 8846            | Hall silt loam, wet substratum, 0 to 1 percent slopes       | All areas are prime farmland | 1,216.9            |
| 8867            | Hord fine sandy loam, 1 to 3 percent slopes                 | All areas are prime farmland | 0                  |
| 8869            | Hord silt loam, 0 to 1 percent slopes                       | All areas are prime farmland | 20,411.4           |
| 8870            | Hord silt loam, 1 to 3 percent slopes                       | All areas are prime farmland | 3,758.6            |
| 8872            | Hord silt loam, 3 to 6 percent slopes                       | All areas are prime farmland | 1,066.0            |
| 8875            | Hord silt loam, wet substratum, 0 to 1 percent slopes       | All areas are prime farmland | 3,257.0            |
| 8876            | Hord silty clay loam, 0 to 1 percent slopes                 | All areas are prime farmland | 21.7               |
| 8877            | Hord silty clay loam, wet substratum, 0 to 1 percent slopes | All areas are prime farmland | 166.7              |
| 8905            | Ovina fine sandy loam                                       | All areas are prime farmland | 471.2              |
| 8960            | Wood River silt loam, 0 to 1 percent slopes                 | All areas are prime farmland | 286.0              |
| 9001            | Anselmo fine sandy loam, 0 to 1 percent slopes              | All areas are prime farmland | 1,100.2            |
| 9002            | Anselmo fine sandy loam, 1 to 3 percent slopes              | All areas are prime farmland | 1,656.5            |
| 9004            | Anselmo fine sandy loam, 3 to 6 percent slopes              | All areas are prime farmland | 437.6              |
| 9010            | Anselmo loam, 0 to 1 percent slopes                         | All areas are prime farmland | 108.1              |
| 9015            | Anselmo very fine sandy loam, 1 to 3 percent slopes         | All areas are prime farmland | 23.6               |
| 9036            | Gates very fine sandy loam, 3 to 6 percent slopes           | All areas are prime farmland | 518.3              |
| 9051            | Graybert very fine sandy loam, 1 to 3 percent slopes        | All areas are prime farmland | 746.9              |
| 9052            | Graybert very fine sandy loam, 3 to 6 percent slopes        | All areas are prime farmland | 70.5               |
| 9068            | Kenesaw very fine sandy loam, 0 to 1 percent slopes         | All areas are prime farmland | 5.7                |
| 9080            | Rusco silt loam, 0 to 1 percent slopes                      | All areas are prime farmland | 3,902.4            |
| 9081            | Rusco silty clay loam, 0 to 1 percent slopes                | All areas are prime farmland | 18.9               |
|                 |                                                             | <b>TOTAL</b>                 | <b>115,669</b>     |

Source: USDA NRCS, 2020



## 4.3 Water Resources

### 4.3.1 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.

### 4.3.2 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) (see Figure 4-3; 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 (see Figure 1-4 and Figure 1-5).

#### **4.3.3 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.

#### **4.3.4 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.

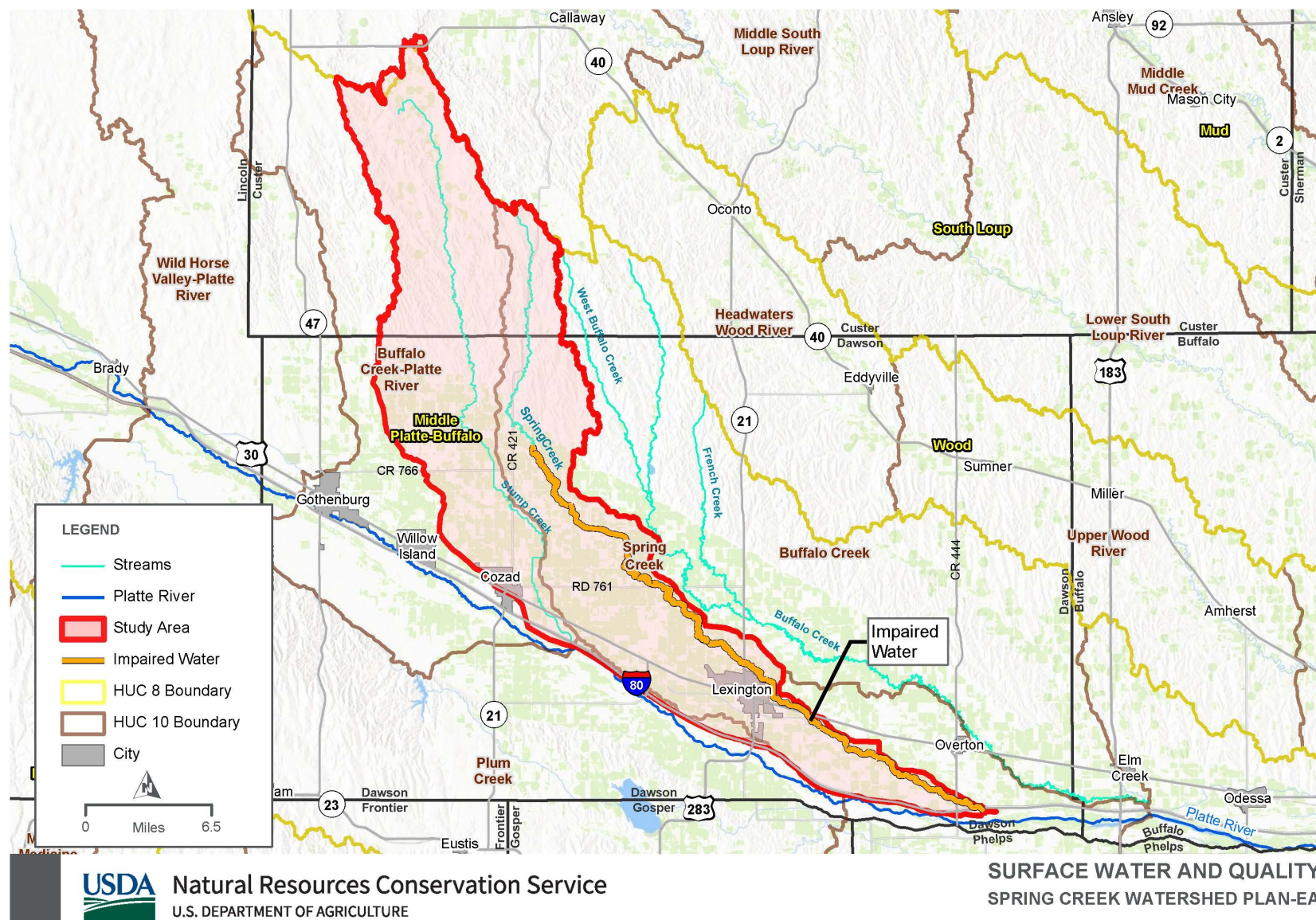


Figure 4-3. Surface water and quality



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, Figure 4-3). These water resources are detailed further in Table 4-2, Table 4-3, and 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 4-4 details delineated aquatic resources, and Appendix E contains the wetland delineation report.

**Table 4-2. National Hydrography Dataset Waterways in the Spring Creek Watershed Study Area**

| Type                                                  | Length (miles) |
|-------------------------------------------------------|----------------|
| Connector                                             | 2.4            |
| Canal Ditch                                           | 16.3           |
| Aqueduct Canal Ditch                                  | 166.1          |
| Pipeline (including underground aqueducts and siphon) | 9.6            |
| Intermittent Stream                                   | 515.7          |
| Perennial Stream                                      | 60.7           |
| <b>Total</b>                                          | <b>770.8</b>   |

Source: USGS 2020a

**Table 4-3. National Wetland Inventory Resources in the Spring Creek Watershed Study Area**

| Wetland Type                      | Acres          |
|-----------------------------------|----------------|
| Lake                              | 56.9           |
| Freshwater Pond                   | 415.4          |
| Freshwater Emergent Wetland       | 1,500.9        |
| Freshwater Forested/Shrub Wetland | 88.1           |
| Riverine                          | 1,245.1        |
| <b>Total</b>                      | <b>3,306.4</b> |

Source: USFWS 2020

**Table 4-4. 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        |
| <b>Total</b>  | <b>36.87</b> | <b>60,986.40</b> |

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

### 4.3.5 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.

#### **4.3.6 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.

## **4.4 Floodplains**

As discussed in Chapter 1, 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 Figure 1-3 and 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.

## 4.5 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 (see Figure 4-4). 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) (see Figure 4-4). 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) (see Figure 4-4). 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 (see Figure 4-4).

#### 4.5.1 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 4-5 provides a list of the fish and aquatic species (mollusks) that are included on the Tier 1 species list within the study area.

**Table 4-5. Tier 1 Fish and Aquatic Species in the Spring Creek Watershed Study Area**

| Common Name            | Scientific Name              | Habitat                                                                    |
|------------------------|------------------------------|----------------------------------------------------------------------------|
| Plains minnow          | <i>Hybognathus placitus</i>  | permanent streams and backwaters with sandy substrate and moderate current |
| Plains topminnow       | <i>Fundulus sciadicus</i>    | vegetative backwaters and headwaters, shallow parts of rivers and streams  |
| Western silvery minnow | <i>Hybognathus argyritis</i> | backwaters, pools, and slow-moving waters in medium to large rivers        |
| Niobrara ambersnail    | <i>Oxyloma haydeni</i>       | moist soil by streams                                                      |

Source: NGPC Conservation and Environmental Review Tool 2024

As documented in Chapter 4.3.1, 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.

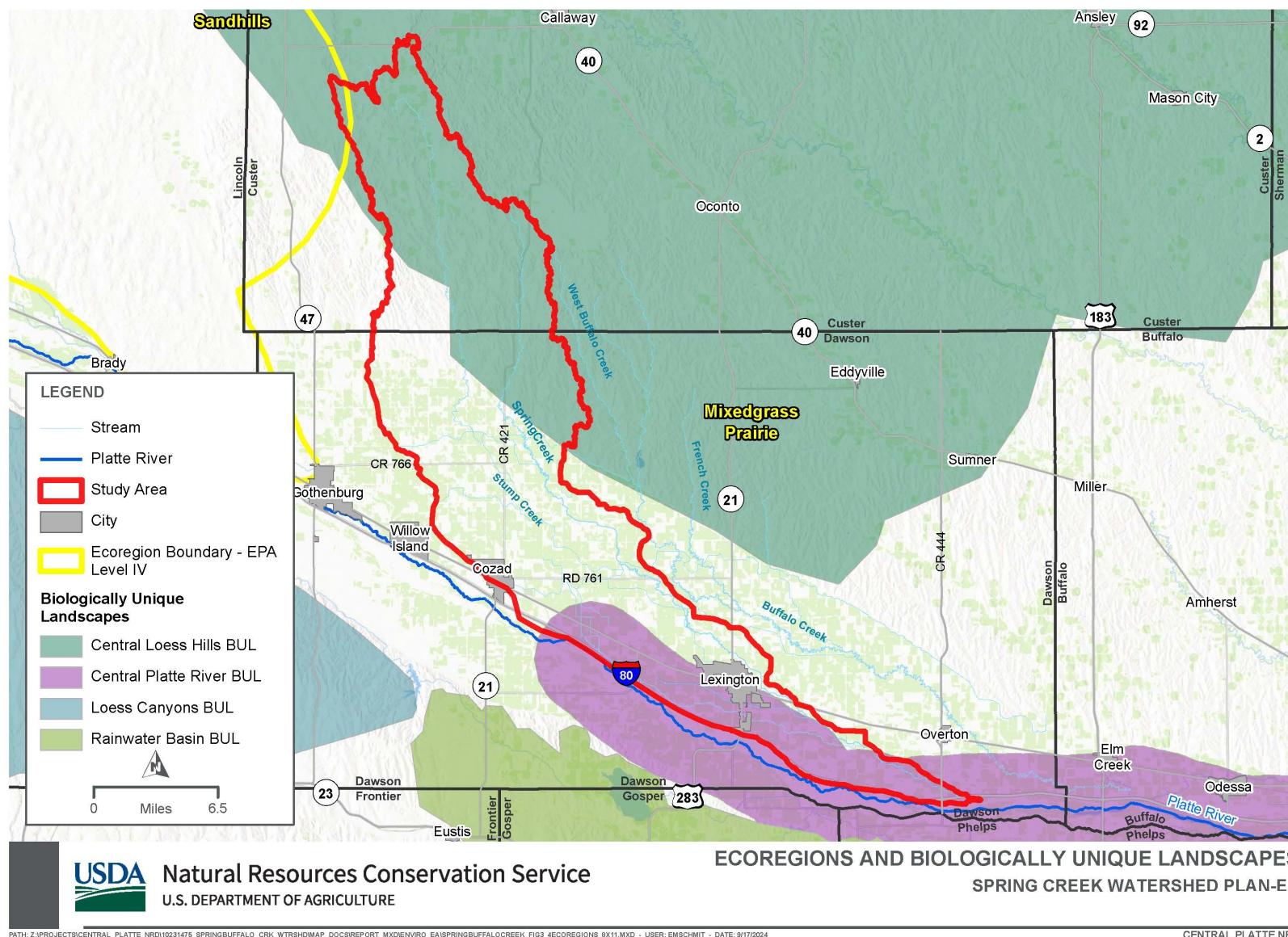


Figure 4-4. Ecoregions and biologically unique landscapes



#### 4.5.2 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 4-6 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 4-6. Tier 1 Terrestrial Species in the Spring Creek Watershed Study Area**

| Common Name             | Scientific Name                    | Habitat                                                                                                                                                                                                                               |
|-------------------------|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| American burying beetle | <i>Nicrophorus americanus</i>      | 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      | <i>Cicindela lepida</i>            | sparsely vegetated areas with open, sandy soils                                                                                                                                                                                       |
| Iowa skipper            | <i>Atrytone arogos iowa</i>        | tall-grass prairie, mixed-grass prairie along the Niobrara, native prairie with standing grass stems                                                                                                                                  |
| Kohler's fritillary     | <i>Boloria selene sabulocollis</i> | Sandhills and stream valley wet meadows with violets                                                                                                                                                                                  |
| Married underwing       | <i>Catocala nuptialis</i>          | tall-grass and mixed-grass prairie; larvae feed on lead plant ( <i>Amorpha</i> )                                                                                                                                                      |
| Monarch                 | <i>Danaus plexippus</i>            | uses broad range of habitats but requires select species of milkweeds as larval host plants                                                                                                                                           |
| Nebraska fritillary     | <i>Boloria selene nebraskensis</i> | wet meadows with violets                                                                                                                                                                                                              |
| Ottoo skipper           | <i>Hesperia ottoe</i>              | tall-grass prairie, rolling/hilly prairie, mixed-grass prairie; feed on bluestems                                                                                                                                                     |
| Regal fritillary        | <i>Speyeria idalia</i>             | tall-grass and mixed-grass prairie with violets, wet meadows                                                                                                                                                                          |
| Sandy Tiger Beetle      | <i>Cicindela limbata limbata</i>   | sand dunes, blowouts, beaches, and stream sides                                                                                                                                                                                       |
| Smoky-eyed brown        | <i>Lethe eurydice fumosa</i>       | sedge meadows in Sandhills and along streams and wetlands                                                                                                                                                                             |
| Two-spotted skipper     | <i>Euphyes bimacula illinois</i>   | moist environments and wetlands, such as marshes, bogs, wet stream sides, and wet sedge meadows.                                                                                                                                      |
| Whitney underwing       | <i>Catocala whitneyi</i>           | tall-grass and mixed-grass prairie; larvae feed on lead plant ( <i>Amorpha</i> )                                                                                                                                                      |

| Common Name             | Scientific Name                  | Habitat                                                                                                                                                                                                         |
|-------------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Eastern red bat         | <i>Lasiurus borealis</i>         | deciduous and pine woodlands, usually associated with water source                                                                                                                                              |
| Hoary bat               | <i>Lasiurus cinereus</i>         | deciduous and pine woodlands, usually associated with water source in arid landscapes                                                                                                                           |
| Northern long-eared bat | <i>Myotis septentrionalis</i>    | interior of deciduous and coniferous woodlands                                                                                                                                                                  |
| Tricolored bat          | <i>Perimyotis subflavus</i>      | deciduous woodlands                                                                                                                                                                                             |
| Blanding's turtle       | <i>Emydoidea blandingii</i>      | 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           | <i>Storeria occipitomaculata</i> | riverbanks and riparian woodlands, often with dense layers of leaf litter providing shelter and moisture                                                                                                        |

Source: NGPC Conservation and Environmental Review Tool 2024

The land use types that are available for terrestrial wildlife habitat in the study area are defined in Figure 4-1. 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.

#### 4.5.3 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 4-7 provides a list of the birds that are included on the Tier 1 species list within the Spring Creek Watershed Study Area

**Table 4-7. Tier 1 Bird Species in the Spring Creek Watershed Study Area**

| Common Name             | Scientific Name                       | Habitat                                                                                                                     |
|-------------------------|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| Baird's sparrow         | <i>Ammodramus bairdii</i>             | native grassland; does not nest in Nebraska                                                                                 |
| Black-billed cuckoo     | <i>Coccyzus erythrophthalmus</i>      | woodlands and thickets, often in proximity to water                                                                         |
| Buff-breasted sandpiper | <i>Tryngites subruficollis</i>        | mixture of agriculture and wetlands; does not nest in Nebraska                                                              |
| Burrowing owl           | <i>Athene cunicularia</i>             | prairie dog towns, short-grass prairie, mixed-grass prairie, heavily grazed grasslands                                      |
| Interior least tern     | <i>Sternula antillarum athalassos</i> | present during April 15–August 15 nesting season; unvegetated or sparsely vegetated sandbars in river channels and sandpits |
| Loggerhead shrike       | <i>Lanius ludovicianus</i>            | grasslands with at least some scattered small trees or shrubs                                                               |
| Piping plover           | <i>Charadrius melodus</i>             | present during April 15–August 15 nesting season; unvegetated or sparsely vegetated sandbars in river channels and sandpits |
| Short-eared owl         | <i>Asio flammeus</i>                  | open grasslands with standing cover and little disturbance                                                                  |

| Common Name    | Scientific Name       | Habitat                                                                                                                                                                                                                                                          |
|----------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Whooping crane | <i>Grus americana</i> | 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

#### 4.5.4 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 4-8 lists the Category 1, 2, and 3 plants for the Mixedgrass Prairie Ecoregion.

**Table 4-8. Noxious and Invasive Plant Species in the Mixedgrass Prairie Ecoregion**

| Common Name                                                                       | Scientific Name               |
|-----------------------------------------------------------------------------------|-------------------------------|
| Category 1: Future Invasive Species<br>Giant reed                                 | <i>Arundo donax L.</i>        |
| Category 1: Future Invasive Species<br>Flowering rush                             | <i>Butomus umbellatus</i>     |
| Category 1: Future Invasive Species<br>Oriental bittersweet                       | <i>Celastrus orbiculatus</i>  |
| Category 1: Future Invasive Species<br>Brazilian elodea                           | <i>Egeria densa</i>           |
| Category 1: Future Invasive Species<br>Water hyacinth                             | <i>Eichhornia crassipes</i>   |
| Category 1: Future Invasive Species<br>Hydrilla                                   | <i>Hydrilla verticillata</i>  |
| Category 1: Future Invasive Species<br>Creeping water primrose, floating primrose | <i>Ludwigia peploides</i>     |
| Category 1: Future Invasive Species<br>Parrot's feather                           | <i>Myriophyllum aquaticum</i> |
| Category 1: Future Invasive Species<br>Starry stonewort                           | <i>Nitellopsis obtusa</i>     |
| Category 1: Future Invasive Species<br>Yellow floating heart                      | <i>Nymphoides peltata</i>     |
| Category 1: Future Invasive Species<br>Water lettuce                              | <i>Pistia stratiotes</i>      |
| Category 1: Future Invasive Species                                               | <i>Salvinia molesta</i>       |





| Common Name                                                                                        | Scientific Name                                                                                   |
|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Giant salvinia                                                                                     |                                                                                                   |
| Category 2: Priority Species<br>Russian knapweed                                                   | <i>Acroptilon repens</i>                                                                          |
| Category 2: Priority Species<br>Garlic mustard                                                     | <i>Allaria petiolata</i>                                                                          |
| Category 2: Priority Species<br>Absinth wormwood                                                   | <i>Artemisia absinthium</i> L.                                                                    |
| Category 2: Priority Species<br>Australian beardgrass (Caucasian bluestem)                         | <i>Bothriochloa bladhii</i> ( <i>Andropogon bladhii</i> )                                         |
| Category 2: Priority Species<br>Queen Anne's lace                                                  | <i>Daucus carota</i>                                                                              |
| Category 2: Priority Species<br>Common teasel                                                      | <i>Dipsacus fullonum</i>                                                                          |
| Category 2: Priority Species<br>Cutleaf teasel                                                     | <i>Dipsacus laciniatus</i>                                                                        |
| Category 2: Priority Species<br>St. Johnswort                                                      | <i>Hypericum perforatum</i>                                                                       |
| Category 2: Priority Species<br>Yellow Flag Iris                                                   | <i>Iris pseudacorus</i>                                                                           |
| Category 2: Priority Species<br>Japanese honeysuckle (also Morrow, Showy Fly) and amur honeysuckle | <i>Lonicera japonica</i> , <i>morrowii</i> , <i>morrowii</i> x <i>tatarica</i> and <i>maackii</i> |
| Category 2: Priority Species<br>Eurasian watermilfoil                                              | <i>Myriophyllum spicatum</i>                                                                      |
| Category 2: Priority Species<br>Brittle naiad                                                      | <i>Najas minor</i>                                                                                |
| Category 2: Priority Species<br>Wild parsnip                                                       | <i>Pastinaca sativa</i>                                                                           |
| Category 2: Priority Species<br>Sulphur cinquefoil                                                 | <i>Potentilla recta</i> L.                                                                        |
| Category 2: Priority Species<br>Common buckthorn, European buckthorn                               | <i>Rhamnus cathartica</i>                                                                         |
| Category 2: Priority Species<br>Camphor weed                                                       | <i>Heterotheca latifolia</i>                                                                      |
| Category 2: Priority Species<br>Perennial sow thistle                                              | <i>Sonchus arvensis</i>                                                                           |
| Category 2: Priority Species<br>Common tansy                                                       | <i>Tanacetum vulgare</i> L.                                                                       |
| Category 3: Established Invasive Species<br>Curly-leaf pondweed                                    | <i>Potamogeton crispus</i>                                                                        |

Source: Nebraska Invasive Species Program 2021

## 4.6 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 17 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 4-9 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 4-9. Endangered and Threatened Species with Potential to Occur in the Spring Creek Watershed Study Area**

| Common Name             | Species Name                              | Listing                                        | Habitat                                                                                                                                                                                                                               |
|-------------------------|-------------------------------------------|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| American burying beetle | <i>Nicrophorus americanus</i>             | 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     | <i>Mustela nigripes</i>                   | Federal Endangered; State Endangered           | prairie dog towns or complexes 1,000 acres or more in size                                                                                                                                                                            |
| Blowout penstemon       | <i>Penstemon haydenii</i>                 | Federal Endangered, State Endangered           | active and open blowouts consisting of bare sand in rangeland landscape                                                                                                                                                               |
| Eastern black rail      | <i>Laterallus jamaicensis jamaicensis</i> | Federal Threatened, State Threatened           | dense vegetative cover, freshwater marsh habitats, sedge meadows                                                                                                                                                                      |
| Eskimo curlew           | <i>Numenius borealis</i>                  | Federal Endangered; State Endangered           | wet meadows, burned-over prairies, newly plowed fields                                                                                                                                                                                |

|                                 |                                       |                                      |                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|---------------------------------------|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Gray wolf                       | <i>Canis lupus</i>                    | Federal Endangered; State Endangered | wide range of habitats including prairie, mountains, temperate forests, wetlands, tundra, and taiga                                                                                                                                                                                                                          |
| Interior least tern             | <i>Sternula antillarum athalassos</i> | State Endangered                     | present during April 15–August 15 nesting season; unvegetated or sparsely vegetated sandbars in river channels and sandpits                                                                                                                                                                                                  |
| Monarch                         | <i>Danaus plexippus</i>               | 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         | <i>Myotis septentrionalis</i>         | 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                 | <i>Scaphirhynchus albus</i>           | 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                   | <i>Charadrius melodus</i>             | 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                   | <i>Calidris canutus rufa</i>          | Federal Threatened, State Threatened | open mud flats and/or mud and sandy shorelines free of vegetation                                                                                                                                                                                                                                                            |
| Suckley's cuckoo bumble bee     | <i>Bombus suckleyi</i>                | Federal Proposed Endangered          | field edges, roadsides, open areas, or urban gardens; a diversity of flowering plants are needed for bee habitat                                                                                                                                                                                                             |
| Tricolored bat                  | <i>Perimyotis subflavus</i>           | Proposed Federal Endangered          | similar habitat needs as northern long-eared bat                                                                                                                                                                                                                                                                             |
| Western prairie fringed orchid  | <i>Platanthera praeclara</i>          | Federal Threatened, State Threatened | wet prairies and meadows with high soil moisture                                                                                                                                                                                                                                                                             |
| Western regal fritillary        | <i>Argynnis idalia occidentalis</i>   | Federal Proposed Threatened          | field edges, roadsides, open areas, or urban gardens; violets and flowering plants are needed for butterfly habitat                                                                                                                                                                                                          |
| Whooping crane                  | <i>Grus americana</i>                 | 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 | <i>Grus americana</i>                 | 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

## 4.7 Cultural Resources and Historic Properties

Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (54 U.S.C. § 306108) and its implementing regulations (36 CFR Part 800) require federal agencies to take into account the effect of undertakings on cultural resources that are listed on or are eligible for listing on the National Register of Historic Places (NRHP). Cultural resources are physical or other expressions of human activity or occupation and include archeological sites, buildings, bridges, business districts, culturally significant landscapes, isolated artifacts or features, culturally sacred places, and objects of cultural and historic significance. In order for a cultural resource to be eligible for the NRHP, it must be associated with events significant to the broad patterns of history; associated with the lives of persons significant in the past; embody distinctive characteristics of a type, period, or method of construction, represent the work of a master, possess high artistic value, or represent a significant and distinguishable entity; and/or must yield or be likely to yield, information important to history or prehistory. If an undertaking will alter, damage, or destroy a historic property, the agency has a responsibility to avoid, minimize, or mitigate the adverse effect.

Consultation with the State Historic Preservation Office (SHPO), Federally Recognized Tribes, as appropriate, and other consulting parties (36 CFR 800.2(c)), is required for any federal action that may affect historic properties. The identification and analysis of cultural resources was carried out in accordance with the guidance found in the NRCS National Cultural Resources Procedures handbook. The list of consulting parties and a summary of NHPA Section 106 consultation is provided in Chapter 8.

The Area of Potential Effects (APE) of the alternatives described in Chapter 5 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 4-10). 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 4-10. Architectural resources within APE.**

| Name                        | Location | Description                                                               | NRHP Eligibility                                                            |
|-----------------------------|----------|---------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| <b>Dawson County Canal</b>  | Cozad    | Irrigation canal built in 1894 by the Farmers and Merchants Canal Company | Eligible (Criterion A – Dawson County agricultural development)             |
| <b>Drainage Ditch No. 4</b> | Cozad    | Drainage ditch or irrigation canal built between 1919 and 1951.           | Potentially eligible (Criterion A – Dawson County agricultural development) |
| <b>Stump Slough</b>         | Cozad    | Straightened stream channel                                               | Not eligible                                                                |

| Name                                      | Location  | Description                                                                                                      | NRHP Eligibility                                                             |
|-------------------------------------------|-----------|------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| <b>Cozad Country Club and Golf Course</b> | 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) |
| <b>Unnamed drainage ditch</b>             | Cozad     | Earthen drainage ditch                                                                                           | Not eligible                                                                 |
| <b>Lateral No. 1</b>                      | Lexington | Drainage ditch/irrigation canal built between 1938 and 1951.                                                     | Potentially eligible (Criterion A – Dawson County agricultural development)  |
| <b>Spring Creek</b>                       | Lexington | Straightened stream channel                                                                                      | Not eligible                                                                 |
| <b>Beatty Ditch</b>                       | Lexington | Irrigation canal constructed between 1938 and 1951.                                                              | Potentially eligible (Criterion A – Dawson County agricultural development)  |
| <b>Dawson County Drain No. 1</b>          | Lexington | Canal built between 1919 and 1951.                                                                               | Potentially eligible (Criterion A – Dawson County agricultural development)  |

## 4.8 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.

### 4.8.1 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) (see Figure 4-5). 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.

#### **4.8.2 CPNRD Lands**

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

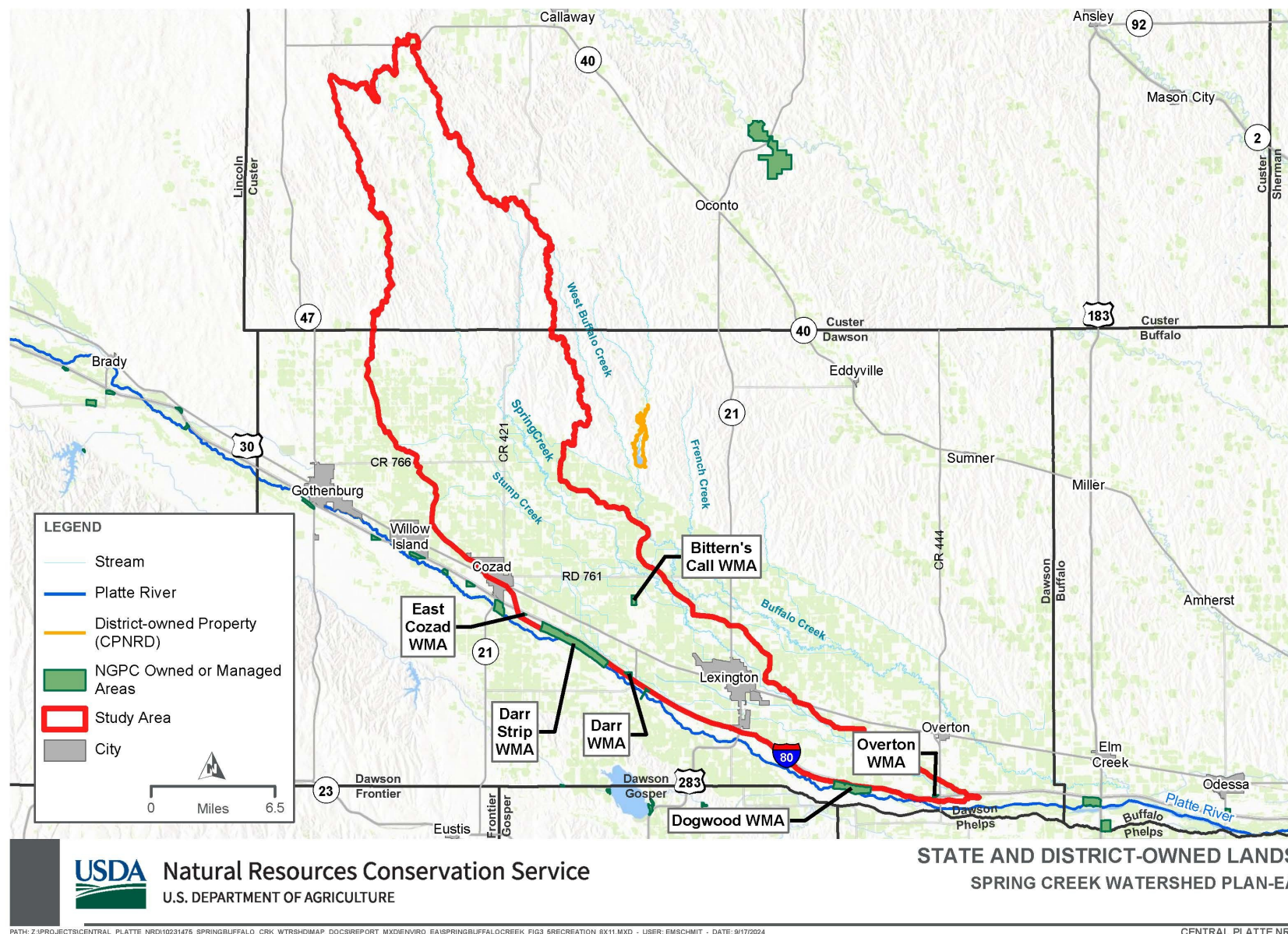


Figure 4-5. State- and CPNRD-owned lands



### 4.8.3 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 (see Figure 4-6). 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 (see Figure 4-7). 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).

## 4.9 Public Health and Safety

As discussed in Chapter 1, 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.

As discussed in Chapter 1, 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.

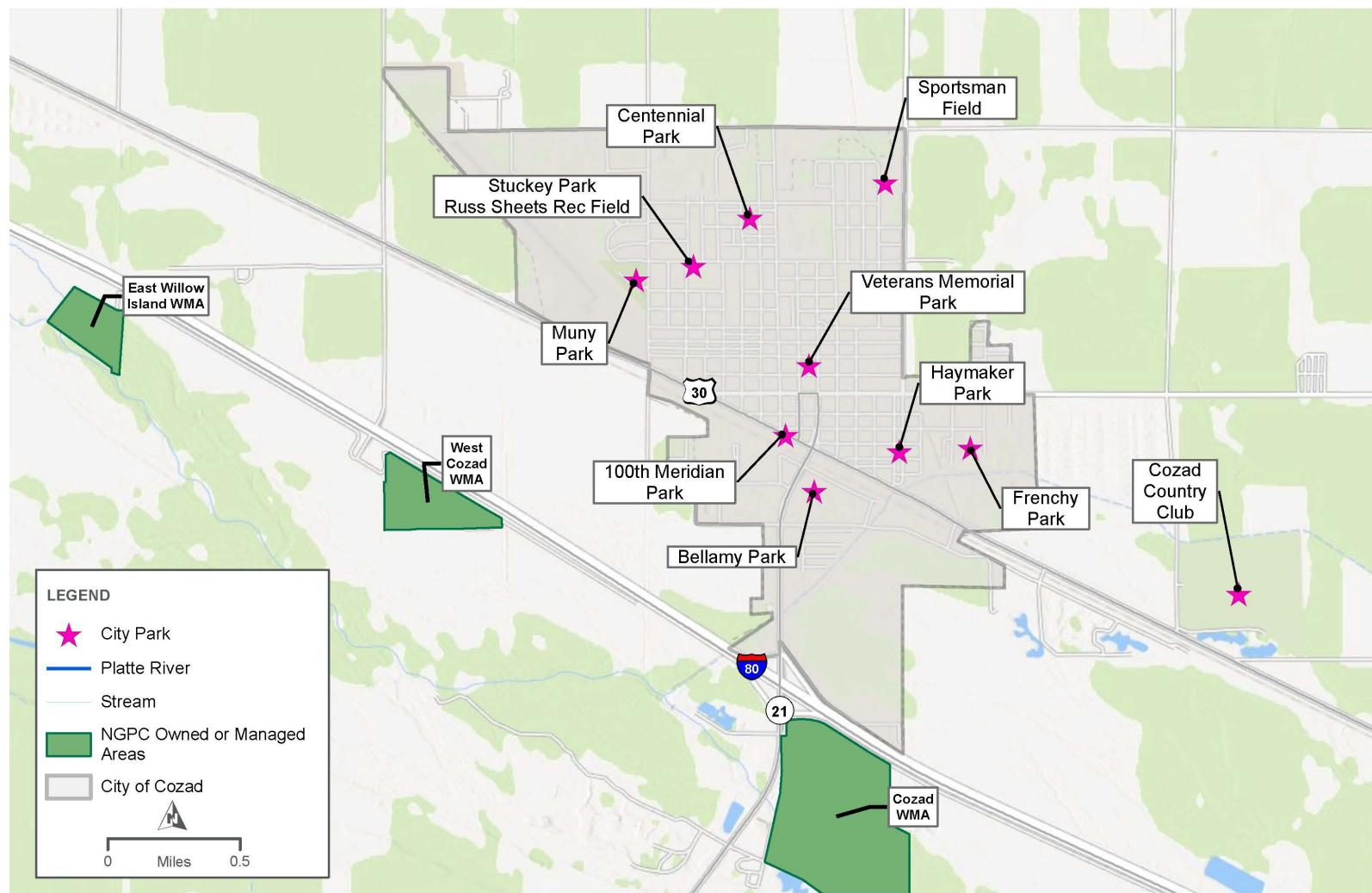
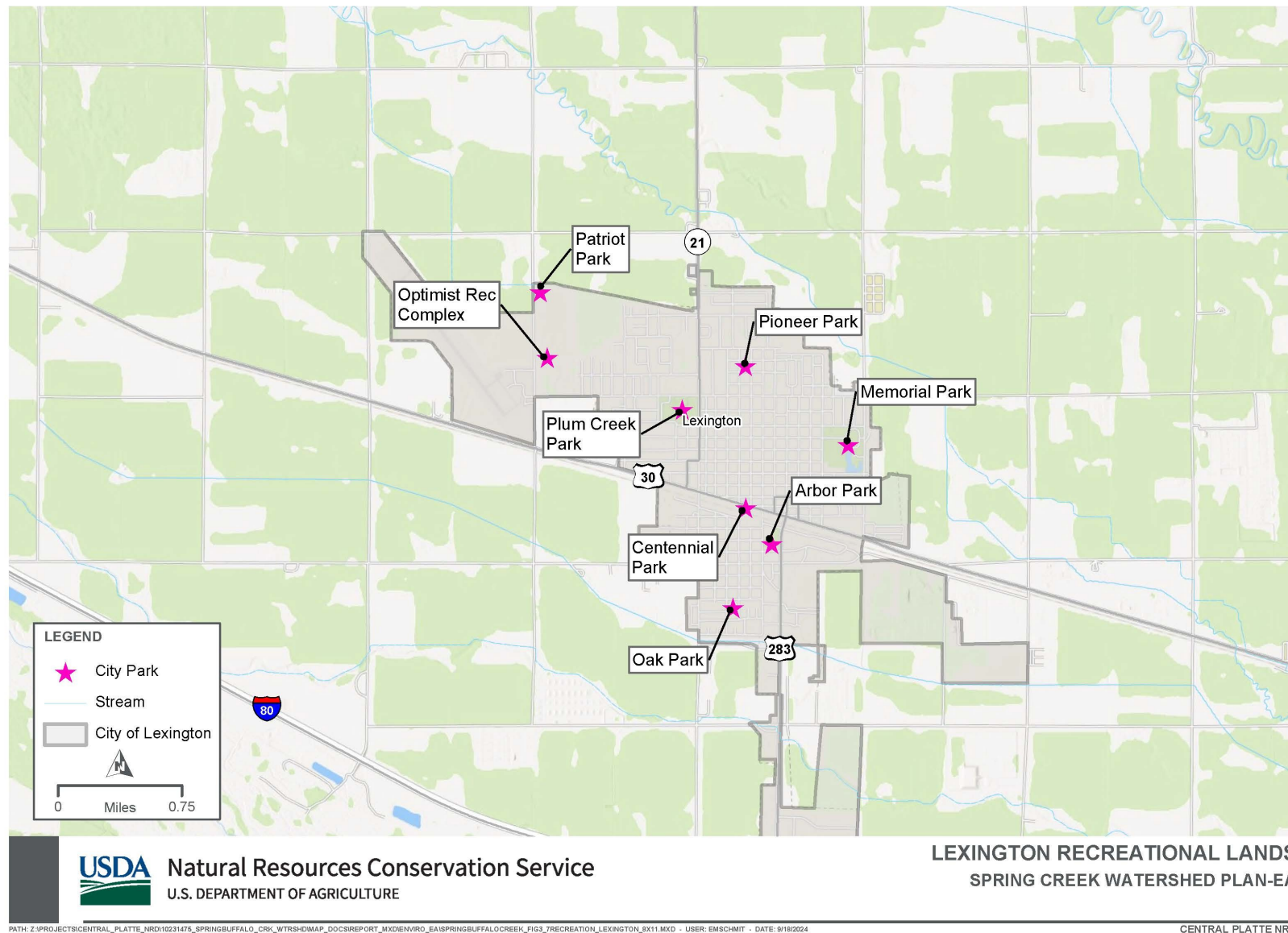


Figure 4-6. Cozad recreational lands



**Figure 4-7. Lexington recreational lands**

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.

## 4.10 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

### 4.10.1 Population

Table 4-11 provides the population estimates for the locations in the study area.

**Table 4-11. 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).

### 4.10.2 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 4-12).

**Table 4-12. 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 4-13).

**Table 4-13. 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)

## 4.11 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.

## 4.12 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 4-14. Land Use**

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

Source: National Land Cover Dataset (2019)

## 4.13 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.

#### **4.13.1 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.

#### **4.13.2 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.

#### **4.13.3 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.

#### **4.13.4 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.

## 5 Alternatives

Options considered in the formulation of alternative plans included those actions believed to address the identified need(s) of the existing resource conditions. Local, state, regional, federal, and non-governmental interests participated in the formulation process.

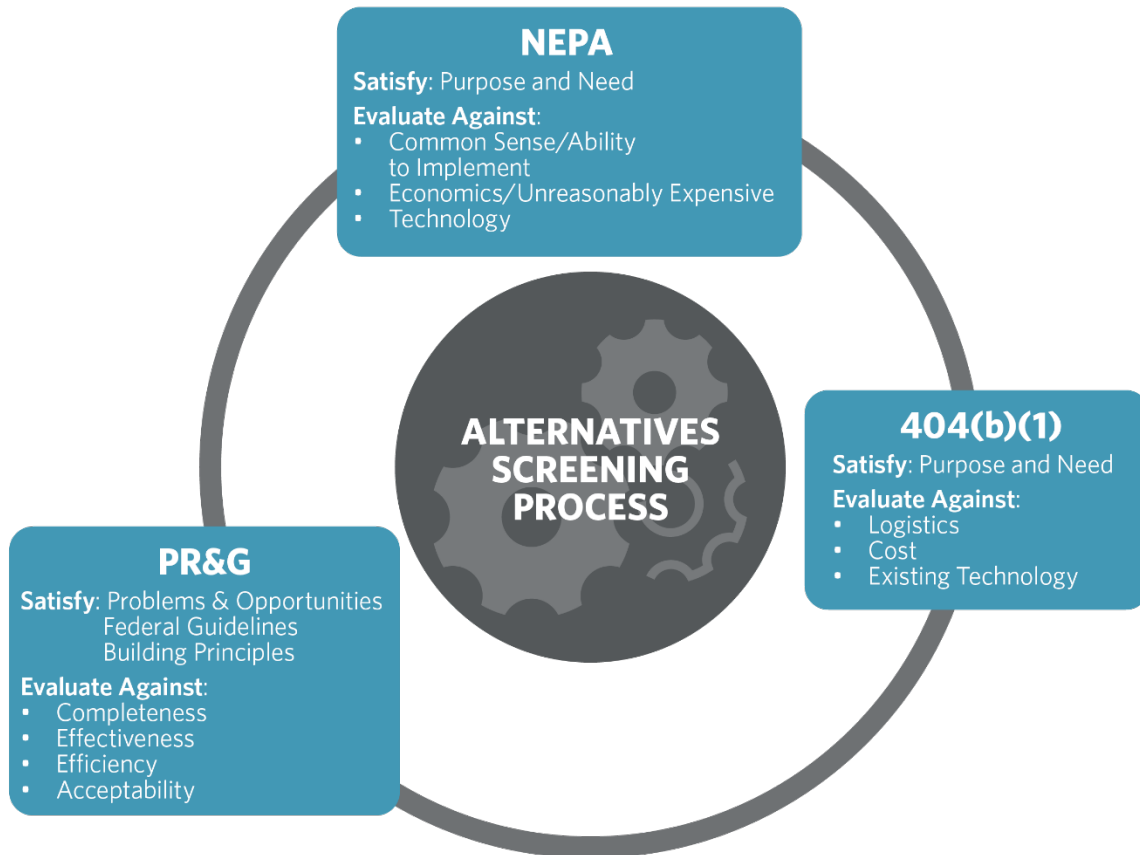
### 5.1 Formulation Process

The formulation process is the basis for selecting combinations of measures to include as alternatives. The combination of alternatives developed are based on measures that could meet the project site purposes and take into consideration multiple federal requirements to streamline the planning and decision-making process. This analysis is meant to satisfy the alternative development and screening criteria requirements of NEPA, Clean Water Act Section 404(b)(1), and PR&G for federal investments in water resources. This means that a wider range of alternatives and a varied screening process was used to satisfy all applicable federal alternatives analysis requirements to reduce the time, cost, and cumbersome agency reviews that often come with multiple analysis documents. Table 5-1 provides a description of when each regulation is required.

**Table 5-1. Federal Requirements for Alternatives Analysis**

| NEPA                                                                                                                            | 404(b)(1)                                                                                                                                                       | PR&G                                                                                                                                                                |
|---------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NEPA requires federal agencies to assess the environmental effects of proposed major federal actions prior to making decisions. | Clean Water Act guidelines require an alternative analysis when an Individual Permit for fill in jurisdictional wetlands and/or streams is required from USACE. | Alternatives analysis requirements when federal funds are used for water projects. Agencies have specific guidelines, including USDA (who is funding this Plan-EA). |

After an appropriate range of alternatives is selected, each alternative is screened to determine whether it should be carried forward for a more detailed analysis, which includes a more refined preliminary design, an analysis of environmental and social consequences (both beneficial and detrimental), and a detailed economic analysis. This pre-screening allows for a detailed look at a narrower range of alternatives for a more efficient decision-making process. Different federal requirements and guidelines present different screening criteria based on the overarching goal of the policy. These screening criteria are shown in Figure 5-1.



**Figure 5-1. Alternatives screening process**

## 5.2 Measures Considered/Eliminated from Detailed Study

During the scoping phase of this Plan-EA, NRCS and the cooperating agencies considered several alternatives. Based on flooding damages in the communities of Cozad and Lexington, a range of measures were evaluated for each community per the criteria identified in the screening process identified in Chapter 5.1. Table 5-2 summarizes the screening results respectively and identifies the measures carried forward for detailed study in the Plan-EA. Additional detail about the screening process and results are provided in Appendix D. Chapter 5.3 provides details about the measures carried forward and combined to form alternatives for detailed study.



**Table 5-2. Summary of Measures for Flood Damage Reduction in Cozad and Lexington**

| <b>Measure</b>                              | <b>Summary of Measure</b>                                                                                                                                                                                         | <b>Meets Purpose and Need</b>                                                                                                                 | <b>Reasonable/Practicable<sup>1</sup></b> | <b>PR&amp;G (Completeness, Effectiveness, Efficiency, Acceptability)</b> | <b>Carried Forward for Detailed Study</b> |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|--------------------------------------------------------------------------|-------------------------------------------|
| No Action/Future Without Federal Investment | No federal assistance would be provided, and the Sponsor would not pursue further action.                                                                                                                         | NO                                                                                                                                            | Not evaluated as it does not meet P&N     | Not evaluated as it does not meet P&N                                    | YES <sup>2</sup>                          |
| Existing On-Channel Storage                 | Restoration and/or enhancement of existing large or small dams.                                                                                                                                                   | NO<br>This alternative does not provide a noticeable improvement in storage capacity and reduction in peak flow for either Cozad or Lexington | Not evaluated as it does not meet P&N     | Not evaluated as it does not meet P&N                                    | NO                                        |
| New On-Channel Storage                      | Construction of new flood retarding structures. The necessary topographic relief for on-channel storage is only provided in the highlands. Of the 56,500 acres in the highlands area, 50,400 acres are regulated. | NO<br>This alternative does not provide a noticeable improvement in storage capacity and reduction in peak flows.                             | Not evaluated as it does not meet P&N     | Not evaluated as it does not meet P&N                                    | NO                                        |

| Measure             | Summary of Measure                                                                                                                                            | Meets Purpose and Need                                                                                                                                                                                                                                     | Reasonable/ Practicable <sup>1</sup>                                                                                                                           | PR&G (Completeness, Effectiveness, Efficiency, Acceptability)                                                                                                                    | Carried Forward for Detailed Study |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| Off-Channel Storage | Construction of an in-channel diversion that directs excess water to off-channel storage during peak flow events.                                             | NO<br>Due to shallow relief and high groundwater table, very small vertical range of storage, and topography of the flood-prone areas, off-channel storage would not be effective in capturing the required runoff needed to address the Purpose and Need. | Not evaluated as it does not meet P&N                                                                                                                          | Not evaluated as it does not meet P&N                                                                                                                                            | NO                                 |
| Levee Systems       | Restrict flood flows from urbanized areas by constructing a levee system that meets USACE standards for participation in the federal flood insurance program. | YES                                                                                                                                                                                                                                                        | NO<br>Due to extensive property takings, this measure does not effectively or efficiently address the problems or achieve the desired opportunity efficiently. | NO<br>Due to the logistics and extensive property takings, this measure does not effectively or efficiently address the problems or achieve the desired opportunity efficiently. | NO                                 |

| Measure                          | Summary of Measure                                                                                                       | Meets Purpose and Need                                                                                                         | Reasonable/ Practicable <sup>1</sup>                                                                                                                                                                                                                                       | PR&G (Completeness, Effectiveness, Efficiency, Acceptability)                                                           | Carried Forward for Detailed Study |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| Channel Conveyance               | A combination of channel improvements and associated flood protection berms (dike) and diversion channels, as necessary. | YES                                                                                                                            | YES                                                                                                                                                                                                                                                                        | YES                                                                                                                     | YES                                |
| Floodplain Connectivity          | Use the historic floodplain for temporary storage of floodwaters.                                                        | NO<br>Temporary flood storage potential is limited due to the hydrologic setting and proximity to the Platte River floodplain. | Not Applicable                                                                                                                                                                                                                                                             | Not Applicable                                                                                                          | NO                                 |
| Physical Non-Structural Measures | Elevation, relocation, buyout/acquisition, dry and wet flood proofing.                                                   | YES                                                                                                                            | NO<br>Acquisition and/or elevation raise and dry/wet proofing is not reasonable at this scale due to the number of properties involved. Approximately 1,020 structures would require some level of non-structural improvement. Total assessed value of \$115,011,850. Volu | NO<br>Due to the voluntary participation needed for realization of planned effects at this scale, use is not effective. | NO                                 |

| Measure                                                        | Summary of Measure                                                                                                                                                | Meets Purpose and Need                                                                                                                                              | Reasonable/ Practicable <sup>1</sup>                                                                                                                          | PR&G (Completeness, Effectiveness, Efficiency, Acceptability) | Carried Forward for Detailed Study |
|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|------------------------------------|
|                                                                |                                                                                                                                                                   |                                                                                                                                                                     | ntary participation at this scale is unlikely; therefore, flood cleanup and repair costs would still affect the communities in the aftermath of flood events. |                                                               |                                    |
| Non-Physical Non-Structural Measures                           | Flood warning systems, land use regulation, zoning, flood insurance, floodplain mapping, evacuation plans, risk communication, flood emergency preparedness plan. | NO<br>Evacuation, risk communication, and flood emergency preparedness would benefit life and health risks but would have minimal effect on flood damage reduction. | Not evaluated as it does not meet P&N                                                                                                                         | Not evaluated as it does not meet P&N                         | NO                                 |
| Agricultural Best Management Practices (Conservation Measures) | Full implementation of conservation measures on agricultural lands in the Spring Creek drainage basin.                                                            | NO<br>Typical best management practices would have little to no effect in reduction to peak flows at levels to reduce flood damage.                                 | Not evaluated as it does not meet P&N                                                                                                                         | Not evaluated as it does not meet P&N                         | NO                                 |

<sup>1</sup> Addresses both reasonableness under NEPA and practicability under Section 404(b)(1) guidelines.

<sup>2</sup> The No Action/Future Without Federal Investment is carried forward for detailed analysis to service as a comparison between no action and the action alternatives.



### 5.3 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. As shown in Figure 1-4 and Figure 1-5, the smaller, more frequent precipitation events cause 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. These changes are described in the quantity and cost estimates in Chapter 7. Cost estimates for potential geological and geotechnical investigations have been included in Chapter 7.7, Costs and Cost Sharing. Geotechnical investigations would be completed, as needed, for design purposes.

#### 5.3.1 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.

#### 5.3.2 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 (see Figure 5-2). 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 5-3).

**Table 5-3: Cozad Channel Conveyance Structure Improvements**

| Location                        | Intersecting Feature | Existing Structure | New Structure | Notes                                |
|---------------------------------|----------------------|--------------------|---------------|--------------------------------------|
| <b>County Road 760</b>          | New Channel          | No                 | Bridge        |                                      |
| <b>Driveway (E 16th Street)</b> | Drainage Ditch No. 4 | Yes                | Bridge        |                                      |
| <b>Newell Street</b>            | New Channel          | No                 | Bridge        |                                      |
| <b>Dawson County Canal</b>      | New Channel          | No                 | Aqueduct      | Dawson County Canal over new channel |
| <b>Country Club Road</b>        | Stump Ditch          | Yes                | Bridge        |                                      |
| <b>E 8th Street</b>             | Stump Ditch          | Yes                | Bridge        |                                      |
| <b>County Road 762</b>          | New Channel          | No                 | Bridge        |                                      |

### 5.3.3 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 (see Figure 5-3). 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. Appendix C shows the typical design of channel conveyance and associated berms. As part of the Lexington Northeast Channel Conveyance alternative, all nine existing structures would be improved (see Table 5-4).

**Table 5-4: Lexington Northeast Channel Conveyance Structure Improvements**

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

| Location               | Intersecting Feature | Existing Structure | New Structure             |
|------------------------|----------------------|--------------------|---------------------------|
| <b>US 30</b>           | Spring Creek         | Yes                | 5-Barrel Concrete Culvert |
| <b>County Road 435</b> | Spring Creek         | Yes                | 5-Barrel Concrete Culvert |
| <b>UPRR</b>            | Spring Creek         | Yes                | 5-Barrel Concrete Culvert |

### 5.3.4 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 where 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 (see Figure 5-4). 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 5-5).

**Table 5-5: Lexington Southwest Channel Conveyance Structure Improvements**

| Location                               | Intersecting Feature               | Existing Structure | New Structure             |
|----------------------------------------|------------------------------------|--------------------|---------------------------|
| <b>Highway 283</b>                     | Dawson County Drainage Ditch No. 1 | Yes                | 3-Barrel Concrete Culvert |
| <b>Prospect Road (County Road 754)</b> | Dawson County Drainage Ditch No. 1 | Yes                | 3-Barrel Concrete Culvert |
| <b>County Road 436</b>                 | Dawson County Drainage Ditch No. 1 | Yes                | 3-Barrel Concrete Culvert |
| <b>County Road 435</b>                 | Dawson County Drainage Ditch No. 1 | Yes                | 3-Barrel Concrete Culvert |
| <b>County Road 434</b>                 | Dawson County Drainage Ditch No. 1 | Yes                | 3-Barrel Concrete Culvert |
| <b>Railroad Spur (County Road 433)</b> | Dawson County Drainage Ditch No. 1 | Yes                | 3-Barrel Concrete Culvert |



| Location                             | Intersecting Feature               | Existing Structure | New Structure             |
|--------------------------------------|------------------------------------|--------------------|---------------------------|
| <b>Pedestrian Bridge</b>             | Dawson County Drainage Ditch No. 1 | Yes                | 3-Barrel Concrete Culvert |
| <b>S Adams Street</b>                | Dawson County Drainage Ditch No. 1 | Yes                | 3-Barrel Concrete Culvert |
| <b>Walnut Road (County Road 755)</b> | Dawson County Drainage Ditch No. 1 | Yes                | 3-Barrel Concrete Culvert |
| <b>S Airport Road</b>                | Dawson County Drainage Ditch No. 1 | Yes                | 3-Barrel Concrete Culvert |
| <b>County Road 431</b>               | New Diversion                      | No                 | 5-Barrel Concrete Culvert |
| <b>UPRR</b>                          | New Diversion                      | No                 | 5-Barrel Concrete Culvert |
| <b>US 30</b>                         | New Diversion                      | No                 | 5-Barrel Concrete Culvert |



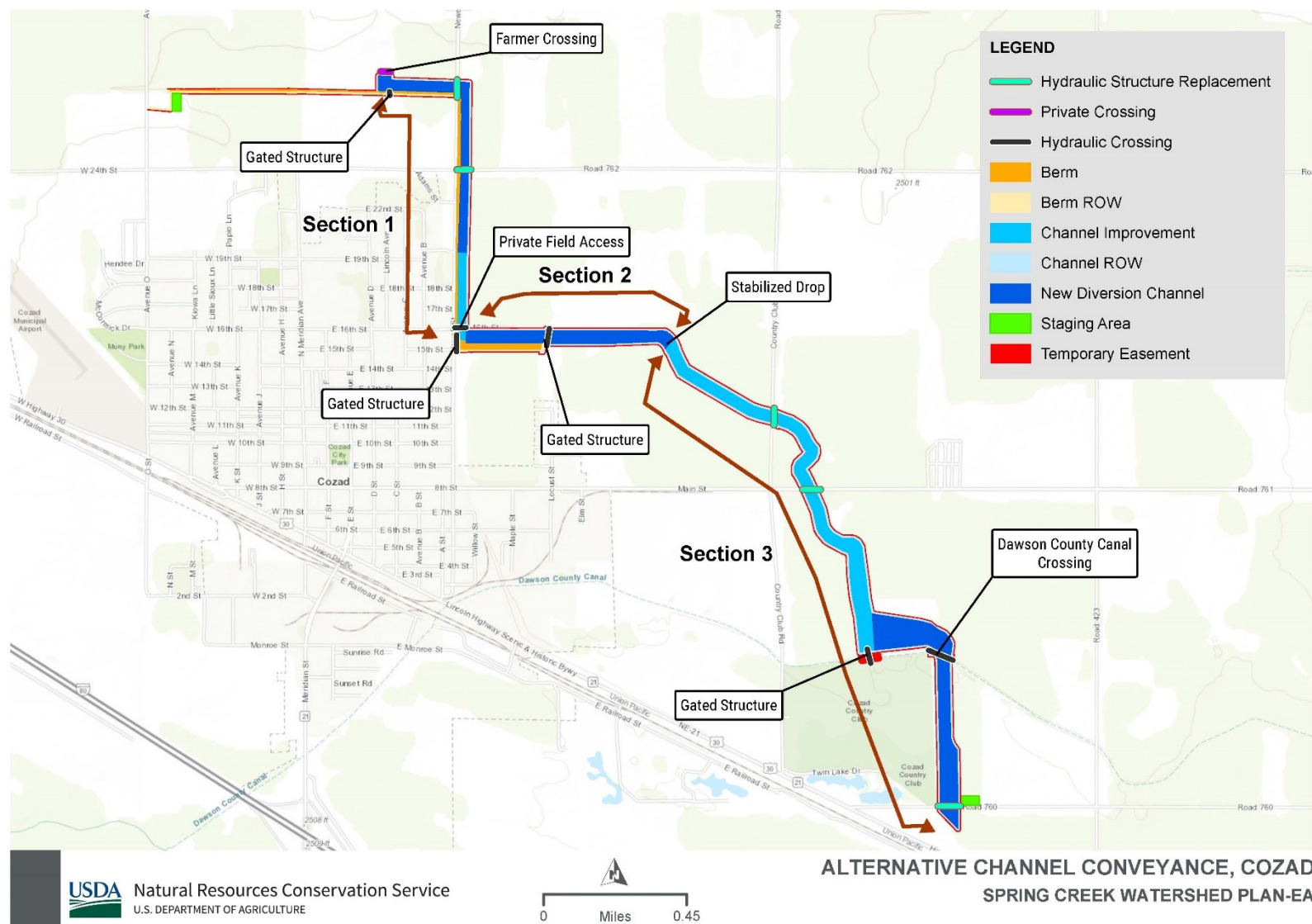
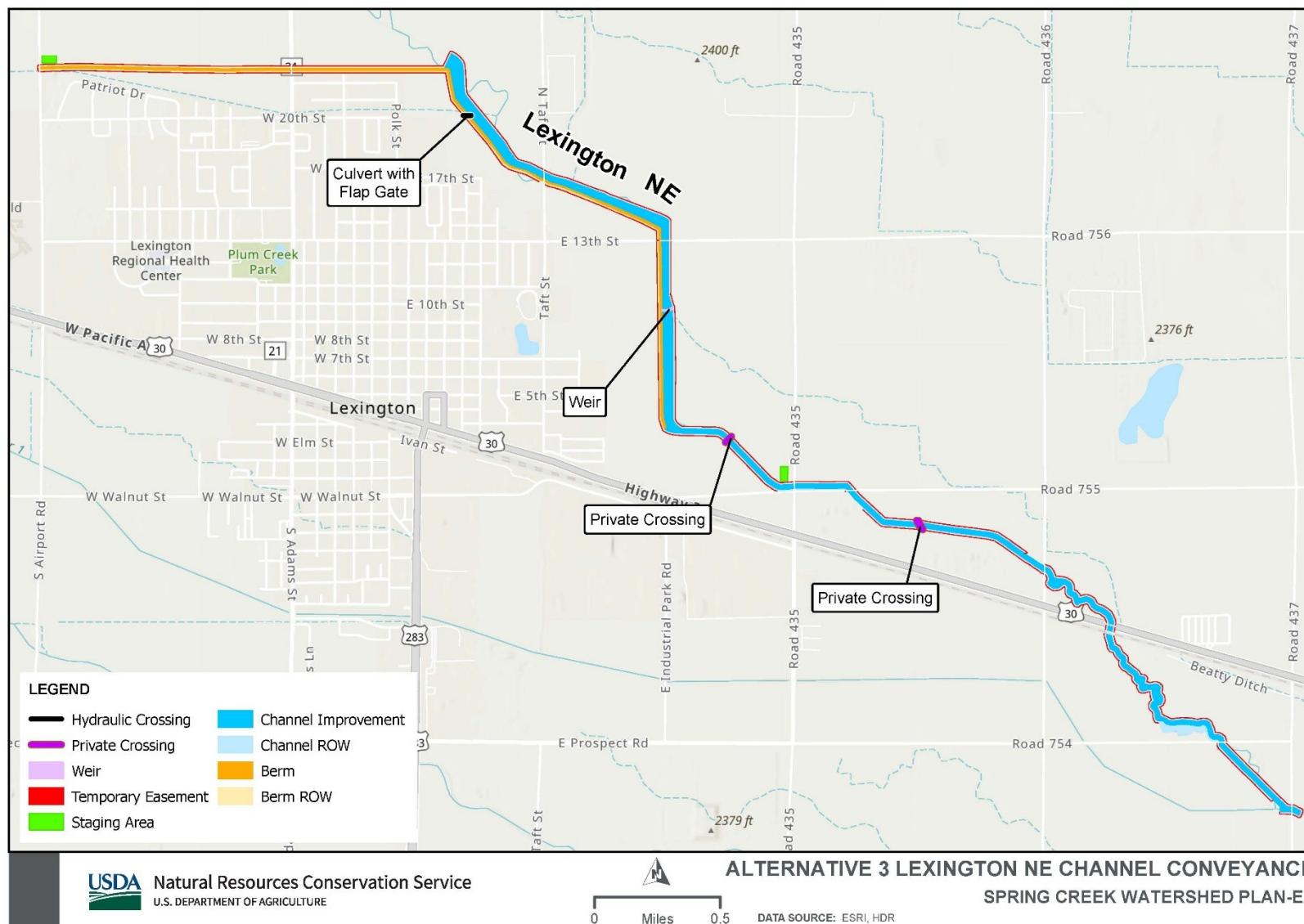


Figure 5-2. Alternative 2, Cozad Channel Conveyance



**Figure 5-3. Alternative 3, Lexington Northeast Channel Conveyance**

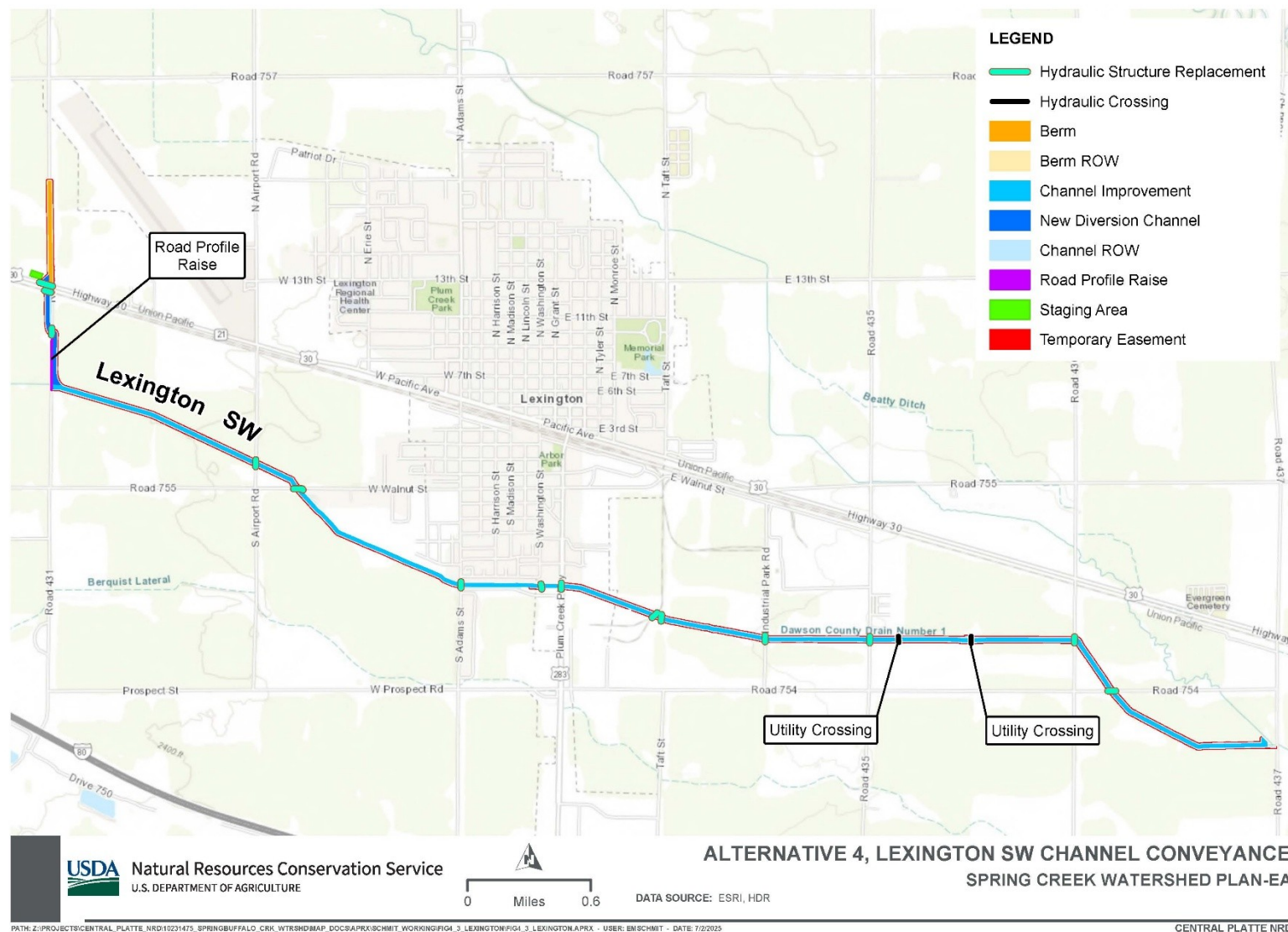


Figure 5-4. Alternative 4, Lexington Southwest Channel Conveyance



## 6 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 5 provides a description of the alternatives, and Chapter 4 presents a description of existing conditions. Cumulative impacts are discussed in Chapter 6.15.

### 6.1 Soils

#### 6.1.1 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 4.1, sedimentation and erosion are not significant issues in the study area due to its range and pastureland land use.

### **6.1.2 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.

### **6.1.3 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.

### **6.1.4 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.

## **6.2 Prime and Unique Farmlands**

### **6.2.1 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.

### **6.2.2 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 6-1 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.

### **6.2.3 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 6-1 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.

### **6.2.4 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 6-1 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 6-1. 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                          |
|            | <b>TOTAL</b>                                                | <b>158.00</b>                | <b>98.8</b>                  | <b>59.1</b>                  |

Source: NRCS 2021

## 6.3 Water Resources

### 6.3.1 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.

### 6.3.2 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 (see Figure 6-1) 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 (see Figure 6-2). For the properties that would be adversely affected by inundation, \$1,653,939 in increased damages is anticipated (see Appendix D). The post-project 100- and 500-year areas of inundation are provided in Appendix C (Figures 5-5a and 5-5b).

### 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 Plains 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 6-2, Figure 6-5).

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 (see Figure 6-5). 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 Figure 6-3). 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 (see Figure 6-2). 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 Plains 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 6-2 and Figure 6-5).

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 (see Figure 6-5). 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.

### **6.3.3 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 (see Figure 6-3). 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 (see Figure 6-4). For the properties that would be adversely affected by inundation, there is an anticipated \$477,620 in increased damages (see Appendix D). The post-project 100-and 500-year areas of inundation are provided in Appendix C (Figures 5-7a and 5-7b).

### 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 Plains 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 6-2 and Figure 6-6).

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 (see Figure 6-6). 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.

### 6.3.4 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 (see Figure 6-3). 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 (see Figure 6-4). For the properties that would be adversely affected by inundation, there is an anticipated \$703,311 in increased damages (see Appendix D). The post-project 100-and 500-year areas of inundation are provided in Appendix C (Figures 5-7a and 5-7b).

#### 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 Plains 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 6-2 and Figure 6-6).

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 (see Figure 6-6). 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 6-2. Spring Creek Delineated Resource Impacts**

|                                 | Permanent Impact                 | Temporary Impact Acreage              |
|---------------------------------|----------------------------------|---------------------------------------|
| <b>Alternative 2</b>            | <b>0.37 acre/150 linear feet</b> | <b>7.48 acres/2,335 linear feet</b>   |
| PEMA/C Wetland                  | 0.33 acre <sup>1</sup>           | 6.75 acres <sup>1</sup>               |
| 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                             |
| <b>Alternative 3</b>            | <b>0.08 acre/172 linear feet</b> | <b>15.02 acres/31,513 linear feet</b> |
| 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        |
| <b>Alternative 4</b>            | <b>0.07 acre/183 linear feet</b> | <b>14.30 acre/29,940 linear feet</b>  |
| 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

<sup>1</sup> 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.



**Figure 6-1. Cozad Channel Conveyance alternative – Change in 10-Year Inundation Levels**



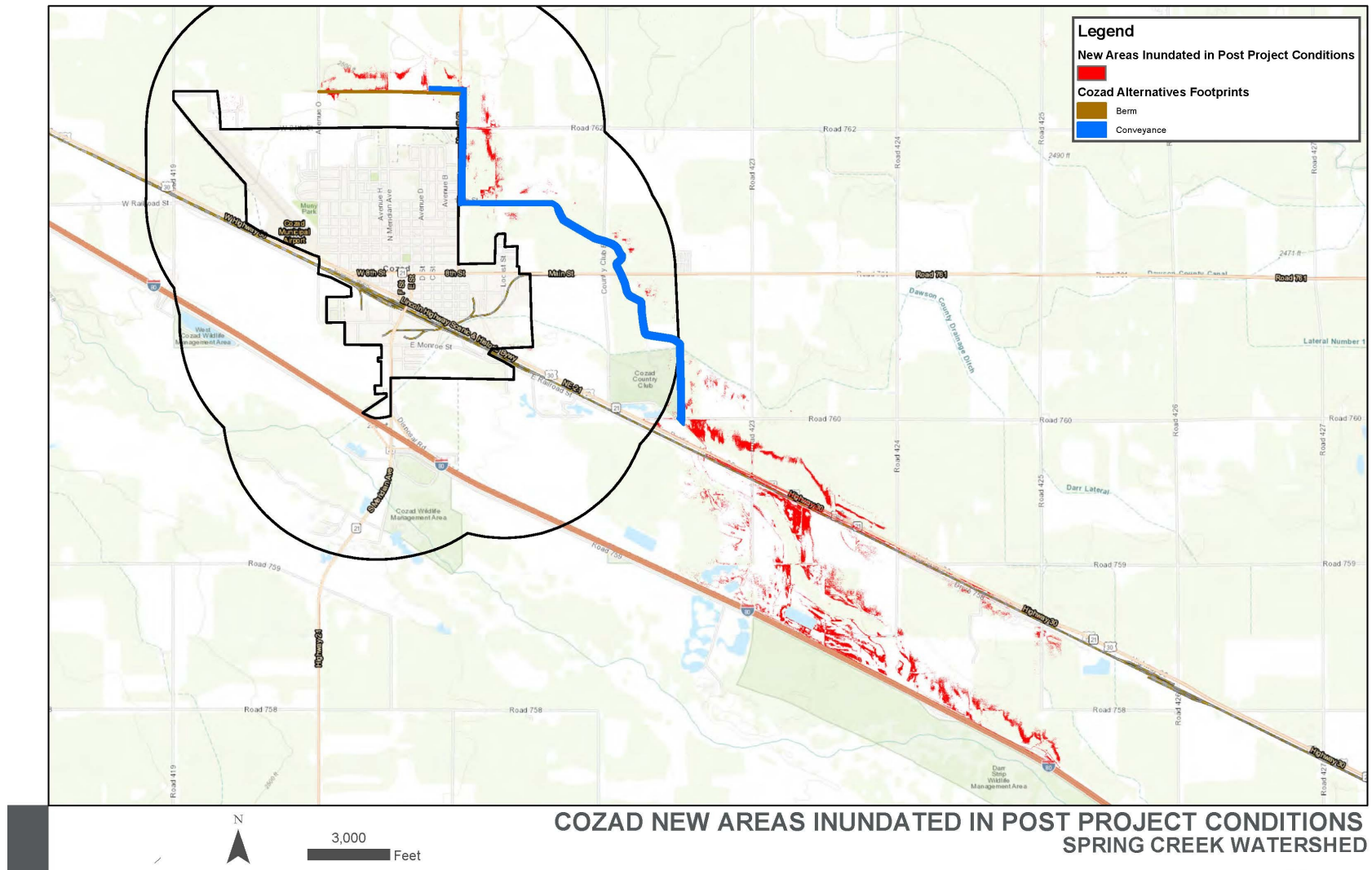


Figure 6-2. Cozad Channel Conveyance alternative – new areas inundated in post-project conditions

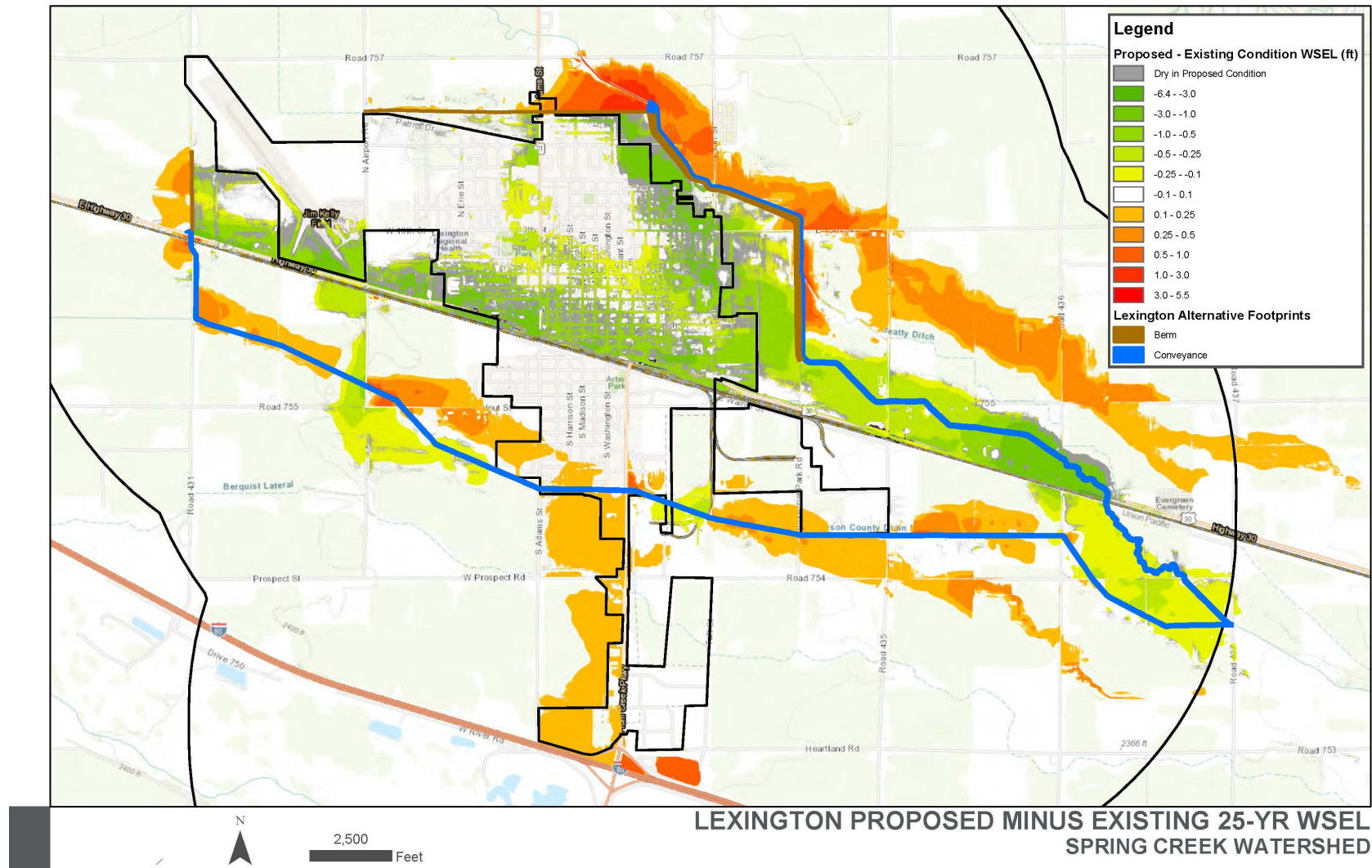


Figure 6-3. Lexington NE and SW Channel Conveyance alternatives – proposed minus existing 25-year water surface elevation



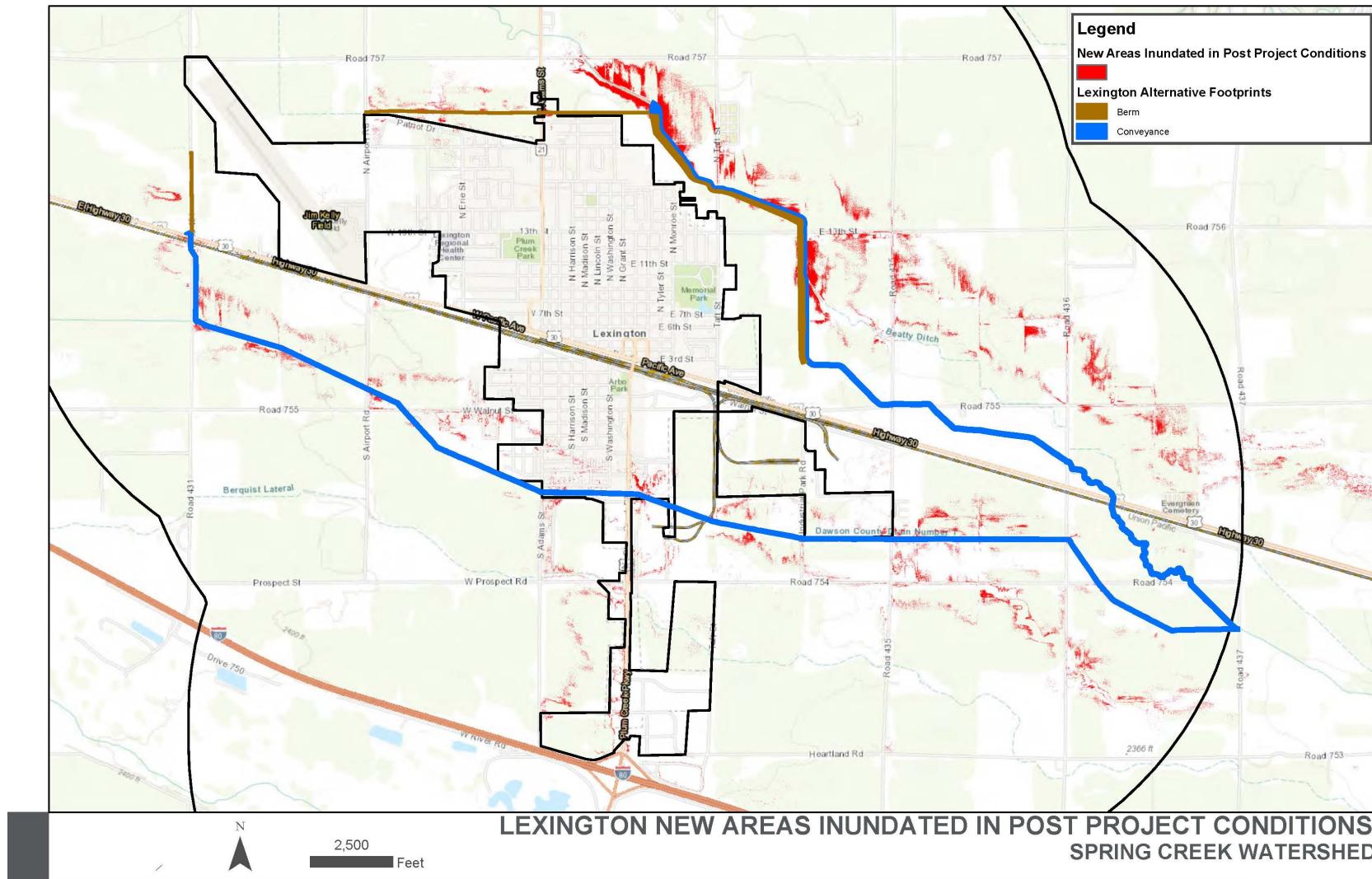


Figure 6-4. Alternatives 3 and 4 – new areas inundated in post-project conditions



Figure 6-5. Cozad Channel Conveyance alternative – wetland and aquatic resources impacts



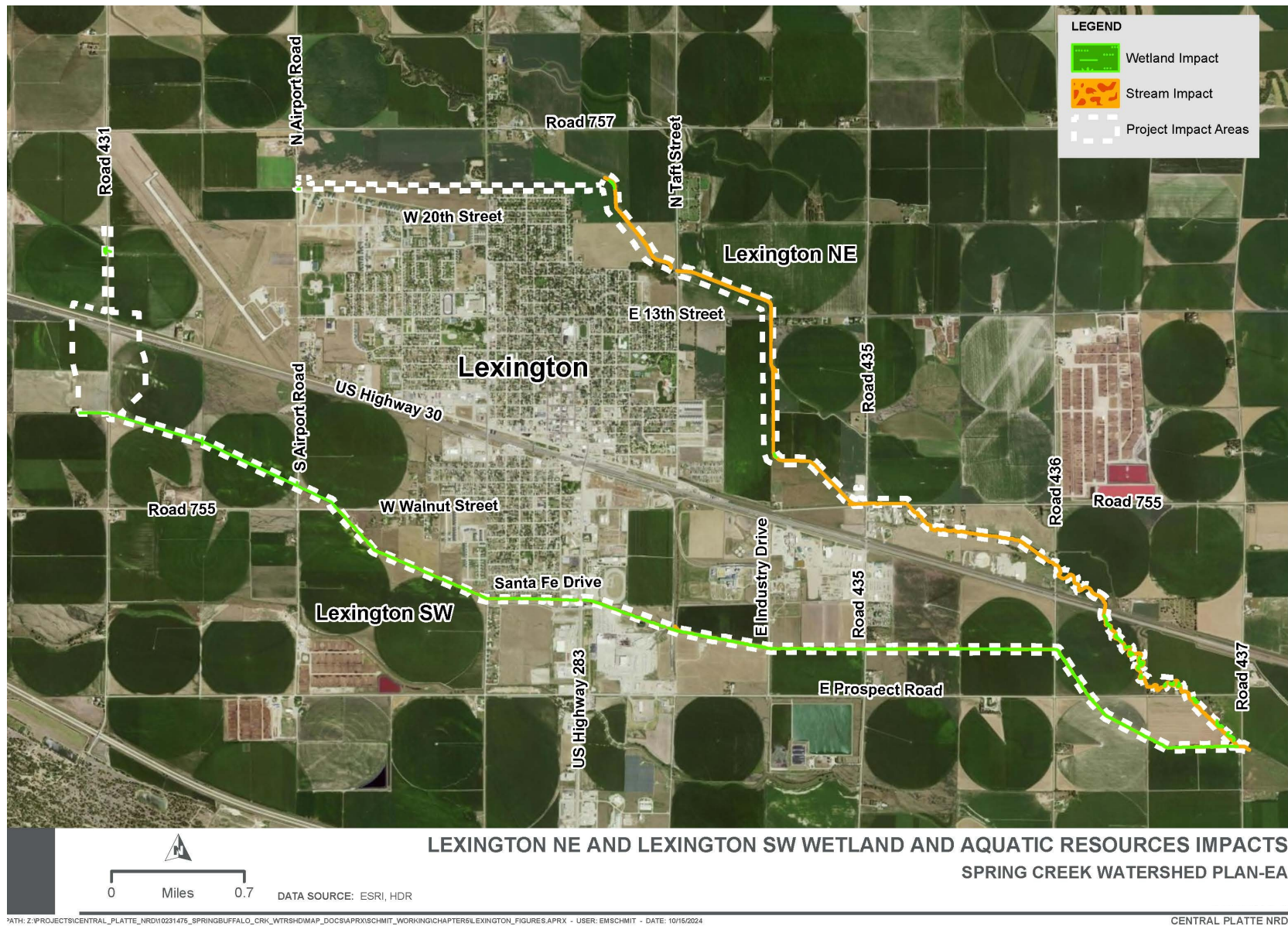


Figure 6-6. Alternatives 3 and 4 – wetland and aquatic resources impacts



## 6.4 Floodplains

### 6.4.1 Alternative 1, No Action/Future Without Federal Investment

This alternative would have change the 100- or 500-year floodplains.

### 6.4.2 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 6-3). 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.

### 6.4.3 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 6-3). 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.

#### 6.4.4 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 6-3). 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 6-3. 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.

## 6.5 Terrestrial and Aquatic Wildlife

### 6.5.1 Alternative 1, No Action/Future Without Federal Investment

Flooding would continue to periodically disrupt aquatic and terrestrial habitat.

### 6.5.2 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 6.3.2 for temporary and permanent wetland and waterway impact quantities. New channel construction would potentially create more suitable habitat for some species.

### 6.5.3 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 6.3.3 for temporary and permanent wetland and waterway impact quantities. New channel construction would potentially create more suitable habitat for some species.

### 6.5.4 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 6.3.4 for temporary and permanent wetland and waterway impact quantities. New channel construction would potentially create more suitable habitat for some species.

## 6.6 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 6-4 provides the list of those endangered and threatened species evaluated for potential impacts for the geographic area around Cozad and Lexington.

**Table 6-4. Endangered and Threatened Species Evaluated for Impacts**

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

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

#### 6.6.1 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.

#### 6.6.2 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.

### **6.6.3 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.

#### **6.6.4 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.

## **6.7 Cultural Resources and Historic Properties**

### **6.7.1 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.

### **6.7.2 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.

### **6.7.3 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.

### **6.7.4 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.

## **6.8 Recreation**

### **6.8.1 Alternative 1, No Action/Future Without Federal Investment**

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

### **6.8.2 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 (see Figure 6-1 and Figure 6-2).

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.

### **6.8.3 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 (see Figure 6-3 and Figure 6-4).

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.

### **6.8.4 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) (see Figure 6-3 and Figure 6-4).

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.

## **6.9 Public Health and Safety**

### **6.9.1 Alternative 1, No Action/Future Without Federal Investment**

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

### **6.9.2 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 4.9 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 (see Figure 6-1 and Figure 6-2) and improve access to these critical resources.

### **6.9.3 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 4.9 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 (see Figure 6-3 and Figure 6-4) and improve access to these critical resources.

### **6.9.4 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 4.9 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 (see Figure 6-3 and Figure 6-4) and improve access to these critical resources.

## **6.10 Social and Economic Conditions**

### **6.10.1 Alternative 1, No Action/Future Without Federal Investment**

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

### **6.10.2 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.

### **6.10.3 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.

### **6.10.4 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.

## **6.11 Scenic Beauty**

### **6.11.1 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.

### **6.11.2 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.

### **6.11.3 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.

### **6.11.4 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.

## **6.12 Land Use**

### **6.12.1 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.

### **6.12.2 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 6.2 for prime and unique farmland impacts.

### **6.12.3 Alternative 3, Lexington Northeast Channel Conveyance**

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

### **6.12.4 Alternative 4, Lexington Southwest Channel Conveyance**

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

## **6.13 Ecosystem Services**

This section provides a description of the impacts related to ecosystem services. See Appendix D and Table 6-5 through Table 6-7 for additional information about ecosystem service trade-offs.

### **6.13.1 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 and sedimentation would inundate 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.

### **6.13.2 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.

### **6.13.3 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.

#### **6.13.4 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.



**Table 6-5. Environmental Effects/Impacts and Ecosystem Trade-offs**

| <b>Ecosystem Service Trade-Offs</b> | <b>Item or Concern</b>                     | <b>Alternative 1</b>                                                        | <b>Alternative 2</b>                          | <b>Alternative 3</b>                          | <b>Alternative 4</b>                          |
|-------------------------------------|--------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|
| <b>Provisioning</b>                 | Soils Resources, Erosion, Sedimentation    | No change                                                                   | Minor benefits to streambank erosion (+)      | Minor benefits to streambank erosion (+)      | Minor benefits to streambank erosion (+)      |
| <b>Provisioning</b>                 | Prime and Unique Farmland                  | No change                                                                   | Conversion of prime and unique farmland (--)  | Conversion of prime and unique farmland (--)  | Conversion of prime and unique farmland (--)  |
| <b>Regulating</b>                   | Floodplain Management                      | No flood control benefits (- - -)                                           | Improved flood control benefits (+++)         | Improved flood control benefits (+++)         | Improved flood control benefits (+++)         |
| <b>Regulating/Cultural</b>          | Regional Water Resource Plans              | No flood control benefits to broader watershed flood control system (- - -) | Improved flood control benefits (+++)         | Improved flood control benefits (+++)         | Improved flood control benefits (+++)         |
| <b>Supporting</b>                   | Surface and Groundwater                    | No change                                                                   | No change                                     | No change                                     | No change                                     |
| <b>Supporting</b>                   | Wetlands and Waters of U.S.                | No change                                                                   | Loss of aquatic resources (-)                 | Loss of aquatic resources (-)                 | Loss of aquatic resources (-)                 |
| <b>Regulating</b>                   | Water Quality                              | No change                                                                   | Maintain water quality benefits (+)           | Maintain water quality benefits (+)           | Maintain water quality benefits (+)           |
| <b>Supporting</b>                   | Vegetation Communities and Habitat         | No change                                                                   | Minor conversion of grassland (-)             | Minor conversion of grassland (-)             | Minor conversion of grassland (-)             |
| <b>Regulating</b>                   | Wetlands                                   | No change                                                                   | Minor conversion (-)                          | Minor conversion (-)                          | Minor conversion (-)                          |
| <b>Regulating</b>                   | Riparian Areas                             | No change                                                                   | Minor conversion (-)                          | Minor conversion (-)                          | Minor conversion (-)                          |
| <b>Cultural</b>                     | Federal and State Listed Species – Plants  | No change                                                                   | No change                                     | No change                                     | No change                                     |
| <b>Supporting</b>                   | Invasive Species                           | No change                                                                   | No change                                     | No change                                     | No change                                     |
| <b>Regulating</b>                   | Fish and Wildlife Species                  | No change                                                                   | Minor increase in aquatic habitat quality (+) | Minor increase in aquatic habitat quality (+) | Minor increase in aquatic habitat quality (+) |
| <b>Regulating</b>                   | Migratory Birds and Eagles                 | No change                                                                   | No change                                     | No change                                     | No change                                     |
| <b>Cultural</b>                     | Federal and State Listed Species – Animals | No change                                                                   | No change                                     | No change                                     | No change                                     |
| <b>Cultural</b>                     | Fish and Wildlife Conservation Act         | No change                                                                   | Minor conversion (-)                          | Minor conversion (-)                          | Minor conversion (-)                          |
| <b>Regulating</b>                   | Climate Change                             | Increased flood risk downstream (- -)                                       | Increased flood control capacity (++)         | Increased flood control capacity (++)         | Increased flood control capacity (++)         |
| <b>Cultural</b>                     | Cultural/Historical Resources              | No change                                                                   | No change                                     | No change                                     | No change                                     |

| <b>Ecosystem Service Trade-Offs</b> | <b>Item or Concern</b>        | <b>Alternative 1</b>                                           | <b>Alternative 2</b>          | <b>Alternative 3</b>          | <b>Alternative 4</b>          |
|-------------------------------------|-------------------------------|----------------------------------------------------------------|-------------------------------|-------------------------------|-------------------------------|
| <b>Cultural</b>                     | Natural Areas and Parklands   | Loss of recreational habitat (- -)                             | Maintain recreational use (+) | Maintain recreational use (+) | Maintain recreational use (+) |
| <b>Regulating</b>                   | Public Health and Safety      | Public safety threats downstream and along the roadway (- - -) | Improve public safety (+++)   | Improve public safety (+++)   | Improve public safety (+++)   |
| <b>Regulating</b>                   | Transportation/Infrastructure | No transportation access and loss of infrastructure (- - -)    | Maintain access (++)          | Maintain access (++)          | Maintain access (++)          |

## 6.14 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.

## 6.15 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.

### 6.15.1 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.

### 6.15.2 Current Projects

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

### 6.15.3 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.

#### **6.15.4 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.

### **6.16 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.

### **6.17 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.

### **6.18 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.

### **6.19 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.

### **6.20 Alternative Summary and Comparison**

Table 6-6 provides a summary and comparison of the alternatives selected for detailed study. This summary includes resource concerns identified in Chapter 3 and detailed in Chapter 4.

**Table 6-6. Summary and Comparison of Selected Alternatives' Impacts on Resource Concerns**

| <b>Resource Topic</b>                                                 | <b>No Action/Future Without Federal Investment</b> | <b>Alternative 2, Cozad Channel Conveyance</b>                                                                                                                                                                                                          | <b>Alternative 3, Lexington Northeast Channel Conveyance</b>                                                                                                                                                                                            | <b>Alternative 4, Lexington Southwest Channel Conveyance</b>                                                                                                                                                                                            |
|-----------------------------------------------------------------------|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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.                                                                                 |

Table 6-7 provides a comparison of the effects of each alternative for its contribution to the federal objective and each of the guiding principles using an ecosystem services approach.

In terms of trade-offs, the Preferred Alternative's investment in the watershed would generate significant public benefit by reducing flood risk as compared to the future without federal investment. While the future without federal investment does not require any investment of public money, the trade-off with avoiding monetary infrastructure investments is accepting continued flooding risk and

damage to infrastructure as compared to the alternative plans. Additional discussion about the cost of each alternative is located in Chapter 7.

**Table 6-7. Summary and Comparison of Alternative Plans**

| Item or Concern                                                         | No Action/Future Without Federal Investment                                                  | Alternative 2, Cozad Channel Conveyance                                                                                                | Alternative 3, Lexington Northeast Channel Conveyance                                                                                  | Alternative 4, Lexington Southwest Channel Conveyance                                                                                  |
|-------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Locally Preferred                                                       |                                                                                              | X                                                                                                                                      | X                                                                                                                                      | X                                                                                                                                      |
| National Economic Efficiency                                            |                                                                                              | X                                                                                                                                      | X                                                                                                                                      | X                                                                                                                                      |
| Environmentally Preferred                                               |                                                                                              | X                                                                                                                                      | X                                                                                                                                      | X                                                                                                                                      |
| Socially Preferred                                                      |                                                                                              | X                                                                                                                                      | X                                                                                                                                      | X                                                                                                                                      |
| Non-Structural                                                          | X                                                                                            |                                                                                                                                        |                                                                                                                                        |                                                                                                                                        |
| PR&G Guiding Principles – Healthy and Resilient Ecosystems <sup>1</sup> |                                                                                              | X                                                                                                                                      | X                                                                                                                                      | X                                                                                                                                      |
| PR&G Guiding Principles – Sustainable Economic Development <sup>1</sup> |                                                                                              | X                                                                                                                                      | X                                                                                                                                      | X                                                                                                                                      |
| PR&G Guiding Principles – Floodplains <sup>1</sup>                      |                                                                                              | X                                                                                                                                      | X                                                                                                                                      | X                                                                                                                                      |
| PR&G Guiding Principles – Public Safety                                 |                                                                                              | X                                                                                                                                      | X                                                                                                                                      | X                                                                                                                                      |
| PR&G Guiding Principles – Watershed Approach                            | X                                                                                            | X                                                                                                                                      | X                                                                                                                                      | X                                                                                                                                      |
| Provisioning Services - Agricultural Production                         | A moderate, long-term effect would occur. No benefit would occur to agricultural production. | A moderate, long-term benefit would occur preventing flooding.                                                                         | A moderate, long-term benefit would occur preventing flooding.                                                                         | A moderate, long-term benefit would occur preventing flooding.                                                                         |
| Regulating Services – Flood Damage Reduction                            | Continued flood risk and damage potential.                                                   | A moderate, long-term benefit would occur preventing flooding.                                                                         | A moderate, long-term benefit would occur preventing flooding.                                                                         | A moderate, long-term benefit would occur preventing flooding.                                                                         |
| Regulating Services – Water Quality                                     | No effect. The existing surface water quality would remain unchanged.                        | A temporary, short-term, negligible effect would occur due to project construction. No long-term effects on water quality would occur. | A temporary, short-term, negligible effect would occur due to project construction. No long-term effects on water quality would occur. | A temporary, short-term, negligible effect would occur due to project construction. No long-term effects on water quality would occur. |

| Item or Concern                                                            | No Action/Future Without Federal Investment | Alternative 2, Cozad Channel Conveyance                 | Alternative 3, Lexington Northeast Channel Conveyance   | Alternative 4, Lexington Southwest Channel Conveyance   |
|----------------------------------------------------------------------------|---------------------------------------------|---------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------|
| Regulating Services – Culture and Heritage                                 | No effect due to no project construction.   | A minor, short-term effect due to project construction. | A minor, short-term effect due to project construction. | A minor, short-term effect due to project construction. |
| National Economic Efficiency Analysis – Federal PL-566 (NRCS Contribution) | \$0                                         | \$12,979,848                                            | \$6,369,953                                             | \$7,306,998                                             |
| National Economic Efficiency Analysis – Sponsor Contribution               | \$0                                         | \$15,772,521                                            | \$21,447,009                                            | \$26,948,047                                            |
| <b>National Economic Efficiency Analysis – Total</b>                       | <b>\$0</b>                                  | <b>\$28,751,369</b>                                     | <b>\$27,816,961</b>                                     | <b>\$34,255,045</b>                                     |
| Average Annual Cost – Installation                                         | \$0                                         | \$842,002                                               | \$814,681                                               | \$1,003,141                                             |
| Average Annual Cost – Operation and Maintenance                            | \$0                                         | \$219,367                                               | \$210,280                                               | \$263,159                                               |
| Average Annual Cost – Other                                                | NA                                          | NA                                                      | NA                                                      | NA                                                      |
| Average Annual Cost – Total                                                | \$0                                         | \$1,061,369                                             | \$1,024,961                                             | \$1,266,300                                             |
| <b>Annual Benefits</b>                                                     | <b>\$0</b>                                  | <b>\$1,881,975</b>                                      | <b>\$1,048,856</b>                                      | <b>(\$455,180)</b>                                      |
| <b>Annual Costs</b>                                                        | <b>\$0</b>                                  | <b>\$1,061,369</b>                                      | <b>\$1,024,961</b>                                      | <b>\$1,266,300</b>                                      |
| <b>Annual Net Benefits</b>                                                 | <b>\$0</b>                                  | <b>\$820,606</b>                                        | <b>\$23,895</b>                                         | <b>(\$1,721,480)</b>                                    |

<sup>1</sup> Represents the federal objective.

<sup>2</sup> This element is not applicable to this alternative because the action is specific to the related project purpose.

<sup>3</sup> Negligible impacts are generally those that might be perceptible but are at the lower level of detection. A minor effect is slight but detectable. A moderate effect is readily apparent. Major or significant effects are those that, in their context and because of their magnitude (severity), have the potential to meet the thresholds for significance set forth in Council on Environmental Quality regulations (40 CFR § 1508.27) and, thus, warrant heightened attention and examination of potential means for mitigation to fulfill the policies set forth in NEPA.

<sup>4</sup> Beneficial effects include only those related to labor income and do not include the net economic benefits quantified in the National Economic Efficiency analysis.

<sup>5</sup> Adverse Effect Annualized includes only the direct costs (no indirect/induced costs included).

## 7 Preferred Alternative

The Proposed Action (Preferred Alternative) is a combination of Alternative 2, Cozad Channel Conveyance, and Alternative 3, Lexington Northeast Channel Conveyance. The combination of these two alternatives meets the project purpose and need, provides the most ecosystem service benefits, best meets the Federal Objective, is the locally Preferred Alternative, and provides a positive monetary benefit to cost ratio. Alternative 3, Lexington Southwest, was removed from the Preferred Alternative due the lack of benefits in comparison to the cost of this alternative. The following sections provide details about the Preferred Alternative in terms of its rationale; specific component measures; associated irreversible or irretrievable commitment of resources; potential areas of controversy; necessary permits and compliance efforts, including mitigation measures, costs and cost-sharing, ecosystem service benefits, installation, and financing; and required operations and maintenance.

### 7.1 Rationale for the Preferred Alternative

Alternative 2, Cozad Channel Conveyance, Alternative 3, Lexington Northeast Channel Conveyance, and Alternative 4, Lexington Southwest Channel Conveyance, were reviewed for their independence in not only the flood damage benefits provided, but also for any indirect effects that implementation of one alternative would have on the effectiveness of another alternative. Implementation of Alternative 2, Cozad Channel Conveyance, does not change the downstream hydrology in a way that effects the design intent or effectiveness of Alternative 3, Lexington Northeast Channel Conveyance, or Alternative 4, Lexington Southwest Channel Conveyance. Because Cozad is upstream and separated from Lexington by approximately 13 miles, implementation of the Lexington alternatives has no influence or effect on Alternative 2, Cozad Channel Conveyance.

Alternative 3, Lexington Northeast Channel Conveyance, and Alternative 4, Lexington Southwest Channel Conveyance, are also independent from one another. Therefore, all three alternatives can be considered separately or in combination without affecting the design intent or performance of the alternative.

Each alternative was evaluated for environmental considerations and economic efficiency. Environmentally, the impacts to resources were reviewed for and did not identify any significant impacts or other environmental consequences that were of special concern.

Economically, Table 7-1 shows the benefits and costs of each alternative (see Appendix D for additional detail):



**Table 7-1. Comparison of NEE Benefits and Costs, Nebraska (FY 2024 Dollars, 2.75% Discount Factor).**

| Alternative                                             | Total Damage reduction benefit, average annual* | Total Average Annual Cost | NEE Metrics Benefit Cost Ratio | NEE Metrics Net Benefits |
|---------------------------------------------------------|-------------------------------------------------|---------------------------|--------------------------------|--------------------------|
| <b>Alternative 2, Cozad Channel Improvements</b>        | \$1,881,975                                     | \$1,061,369               | 1.77                           | \$820,606                |
| <b>Alternative 3, Lexington NE Channel Improvements</b> | \$1,048,856                                     | \$1,024,961               | 1.02                           | \$23,895                 |
| <b>Alternative 4, Lexington SW Channel Improvements</b> | -\$455,180                                      | \$1,266,300               | -0.36                          | -\$1,721,480             |

Alternative 4, Lexington Southwest Channel Improvements, has a high cost related to the benefits that would be received, while Alternative 2, Cozad Channel Improvements, and Alternative 3, Lexington Northeast Channel Improvements, both had positive (above 1.0) benefit to cost ratios. Therefore, the Preferred Alternative is a combination of Alternative 2, Cozad Channel Conveyance, and Alternative 3, Lexington Northeast Channel Conveyance.

The Preferred Alternative meets the purpose and need for the project, the federal and local project objectives, and maximizes net public benefits with appropriate consideration of costs. The NRCS developed the Preferred Alternative in coordination with local sponsors to address urgent flood control issues and provide flood damage reduction to critical infrastructure and emergency access routes. NRCS and the sponsors developed and subsequently evaluated a suite of candidate measures to address flood control reduction before ultimately arriving at the Preferred Alternative.

The impacts, both adverse and beneficial, of the Preferred Alternative were analyzed using the ecosystem services approach to determine its contribution of net public benefits. The ecosystem service trade-offs of the Preferred Alternative determined the extent to which it met project objectives, the federal objective, and its guiding principles. This comparison can be found in the Summary and Comparison of Alternatives PR&G Tradeoff Analysis in Appendix D.

The Preferred Alternative supports the purposes of PL 83-566 because it alleviates existing flood control issues in the watershed and reduces the likelihood of damage to structures and critical infrastructure from floodwater. As required by PL 83-566, the Preferred Alternative contains benefits directly related to rural communities and agriculture because the nearest municipality has a population less than 50,000; hence, all benefits of the project are considered agricultural/rural.

The estimated cost of the Preferred Alternative is \$56,568,330, of which \$20,353,091 would be PL 83-566 funds; the estimated installation period is 4 years.

## 7.2 Measures to Be Installed

The measures of the Preferred Alternative for Cozad includes a combination of constructing small earthen flood control berms and new drainage conveyance ditches and diversions, as well as improving existing drainage channel conveyance.

Beginning at O Street, 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 (see Figure 7-1). An underdrain would be installed for the 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 of a 102-foot bottom width and maximum 201-foot top width. A 25-foot ROW would be maintained on each side of these improvements, where applicable. As part of the Cozad Channel Conveyance alternative, four new structures would be installed, and three structures would be improved. Detailed structural data for the Preferred Alternative can be found in Table 7-2.

The measures of the Preferred Alternative for Lexington NE includes a small earthen flood control berm beginning on the south side of County Road 757 at North Airport Road. It would continue east to Spring Creek east of Nebraska Highway 21. Spring Creek capacity would then be improved south to County Road 437 (Figure 7-2). 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.

Figure 7-3 shows the typical design of channel conveyance and associated berms. Appendix C includes preliminary design plans for the Preferred Alternative. Detailed structural data for the Preferred Alternative can be found in Table 7-2.

**Table 7-2. Preferred Alternative Structure Improvements**

| Address                                | Intersecting Feature                  | Existing Structure | New Structure             | Notes                                |
|----------------------------------------|---------------------------------------|--------------------|---------------------------|--------------------------------------|
| <b>County Road 760</b>                 | New Channel                           | No                 | Bridge                    |                                      |
| <b>Driveway (E 16th Street)</b>        | Drainage Ditch No. 4                  | Yes                | Bridge                    |                                      |
| <b>Newell Street</b>                   | New Channel                           | No                 | Bridge                    |                                      |
| <b>Dawson County Canal</b>             | New Channel                           | No                 | Aqueduct                  | Dawson County Canal over new channel |
| <b>Country Club Road</b>               | Stump Ditch                           | Yes                | Bridge                    |                                      |
| <b>E 8th Street</b>                    | Stump Ditch                           | Yes                | Bridge                    |                                      |
| <b>County Road 762</b>                 | New Channel                           | No                 | Bridge                    |                                      |
| <b>County Road 436</b>                 | Spring Creek                          | Yes                | 5-Barrel Concrete Culvert | County Road 436                      |
| <b>County Road 437</b>                 | Spring Creek/<br>Drainage Ditch No. 1 | Yes                | Bridge                    | County Road 437                      |
| <b>Taft Street</b>                     | Spring Creek                          | Yes                | 5-Barrel Concrete Culvert | Taft Street                          |
| <b>E 13th Street</b>                   | Spring Creek                          | Yes                | 5-Barrel Concrete Culvert | E 13th Street                        |
| <b>County Road 755</b>                 | Spring Creek                          | Yes                | 5-Barrel Concrete Culvert | County Road 755                      |
| <b>Prospect Road (County Road 754)</b> | Spring Creek                          | Yes                | 5-Barrel Concrete Culvert | Prospect Road (CR 754)               |
| <b>US 30</b>                           | Spring Creek                          | Yes                | 5-Barrel Concrete Culvert | US 30                                |
| <b>County Road 435</b>                 | Spring Creek                          | Yes                | 5-Barrel Concrete Culvert | County Road 435                      |
| <b>UPRR</b>                            | Spring Creek                          | Yes                | 5 Barrel Concrete Culvert | UPRR                                 |

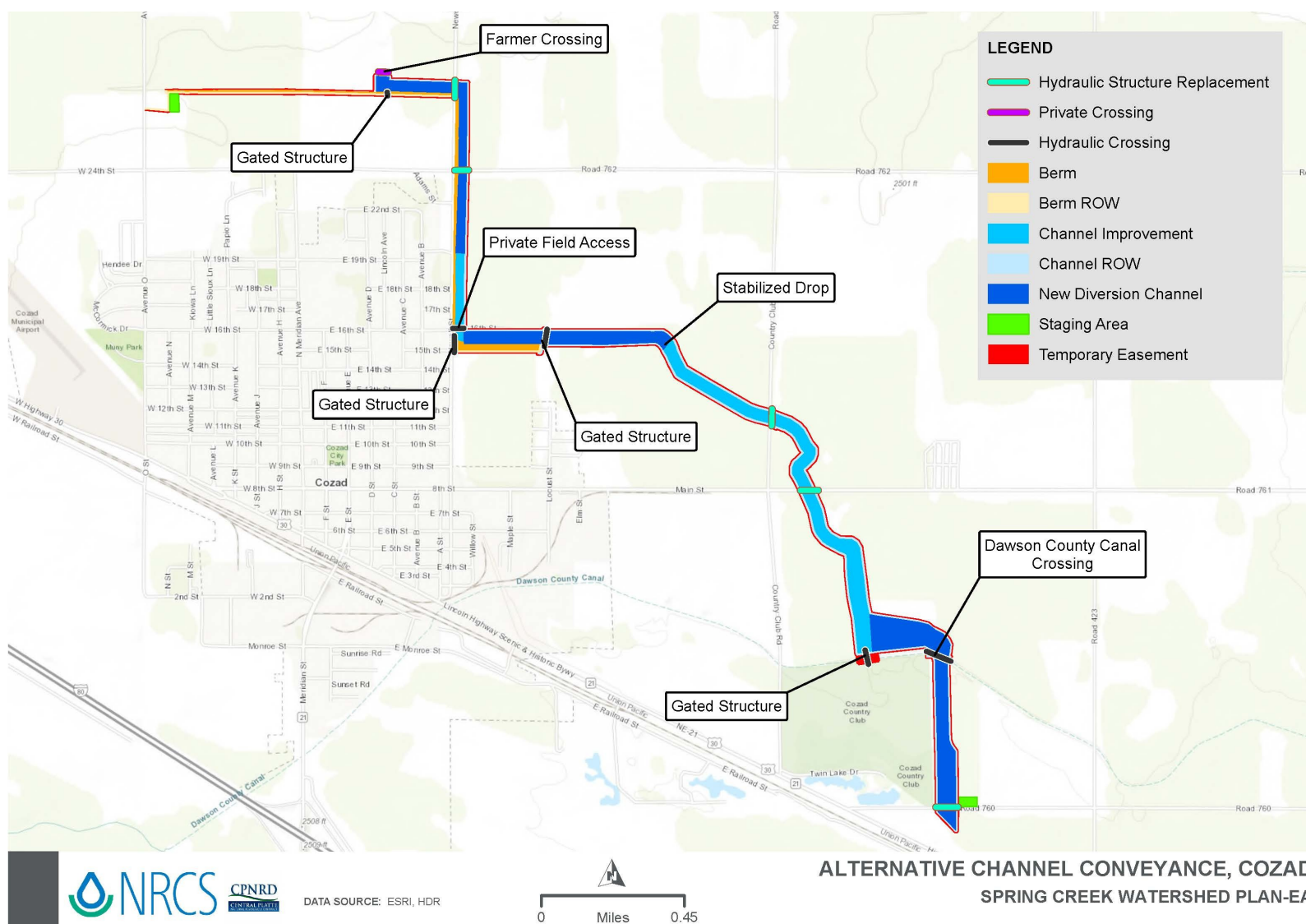


Figure 7-1. Cozad Channel Conveyance alternative

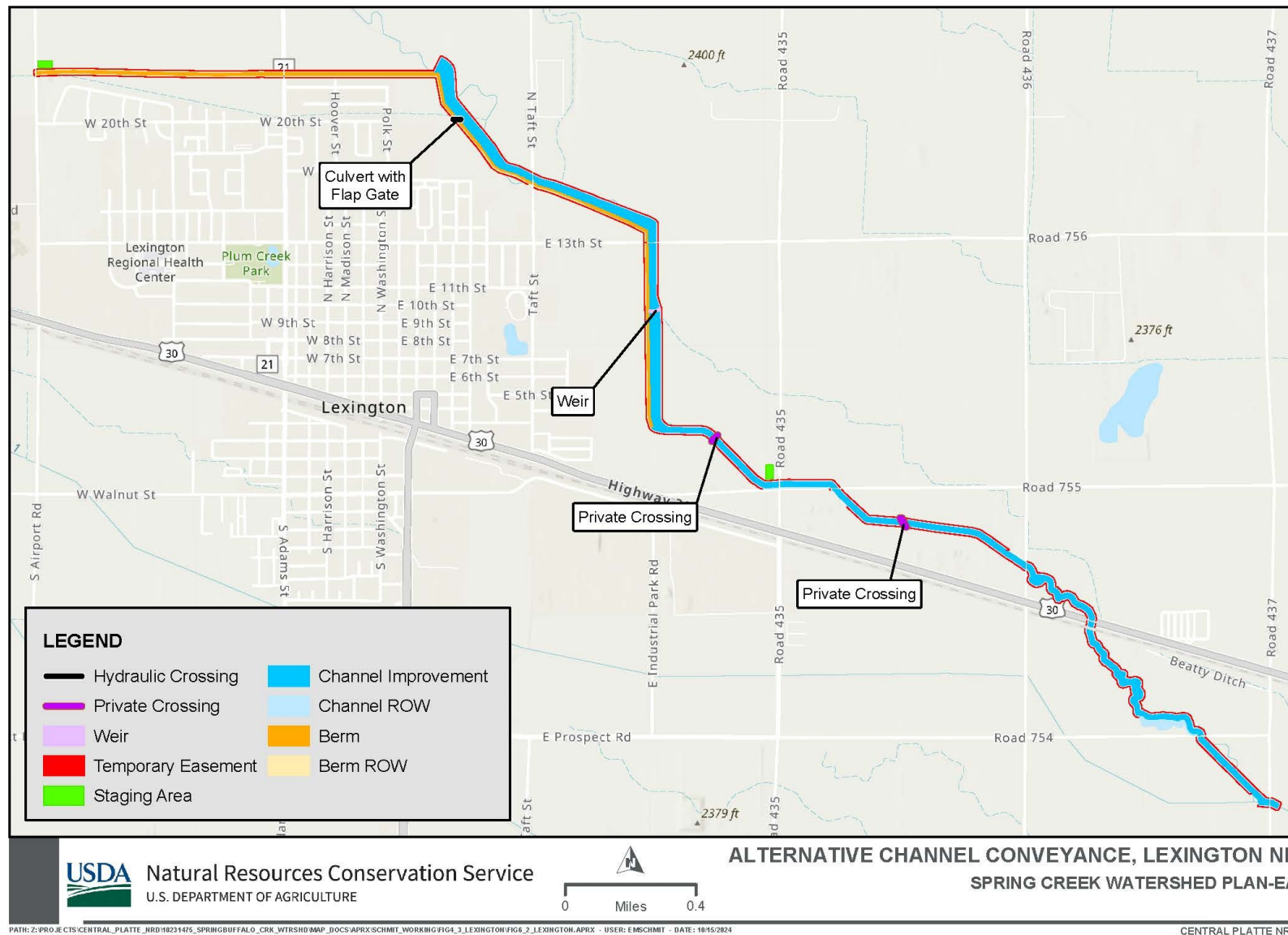
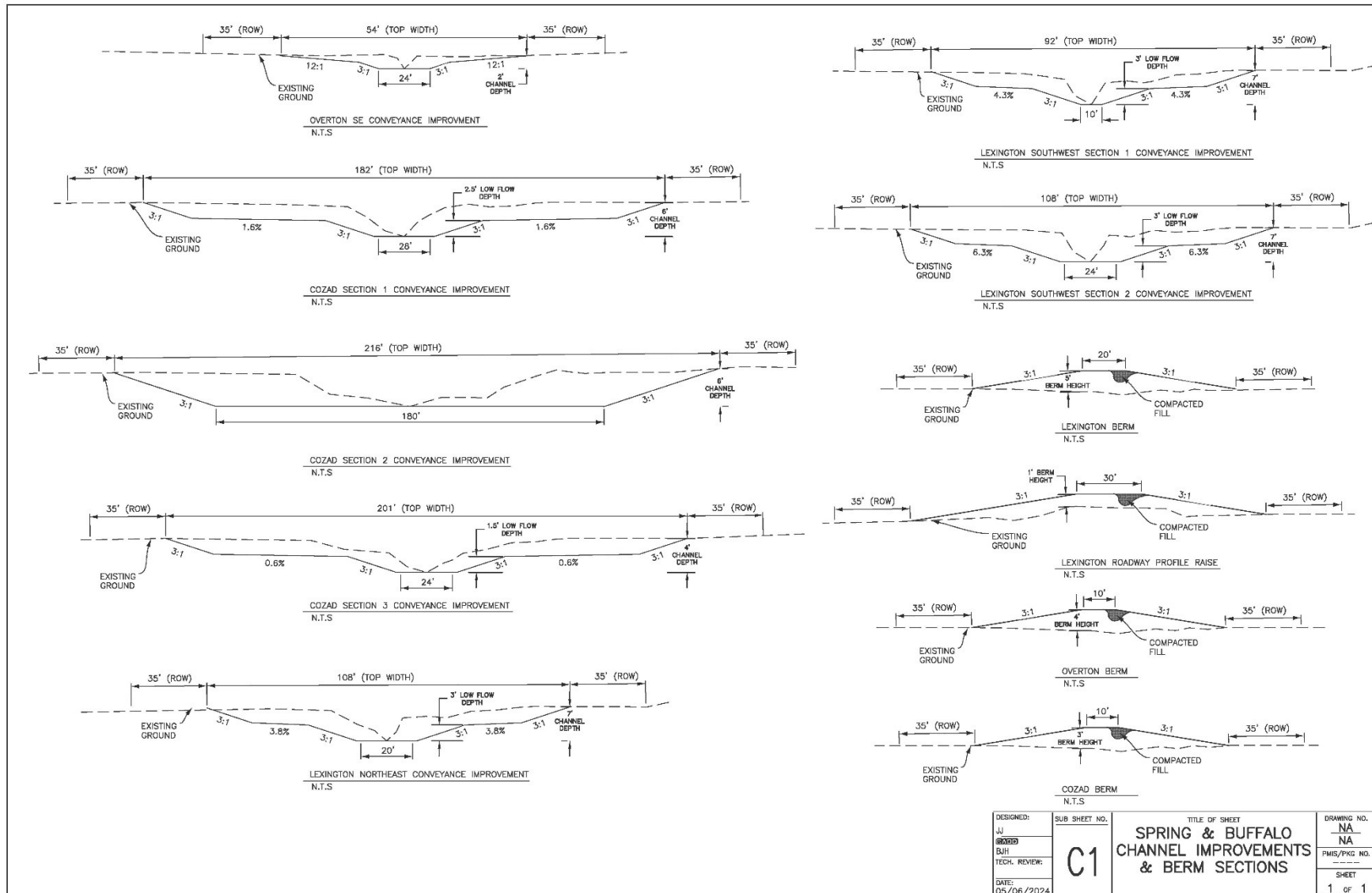


Figure 7-2. Lexington NE Channel Conveyance





**Figure 7-3. Typical design of channel conveyance and associated berms**

### 7.3 Irreversible or Irretrievable Commitment of Resources

Irreversible effects are those caused by the Preferred Alternative that cannot be reversed and are considered permanent. Irretrievable effects are gains and losses of outputs, such as land use, and may occur in the short-term or long-term.

The Preferred Alternative would require construction equipment and materials and other energy in the form of labor and fossil fuels. Using these items would generally be irretrievable. No components of the Preferred Alternative would be retrievable. The expenditure of financial resources is irretrievable in the short term, but the investment would reduce long-term risks to critical infrastructure and the cities of Lexington and Cozad.

### 7.4 Areas of Controversy

No areas of controversy have been identified relative to the Preferred Alternative.

### 7.5 Permits and Compliance

The following items have been identified which the proposed alternative may need to comply with:

- Section 404 of the Clean Water Act
- Section 401 State Water Quality Certification
- Endangered Species Act
- Migratory Bird Treaty Act
- Floodplain Management
- National Environmental Policy Act
- National Historic Preservation Act
  - NRCS determined that this undertaking would have no adverse effect on the Dawson County Canal, Drainage Ditch No. 4, Cozad Country Club and Golf Course, Lateral No. 1, Beatty Ditch, and Dawson County Drain No. 1. However, approximately 50 acres of the APE have not been investigated for historic properties. If historic properties are present, this undertaking may have an adverse effect. 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. Identification procedures and further consultation with Nebraska SHPO, Federally Recognized Tribes, and other consulting parties will continue following the procedures outlined in the Programmatic Agreement executed pursuant to 36 CFR 800.14(b). If historic properties will be adversely affected, mitigation will follow the procedures outlined in the Programmatic Agreement.
- Construction permits
- Dust Control Title 129 – Nebraska Air Quality Regulations, Chapter 15 Section 003

- Solid Waste Management; Nebraska Title 128 and Title 132
- National Pollutant Discharge Elimination System (NPDES) Construction Stormwater Permit
- Operation, Maintenance, and Replacement plans for each structure

As required by NEPA and NRCS Planning policy, consultation with the Nebraska Department of Environment and Energy, Section 7 Endangered Species Act (ESA) consultation, and coordination under Section 106 of the National Historic Preservation Act have been completed for the planning phase and documented throughout the Plan-EA. Ongoing consultation would be carried out as required, such as for updating ESA Section 7 consultation at specific time intervals or engaging the NHPA Section 106 consulting parties per the stipulations of the Programmatic Agreement. All other permits would be secured during the design phase of the project.

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.

NRCS has determined that it has fulfilled its responsibilities under the laws, regulations, policies, and guidance shown in Table 7-3.

**Table 7-3. Compliance with Federal Laws and Responsibilities**

| Laws, Regulations, Policies, and EOs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Yes | N/A |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|
| <b>Section 7(a)(2) of the ESA, PL 93-205, ESA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Yes |     |
| <b>PL 94-265 provisions of the Magnuson-Stevens Act, Essential Fish Habitat</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |     | N/A |
| <b>Section 12 PL 83-566</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Yes |     |
| <b>Section 106 of the National Historic Preservation Act (NHPA)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Yes |     |
| <b>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</b> | Yes |     |

| Laws, Regulations, Policies, and EOs                                                                                                                                                                                                                                                | Yes | N/A |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|
| <b>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</b> |     |     |
| <b>PL 92-583, Coastal Zone Management Act</b>                                                                                                                                                                                                                                       |     | N/A |
| <b>Wild and Scenic Rivers Act, PL 90-542</b>                                                                                                                                                                                                                                        |     | N/A |
| <b>Section 408 – 33 U.S. Code 408</b>                                                                                                                                                                                                                                               |     | N/A |
| <b>PL 99-198, Title XII, The Food Security Act of 1985</b>                                                                                                                                                                                                                          | Yes |     |
| <b>Prime and Unique Farmland, Farmland of Statewide or Local Importance: Farmland Protection Policy Act, PL 97-98</b>                                                                                                                                                               | Yes |     |
| <b>Waters of the United States, including Wetlands: PL 112-328, Federal Water Pollution Control Act, Clean Water Act</b>                                                                                                                                                            | Yes |     |
| <b>Water Quality: PL 112-328</b>                                                                                                                                                                                                                                                    | Yes |     |
| <b>NRCS Wetland and Highly Erodible Land Policy (PL 99-198, Title XII, The Food Security Act of 1985), Highly Erodible Soil</b>                                                                                                                                                     | Yes |     |
| <b>Other</b>                                                                                                                                                                                                                                                                        |     | N/A |

## 7.6 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 6. 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.

## **7.7 Costs and Cost Sharing**

Cost sharing between PL 83-566 and other sources is shown in Table 7-4 through Table 7-10. The estimated Preferred Alternative costs are \$56,568,330. The estimated construction costs for program measures, all of which are understood eligible for PL 83-566 funding, total \$20,353,091.

Construction costs for program measures are direct costs for installation (Table 7-4) and include such items as excavation, staging of materials, labor and material costs, and seeding of disturbed areas with native species. Engineering services include the direct cost of engineers and other technicians for surveys, investigations, designs, and preparation of plans and specifications for program measures and the preparation of operation and maintenance plans.

Project administration costs include the cost of contract administration, review of engineering plans prepared by others, contract administrators, and inspection services during construction. The total estimated cost of project administration is \$4,296,474. The Sponsor's estimated cost of project administration is \$2,234,166, and the estimated cost of project administration eligible for PL 83-566 funding is \$2,062,307.

The Sponsor's estimated cost of land rights is expected to cost \$32,832,836. The estimated cost of real estate appraisal fees, legal fees, and survey costs for PL 83-566 funding is \$230,925.



For a flood risk reduction project, engineering costs are cost shared at 100 percent; the Sponsor's engineering costs are estimated to be \$0. The cost to obtain permits for the works of improvement is estimated to be \$2,148,237 for the project.

## **7.8 Ecosystem Services Benefits**

The Preferred Alternative would protect ecosystem services from impacts of flooding and would enhance some services through installation, including protecting nonagricultural and productive cropland, maintaining and improving the provision of drinking water to the local community, and improving water quality. It is expected to improve conditions related to all six guiding principles<sup>1</sup>: healthy and resilient ecosystems, sustainable economic development, floodplains, public safety, and watershed approach.

## **7.9 Installation and Financing**

This section details the installation and financing requirements associated with the Preferred Alternative.

### **7.9.1 Installation**

Works of improvement would be installed over a 4-year period following authorization of federal assistance under the Watershed Protection and Flood Protection Act, PL 83-566. Final design and installation of the works of improvement would commence upon approval of the plan.

### **7.9.2 Responsibilities**

Responsibilities for conducting a site-specific project would be shared between NRCS and the Sponsor as follows:

#### **NRCS**

- Provide overall project administration.
- Provide engineering design and construction inspection for works contracted by NRCS.
- Provide engineering designs for works contracted by Sponsor.
- Complete all required federal, tribal, state, and local consultation processes.
- Provide funds to Sponsor for preparing engineering designs and construction inspection for works contracted by Sponsor.
- Provide up to 100 percent of the construction costs. The cost-share rate is to be commensurate with other national programs at the time of signing project agreements.

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<sup>1</sup> Executive Orders 14148 and 14173 have revoked federal agencies' responsibilities to assess impacts of our actions on communities with environmental justice concern; environmental justice was not assessed for this Plan-EA

- Provide funds to Sponsor for project management and engineering typically performed by NRCS to implement projects.

#### **Sponsors**

- Provide up to 100 percent of costs for project and contract administration costs, permitting, and real estate for installing works of improvement.
- Acquire any land rights necessary for installing the works of improvement.
- Bear the costs of relocating or modifying utilities and construction of infrastructure improvements.
- Secure all required federal, state, and local permits.
- Provide operation and maintenance of all components of installed works of improvement.
- When funded by NRCS, provide project management and engineering typically performed by NRCS to implement projects.

#### **7.9.3 Contracting**

This project would be constructed through project agreements between NRCS and the Sponsor for that site by means of a federal contract, local contract, division of work, or force account.

#### **7.9.4 Real Property Rights**

The Sponsor would be responsible for acquiring the real property rights and ROW necessary to install, operate, and maintain the works of improvement. The Sponsor would also be responsible for the satisfactory relocation or modification of any utilities disturbed as a result of the project.

### **7.10 Operation, Maintenance, and Replacement (O&M&R)**

Operation includes the administration, management, and performance of non-maintenance actions needed to keep each completed practice safe and functioning as planned. Maintenance includes the performance of work, preventing deterioration of installed practices, and repairing damage or replacement of the practice if one or more of its components fail. Damages to completed practices caused by normal deterioration, drought, flooding, sedimentation, or vandalism are considered normal maintenance.

The Sponsor's liability for operation and maintenance extends throughout the life of the project (100 years). There is contingency to account for culvert replacements since the design life of the structure is typically 50 years. The calculated Operation and Maintenance and Replacement (O&M&R) cost does not include bridge replacements as the design life of the structure is typically over 100 years. Annual O&M&R would accommodate any damage resulting from over-topping events. A separate operation and maintenance agreement would be developed and signed prior to construction of the project. The agreement would provide for inspections, reports, and procedures for performing the maintenance items. An operation and maintenance plan

would be included with the agreement, which would have strict requirements for the Sponsor to inspect and perform maintenance work. Each measure is to be inspected on a regularly scheduled basis and immediately following major storms, earthquakes, or other occurrences that may adversely affect the measure.

The estimated average annual operation and maintenance costs are \$429,647 (evaluated for a 100-year period).

## **7.11 Emergency Action Plan**

An emergency action plan would be drafted and approved by the Sponsoring Local Organization upon completion of the detailed design phase. The plan would outline plausible catastrophic failure scenarios and include pertinent steps for each considered scenario. Contact information of relevant emergency response agencies would be included and updated on an annual basis. Semiannual disaster training would also be conducted with local emergency response agencies to drill the most likely disaster response scenarios.

## 7.12 Economic and Structural Tables

**Table 7-4. Economic Table 1 – Estimated Installation Costs**

| Works of Improvement       | Fed Land (acres) | Non-Federal Land (acres) | Total (acres)  | Public Law 83-566 Estimated Cost – Federal Land (Dollars <sup>1</sup> ) | Public Law 83-566 Estimated Cost – Non-Federal Land (Dollars <sup>1</sup> ) | Public Law 83-566 Estimated Cost – Total (Dollars <sup>1</sup> ) | Other Funds Estimated Cost - Federal Land (Dollars <sup>1</sup> ) | Other Funds Estimated Cost - Non-Federal Land (Dollars <sup>1</sup> ) | Other Funds Estimated Cost - Total (Dollars <sup>1</sup> ) | Estimated Cost – Total (Dollars <sup>1</sup> ) |
|----------------------------|------------------|--------------------------|----------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------|-------------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------|------------------------------------------------|
| Channel Conveyance / Berms | 0                | 324                      | 324            | \$0                                                                     | \$16,656,988                                                                | \$0                                                              | \$0                                                               | \$4,430,622                                                           | \$0                                                        | \$21,087,610                                   |
| Structures                 | 0                | 0                        | 0 <sup>3</sup> | \$0                                                                     | \$3,357,765                                                                 | \$0                                                              | \$0                                                               | \$32,122,955                                                          | \$0                                                        | \$35,480,720                                   |
| Total Project              | 0                | 324                      | 324            | \$0                                                                     | \$20,014,754                                                                | \$0                                                              | \$0                                                               | \$36,553,577                                                          | \$0                                                        | \$56,568,330                                   |

Note: <sup>1</sup> Price base 2024.

<sup>2</sup> No ROW costs anticipated.

<sup>3</sup> Structural replacement acreage is included within channel conveyance/berm acreage.

**Table 7-5. Economic Table 2 – Estimated Cost Distribution (Dollars<sup>1</sup>)**

| Works of Improvement       | PL 83-566 – Construction | PL 83-566 – Engineering | PL 83-566 – Project Administration <sup>2</sup> | Total Public Law 83-566 Funds | Other Funds – Construction | Other Funds – Engineering | Other Funds – Real Property Rights <sup>4</sup> | Other Funds – Relocation Payments | Other Funds – Permits | Other Funds – Project Admin <sup>2</sup> | Total Other Funds | Total – Installation Costs |
|----------------------------|--------------------------|-------------------------|-------------------------------------------------|-------------------------------|----------------------------|---------------------------|-------------------------------------------------|-----------------------------------|-----------------------|------------------------------------------|-------------------|----------------------------|
| Channel Conveyance / Berms | \$13,441,149             | \$1,344,115             | \$1,957,654                                     | \$16,742,918                  | \$0                        | \$0                       | \$2,540,173                                     | \$0                               | \$1,718,590           | \$85,929                                 | \$4,344,692       | \$21,087,610               |
| Structures                 | \$0                      | \$2,952,359             | \$426,889                                       | \$3,379,248                   | \$0                        | \$0                       | \$29,523,588                                    | \$0                               | \$429,647             | \$2,148,237                              | \$32,101,473      | \$35,480,720               |
| Total Project              | \$13,441,149             | \$4,296,474             | \$2,384,543                                     | \$20,122,166                  | \$0                        | \$0                       | \$32,063,761                                    | \$0                               | \$2,148,237           | \$2,234,166                              | \$36,446,165      | \$56,568,330               |

Note: <sup>1</sup> Price base 2024

<sup>2</sup> Includes construction management and technical assistance

<sup>3</sup> Includes construction costs associated with infrastructure on public ROW

**Table 7-6. Structural Table 3a – Dikes**

| Dike            | Stationing <sup>1</sup> | Top Width (ft) | Average Side Slope | Average Height (ft) | 100-Year Frequency Velocity (ft/sec) | Dike Protection | Volume of Earth Fill (yd <sup>3</sup> ) |
|-----------------|-------------------------|----------------|--------------------|---------------------|--------------------------------------|-----------------|-----------------------------------------|
| Cozad Section 1 | 4,600                   | 10             | 3                  | 3                   | 1.5                                  | Y               | 14,718                                  |
| Cozad Section 2 | 1,400                   | 10             | 3                  | 5                   | 2                                    | Y               | 1,432                                   |
| Lexington NW    | 18,800                  | 20             | 3                  | 4                   | 3                                    | Y               | 97,849                                  |
| Total           |                         |                |                    |                     |                                      |                 | 113,999                                 |

Note: <sup>1</sup> Total length

**Table 7-7. Structural Table 3b – Channel Work**

| Channel Name    | Stationing <sup>1</sup> | 10-Year Frequency Design Discharge | Gradient (ft/ft) | Bottom Width Range (ft) | Side Slope | Aged | Excavation Volume (yd <sup>3</sup> ) | Type of Work <sup>2</sup> | Type <sup>3</sup> | Present Flow Condition <sup>4</sup> |
|-----------------|-------------------------|------------------------------------|------------------|-------------------------|------------|------|--------------------------------------|---------------------------|-------------------|-------------------------------------|
| Cozad Section 1 | 2,350                   | 1,683                              | 0.001            | 28-152                  | 3          | 0.04 | 214,648                              | II                        | M                 | I                                   |
| Cozad Section 2 | 3,650                   | 1,785                              | 0.001            | 180                     | 3          | 0.03 | 194,751                              | I                         | O                 | E                                   |
| Cozad Section 3 | 7,750                   | 1,032                              | 0.001            | 180                     | 3          | 0.04 | 383,573                              | II                        | N                 | PR                                  |
| Lexington NE    | 27,550                  | 2,395                              | 0.001            | 72                      | 3          | 0.04 | 444,179                              | II                        | N                 | PR                                  |
| Total           |                         |                                    |                  |                         |            |      | 1,237,151                            |                           |                   |                                     |

Note: <sup>1</sup> Total length

<sup>2</sup> I – Establishment of new channel including necessary stream stabilization measures; II – Enlargement of existing channel

<sup>3</sup> N – Un-modified well-defined channel; M – Manmade ditch; O – None or practically no defined channel

<sup>4</sup> PR – Perennial – Flows at all times except drought; I – Intermittent – Continuous flow through some seasons of the year; E – Ephemeral – Flows only during periods of surface runoff, otherwise dry.



**Table 7-8. Economic Table 4 – Average Annual Preferred Alternative Annual Costs (Dollars<sup>1</sup>)**

| Works of Improvement | Average Annual Installation Cost <sup>1</sup> | Average Annual Operation, Maintenance, and Replacement Cost <sup>1,2</sup> | Other Direct Costs | Total Costs        |
|----------------------|-----------------------------------------------|----------------------------------------------------------------------------|--------------------|--------------------|
| Cozad                | \$842,002                                     | \$219,367 <sup>1</sup>                                                     | \$0                | \$1,061,369        |
| Lexington NE         | \$814,681                                     | \$210,280 <sup>1</sup>                                                     | \$0                | \$1,024,961        |
| <b>Total Project</b> | <b>\$1,656,683</b>                            | <b>\$429,647<sup>1</sup></b>                                               | <b>\$0</b>         | <b>\$2,086,330</b> |

Note: <sup>1</sup> Price base 2024; Amortized over 100 years at a discount rate of 2.75 percent.

<sup>2</sup> Based on 1% of total construction costs

**Table 7-9. Economic Table 5 – Estimated Average Annual Flood Damage Reduction Benefits (Dollars<sup>1</sup>)**

| Item                            | Estimated Annual Damage Without Project Agricultural Related <sup>1</sup> | Estimated Annual Damage Without Project Non-Agricultural Related <sup>1</sup> | Estimated Annual Damage With Project Agricultural Related <sup>1</sup> | Estimated Annual Damage With Project Non-Agricultural Related <sup>1</sup> | Damage Reduction Benefit Agricultural Related <sup>1</sup> | Damage Reduction Benefit Non-Agricultural Related <sup>1</sup> |
|---------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------|----------------------------------------------------------------|
| Cozad – Structures              | \$9,334,627                                                               | \$0                                                                           | \$7,721,510                                                            | \$0                                                                        | \$1,613,117                                                | \$0                                                            |
| Cozad – Crop and Pasture        | \$46,882,039                                                              | \$0                                                                           | \$46,613,181                                                           | \$0                                                                        | \$268,858                                                  | \$0                                                            |
| Lexington NE – Structures       | \$9,152,255                                                               | \$0                                                                           | \$7,660,510                                                            | \$0                                                                        | \$1,491,745                                                | \$0                                                            |
| Lexington NE – Crop and Pasture | \$46,909,511                                                              | \$0                                                                           | \$47,352,400                                                           | \$0                                                                        | -\$442,889                                                 | \$0                                                            |
| <b>Total</b>                    | <b>\$112,278,432</b>                                                      | <b>\$0</b>                                                                    | <b>\$109,347,601</b>                                                   | <b>\$0</b>                                                                 | <b>\$2,930,831</b>                                         | <b>\$0</b>                                                     |

Note: <sup>1</sup> Price base 2024; Amortized over 100 years at a discount rate of 2.75 percent. Agriculture related damage includes damage to rural communities.

**Table 7-10. Economic Table 6 – Comparison of Preferred Alternative Benefits and Costs (Dollars<sup>1</sup>)**

| Works of Improvement | Agriculture-Related<br>Damage Reduction<br>Flood Prevention <sup>2</sup> | Average Annual<br>Benefits | Average Annual<br>Costs | Benefit-Cost<br>Ratio |
|----------------------|--------------------------------------------------------------------------|----------------------------|-------------------------|-----------------------|
| Cozad                | \$1,881,975                                                              | \$1,881,975                | \$1,061,369             | 1.77                  |
| Lexington NE         | \$1,048,856                                                              | \$1,048,856                | \$1,024,961             | 1.02                  |
| Total                | \$2,930,831                                                              | \$2,930,831                | \$2,086,330             | 1.40                  |

Note: <sup>1</sup> Price base 2024. Amortized over 100 years at a discount rate of 2.75 percent.

<sup>2</sup> Agriculture related damage includes damage to rural communities.

## 8 Consultation, Coordination, and Public Participation

This Chapter summarizes the consultation and coordination processes with other agencies and describes the opportunities provided for public participation throughout the planning process, from the initial request to NRCS assistance to preparation of the final watershed project plan.

### 8.1 Consultation

#### 8.1.1 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.

#### 8.1.2 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.

### 8.1.3 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.

## 8.2 Coordination

Coordination began early in the planning process, and agencies provided input on all resource areas that they oversee. The agencies were also asked to comment on the evaluated natural and cultural resource impacts of the project. Twenty-three state, county, and local agencies were sent an agency scoping packet on October 29, 2020, which included an introduction and background, a description of the project and alternatives, anticipated impacts, a description of NRCS procedures, and a schedule. A project area figure was also provided. A response was requested within 30 days of receipt of the letter; five agencies provided comments.

The following organizations participated in the development of this Plan-EA and provided technical support, information, data analysis, and guidance:

- 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

All coordination correspondence is provided in Appendix A.

## 8.3 Public Involvement

The project development team (NRCS and the Sponsor) collaborated closely with local landowners, residents, and nonresident workers to include them in the planning process, provide timely information, and solicit their input on pertinent issues considered during planning.





CPNRD hosted an online public scoping meeting instead of an in-person public meeting due to COVID-19 public gathering guidelines and recommendations. The public was notified of the online public scoping meeting via legal notice posted in the Lexington Clipper-Herald (published October 28, 2020, and November 18, 2020), the Grand Island Independent (published October 28, 2020, and November 17, 2020), and the Kearney Hub (published October 28, 2020, and November 17, 2020). A press release was also published October 28, 2020, to notify area media outlets. Project fact sheets were printed and delivered to public agencies, as needed. The CPNRD website posted information regarding the online public scoping meeting. If individuals did not have internet access, outreach provided contact information to obtain hard-copy alternatives for the meeting. If individuals needed meeting materials translated into Spanish, outreach provided contact information for a translator.

The self-guided online meeting was posted on the CPNRD website at <http://cpnrd.org/> and was available for review and comment for 45 days from Wednesday, October 28, 2020, through Saturday, December 12, 2020. During those 45 days, the website had 88 total visitors, drawing 7 comments from the general comment form, comment-mapping tool, and email.

Public scoping meetings were conducted jointly with CPNRD in partnership with NRCS.

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## 10 List of Preparers

| Name                 | Title (Years of Experience)                                                       | Education (Degree, field of study)                                                        | Other (licenses, etc.)                                          |
|----------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| <b>USDA NRCS</b>     |                                                                                   |                                                                                           |                                                                 |
| Melissa Baier        | Watershed Planning Coordinator (4 years);<br>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;<br>MSC. Soil Chemistry, Bulgaria;<br>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<br>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);<br>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)                              |                        |
| <b>HDR</b>                               |                                           |                                                                                       |                        |
| 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                     |
| <b>Nebraska State Historical Society</b> |                                           |                                                                                       |                        |
| Dave Williams                            | Principal Investigator; Archaeologist     | B.A. Anthropology; M.A. Anthropology                                                  | MA, RPA                |

# 11 Distribution List

- 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

## 12 Abbreviations and Acronyms

|       |                                           |
|-------|-------------------------------------------|
| AIRFA | American Indian Religious Freedom Act     |
| APE   | Area of Potential Effect                  |
| ARA   | Affected Resource Area                    |
| BGEPA | Bald and Golden Eagle Protection Act      |
| BUL   | biologically unique landscape             |
| CFR   | Code of Federal Regulations               |
| CLOMR | Conditional Letter of Map Revision        |
| CPNRD | Central Platte Natural Resources District |
| DR    | Department Regulation                     |
| EAP   | Emergency Action Plan                     |
| EO    | Executive Order                           |
| EPA   | U.S. Environmental Protection Agency      |
| ESA   | Endangered Species Act                    |
| FEMA  | Federal Emergency Management Agency       |
| FIS   | Flood Insurance Study                     |
| FPPA  | Federal Farmland Protection Policy Act    |
| FWOFI | Future Without Federal Investment         |
| GM    | General Manual                            |
| HEL   | Highly Erodible Land                      |
| I-80  | Interstate 80                             |
| IPaC  | Information for Planning and Consultation |
| LEP   | limited English proficiency               |
| MBTA  | Migratory Bird Treaty Act                 |



|         |                                                            |
|---------|------------------------------------------------------------|
| MOA     | Memorandum of Agreement                                    |
| NE      | Northeast                                                  |
| NEMA    | Nebraska Emergency Management Agency                       |
| NDOT    | Nebraska Department of Transportation                      |
| NEMA    | Nebraska Emergency Management Agency                       |
| NEPA    | National Environmental Policy Act                          |
| NDOT    | Nebraska Department of Transportation                      |
| NGPC    | Nebraska Game and Parks Commission                         |
| NHD     | National Hydrography Dataset                               |
| NPDES   | National Pollutant Discharge Elimination System            |
| NRCS    | Natural Resources Conservation Service                     |
| NRHP    | National Register of Historic Places                       |
| NSP     | Nebraska State Patrol                                      |
| NWI     | National Wetland Inventory                                 |
| O&M     | Operation and Maintenance                                  |
| O&M&R   | Operation and Maintenance and Replacement                  |
| OMB     | Office of Management and Budget                            |
| PEMA/C  | Palustrine Emergent Temporarily/Seasonally Flooded Wetland |
| PL      | Public Law                                                 |
| Plan-EA | Spring Creek Watershed Plan and Environmental Assessment   |
| PR&G    | principles, requirements, and guidelines                   |
| ROW     | right-of-way                                               |
| SCS     | Soil Conservation Service                                  |
| SHPO    | State Historic Preservation Office                         |
| SW      | Southwest                                                  |





|                    |                                 |
|--------------------|---------------------------------|
| UPRR               | Union Pacific Railroad          |
| United States Code | U.S.C.                          |
| US 30              | U.S. Highway 30                 |
| USACE              | U.S. Army Corps of Engineers    |
| U.S.C.             | United States Code              |
| USDA               | U.S. Department of Agriculture  |
| USFWS              | U.S. Fish and Wildlife Service  |
| USGS               | United States Geological Survey |
| WMA                | Wildlife Management Area        |



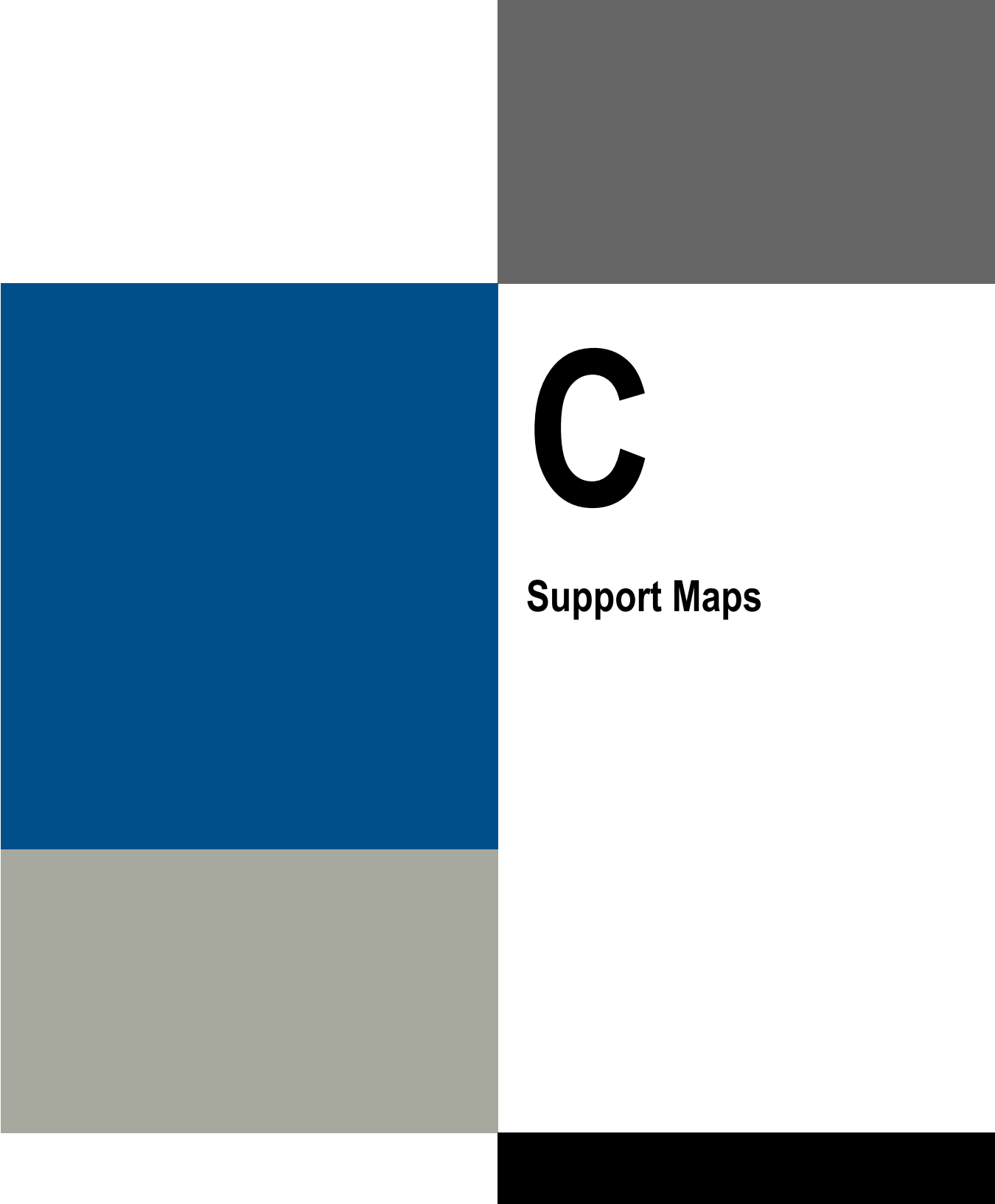
**A**

**Comments and Responses**



**B**

**Project Map**



**C**

**Support Maps**



**D**

**Investigations and  
Analyses Report**





**E**

**Other Supporting  
Information**