DRAFT – August 2025

Watershed Plan - Environmental Assessment

North Fork Elkhorn River Watershed

Antelope, Cedar, Knox, and Pierce Counties, Nebraska

PREPARED BY

USDA Natural Resources Conservation Service
U.S. DEPARTMENT OF AGRICULTURE

IN COOPERATION WITH

Lower Elkhorn Natural Resources District

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DRAFT
WATERSHED PLAN - ENVIRONMENTAL ASSESSMENT
For
North Fork Elkhorn River Watershed
Antelope, Cedar, Knox, and Pierce 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.).

ABSTRACT

The purpose of the proposed action is to provide flood prevention (flood damage reduction) to the communities of Pierce and Osmond, in addition to agricultural and rural lands within the watershed. The recommended plan consists of constructing two alternatives to enhance flood damage reduction. The alternative in Osmond consists of a road raise, berm, and nonstructural elements. The alternative in Pierce consists of levee improvements in conjunction with interior drainage improvements including two diversion channels and two pump stations. Total project costs are $26,733,445 of which $22,423,700 (84 percent) will be paid by Public Law 566 funds and $4,309,745 (16 percent) will be paid by the Sponsor. This document is intended to fulfill requirements of the National Environmental Policy Act and to be considered for authorization of Public Law 566 funding.

Prepared by:	U.S Dept. of Agriculture, Natural Resources Conservation Service
Responsible Agency:	U.S. Dept. of Agriculture, Natural Resources Conservation Service
Sponsor:	Lower Elkhorn Natural Resources District
Cooperating Agency:	United States Army Corps of Engineers, US Fish and Wildlife Service

ADDITIONAL INFORMATION

Comments and inquiries must be received by October , 2025. Submit comments and inquiries to:

Melissa Baier
Assistant State Conservationist – Water Resources & Easements
Natural Resources Conservation Service
1121 Lincoln Mall, Room 360
Lincoln, NE 68508

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Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

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Watershed Agreement
for North Fork Elkhorn River Watershed

between the
Lower Elkhorn Natural Resources District
(Referred to herein as Sponsor)
and the
Natural Resources Conservation Service,
United States Department of Agriculture
(Referred to herein as NRCS)

Whereas, application has heretofore been made to the Secretary of Agriculture by the Sponsor for assistance in preparing a plan for works of improvement for the North Fork Elkhorn River Watershed, State of Nebraska, under the authority of the Watershed Protection and Flood Prevention Act, as amended (16 U.S.C. 1001 to 1008, 1010, and 1012); and

Whereas, the responsibility for administration of the Watershed Protection and Flood Prevention Act, as amended, has been assigned by the Secretary of Agriculture to NRCS; and

Whereas, there has been developed through the cooperative efforts of the Sponsor and NRCS a watershed project plan and environmental assessment for works of improvement for the North Fork Elkhorn River Watershed, State of Nebraska, hereinafter referred to as the watershed project plan, which plan is annexed to and made a part of this agreement;

Now, therefore, in view of the foregoing considerations, the Secretary of Agriculture, through NRCS, and the Sponsor, hereby agree on this watershed project plan and that the works of improvement for this project will be installed, operated, and maintained in accordance with the terms, conditions, and stipulations provided for in this plan and including the following:

1. Term. The term of this agreement (105 years) is for the combined installation period (5 years) and evaluated life of the project (100 years) and does not commit NRCS to assistance of any kind beyond the end of the evaluated life.

2. Costs. The costs shown in this plan are preliminary estimates. Final costs are to be borne by the parties hereto will be the actual costs incurred in the installation of works of improvement.

3. Real Property. The Sponsor will acquire such real property as will be needed in connection with the works of improvement. The amounts and percentages of the real property acquisition costs to be borne by the Sponsor and NRCS are as shown in the cost-share table in section 5 hereof.

The sponsors agree that all land acquired for measures, other than land treatment practices, with financial or credit assistance under this agreement will not be sold or otherwise disposed of for the evaluated life of the project except to a public agency which will continue to maintain and operate the development in accordance with the Operation and Maintenance Agreement.

4. Uniform Relocation Assistance and Real Property Acquisition Policies Act. The Sponsor hereby agrees to comply with all of the policies and procedures of the Uniform Relocation Assistance and Real Property Acquisition Policies Act (42 U.S.C. Section 4601 et seq. as further implemented through regulations in 49 CFR Part 24 and 7 CFR Part 21) when acquiring real property interests for this federally assisted project. If the sponsor is legally unable to comply with

the real property acquisition requirements, it agrees that, before any Federal financial assistance is furnished, it will provide a statement to that effect, supported by an opinion of the chief legal officer of the state containing a full discussion of the facts and law involved. This statement may be accepted as constituting compliance.

5. Cost-share for Watershed Project Plans. The following table will be used to show cost-share percentages and amounts for watershed project plan implementation.

Project Costs	NRCS %	NRCS $	Sponsor %	Sponsor $	Total $
Cost-Sharable Items[1]					
Construction of Osmond Alternative	97%	$3,146,300	3%	$88,700	$3,235,000
Construction of Pierce Alternative	61%	$10,619,900	39%	$6,694,700	$17,314,600
Relocation	100%	$0	0%	$0	$0
Subtotal: Cost-Sharable Costs	**67%**	**$13,766,200**	**33%**	**$6,783,400**	**$20,549,600**
Non-Cost-Sharable Items					
Engineering	100%	$3,288,200	0%	$0	$3,288,200
Project Administration	50%	$514,100	50%	$514,100	$1,028,200
Permit Acquisition	0%	$0	100%	$822,200	$822,200
Real Property Acquisition	0%	$0	100%	$1,045,245	$1,045,245
Subtotal: Non-Cost-Share Costs	**61%**	**$3,802,300**	**39%**	**$2,381,545**	**$6,183,845**
Total	**66%**	**$17,568,500**	**34%**	**$9,164,945**	**$26,733,445**

[1]Sponsor's share includes cost of legal fees and land appraisals. Sponsor's share also includes construction costs that are defined as "real property rights" in the 2014 Title 390-National Watershed Program Manual, Part 506, subpart E, Section 506.50(K)(12).

6. Land Treatment Agreements. The sponsors will obtain agreements from owners of not less than 50 percent of the land above each multiple-purpose and floodwater-retarding structure. These agreements must provide that the owners will carry out farm or ranch conservation plans on their land. The sponsors will ensure that 50 percent of the land upstream of any retention reservoir site is adequately protected before construction of the dam. The sponsors will provide assistance to landowners and operators to ensure the installation of the land treatment measures shown in the watershed project plan. The sponsors will encourage landowners and operators to continue to operate and maintain the land treatment measures after the long-term contracts expire, for the protection and improvement of the watershed.

7. Floodplain Management. Before construction of any project for flood prevention, the Sponsor must agree to participate in and comply with applicable Federal floodplain management and flood insurance programs. The Sponsor is required to have development controls in place below low and significant hazard dams prior to NRCS or the Sponsor entering into a construction contract.

8. Water and Mineral Rights. The Sponsor will acquire or provide assurance that landowners or resource users have acquired such water, mineral, or other natural resources rights pursuant to State law as may be needed in the installation and operation of the works of improvement.

9. Permits. The sponsors will obtain and bear the cost for all necessary Federal, State, and local permits required by law, ordinance, or regulation for installation of the works of improvement.

10. NRCS Assistance. This agreement is not a fund-obligating document. Financial and other assistance to be furnished by NRCS in carrying out the plan is contingent upon the fulfillment of applicable laws and regulations and the availability of appropriations for this purpose.

11. Additional agreements. A separate agreement will be entered into between NRCS and the sponsors before either party initiates work involving funds of the other party. Such agreements will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.

12. Amendments. This plan may be amended or revised only by mutual agreement of the parties hereto, except that NRCS may deauthorize or terminate funding at any time it determines that the sponsors have failed to comply with the conditions of this agreement or when the program funding or authority expires. In this case, NRCS must promptly notify the sponsors in writing of the determination and the reasons for the deauthorization of project funding, together with the effective date. Payments made to the sponsors or recoveries by NRCS must be in accordance with the legal rights and liabilities of the parties when project funding has been deauthorized. An amendment to incorporate changes affecting a specific measure may be made by mutual agreement between NRCS and the sponsors having specific responsibilities for the measure involved.

13. Prohibitions. No member of or delegate to Congress, or resident commissioner, may be admitted to any share or part of this plan or to any benefit that may arise therefrom; but this provision may not be construed to extend to this agreement if made with a corporation for its general benefit.

14. Operation and Maintenance (O&M). The Sponsor will be responsible for the operation, maintenance, and any needed replacement of the works of improvement by actually performing the work or arranging for such work, in accordance with an O&M agreement. An O&M agreement will be entered into before Federal funds are obligated and will continue for the project life (100 years). Although the Sponsor's responsibility to the Federal Government for O&M ends when the O&M agreement expires upon completion of the evaluated life of measures covered by the agreement, the sponsors acknowledge that continued liabilities and responsibilities associated with works of improvement may exist beyond the evaluated life.

15. Emergency Action Plan. Prior to construction, the Sponsor must prepare an emergency action plan (EAP) for each dam or similar structure where failure may cause loss of life or as required by state and local regulations. The EAP must meet the minimum content specified in NRCS Title 180, National Operation and Maintenance Manual (NOMM), Part 500, Subpart F, Section 500.52, and meet applicable State agency dam safety requirements. The NRCS will determine that an EAP is prepared prior to the execution of fund obligating documents for construction of the structure. EAPs must be reviewed and updated by the sponsors annually.

16. Nondiscrimination Provisions. In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

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USDA is an equal opportunity provider, employer, and lender. By signing this agreement, the recipient assures the Department of Agriculture that the program or activities provided for under this agreement will be conducted in compliance with all applicable Federal civil rights laws, rules, regulations, and policies.

17. Certification Regarding Drug-Free Workplace Requirements (7 CFR Part 3021). By signing this Watershed Agreement, the Sponsor is providing the certification set out below. If it is later determined that the Sponsor knowingly rendered a false certification, or otherwise violated the requirements of the Drug-Free Workplace Act, the NRCS, in addition to any other remedies available to the Federal Government, may take action authorized under the Drug-Free Workplace Act.

Controlled substance means a controlled substance in schedules I through V of the Controlled Substances Act (21 U.S.C. Section 812) and as further defined by regulation (21 CFR Sections 1308.11 through 1308.15);

Conviction means a finding of guilt (including a plea of *nolo contendere*) or imposition of sentence, or both, by any judicial body charged with the responsibility to determine violations of the Federal or State criminal drug statutes;

Criminal drug statute means a Federal or non-Federal criminal statute involving the manufacturing, distribution, dispensing, use, or possession of any controlled substance;

Employee means the employee of a grantee directly engaged in the performance of work under a grant, including (i) all direct charge employees, (ii) all indirect charge employees unless their impact or involvement is insignificant to the performance of the grant, and (iii) temporary personnel and consultants who are directly engaged in the performance of work under the grant and who are on the grantee's payroll. This definition does not include workers not on the payroll of the grantee (e.g., volunteers, even if used to meet a matching requirement, consultants or independent contractors not on the grantees' payroll, or employees of subrecipients or subcontractors in covered workplaces).

Certification

A. The sponsors certify that they will or will continue to provide a drug-free workplace by—

(1) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the grantee's

workplace and specifying the actions that will be taken against employees for violation of such prohibition.

(2) Establishing an ongoing drug-free awareness program to inform employees about—

(a) The danger of drug abuse in the workplace.

(b) The grantee's policy of maintaining a drug-free workplace.

(c) Any available drug counseling, rehabilitation, and employee assistance programs.

(d) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace.

(3) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (1).

(4) Notifying the employee in the statement required by paragraph (1) that, as a condition of employment under the grant, the employee must—

(a) Abide by the terms of the statement; and

(b) Notify the employer in writing of his or her conviction for a violation of a criminal drug statute occurring in the workplace no later than 5 calendar days after such conviction.

(5) Notifying the NRCS in writing, within 10 calendar days after receiving notice under paragraph (4)(b) from an employee or otherwise receiving actual notice of such conviction. Employers of convicted employees must provide notice, including position title, to every grant officer or other designee on whose grant activity the convicted employee was working, unless the Federal agency has designated a central point for the receipt of such notices. Notice must include the identification numbers of each affected grant.

(6) Taking one of the following actions, within 30 calendar days of receiving notice under paragraph (4)(b), with respect to any employee who is so convicted—

(a) Taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973, as amended; or

(b) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency.

(7) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (1), (2), (3), (4), (5), and (6).

B. The sponsors may provide a list of the sites for the performance of work done in connection with a specific project or other agreement.

C. Agencies will keep the original of all disclosure reports in the official files of the agency.

18. Certification Regarding Lobbying (7 CFR Part 3018) (for projects > $100,000)

A. The sponsors certify to the best of their knowledge and belief, that—

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the sponsors, to any person for influencing or attempting to influence an officer or employee of an agency, Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal,

amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned must complete and submit Standard Form LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The sponsors must require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients must certify and disclose accordingly.

B. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. Section 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

19. Certification Regarding Debarment, Suspension, and Other Responsibility Matters—Primary Covered Transactions (7 CFR Part 3017).

A. The sponsors certify to the best of their knowledge and belief, that they and their principals—

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

(2) Have not within a 3-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph A(2) of this certification; and

(4) Have not within a 3-year period preceding this application/proposal had one or more public transactions (Federal, State, or local) terminated for cause or default.

B. Where the primary sponsors are unable to certify to any of the statements in this certification, such prospective participant must attach an explanation to this agreement.

20. Clean Air and Water Certification

A. The project sponsoring organization signatory to this agreement certifies as follows:

(1) Any facility to be utilized in the performance of this proposed agreement is not listed on the Environmental Protection Agency List of Violating Facilities.

(2) To promptly notify the NRCS-State administrative officer prior to the signing of this agreement by NRCS, of the receipt of any communication from the Director, Office of Federal Activities, U.S. Environmental Protection Agency, indicating that any facility which is proposed for use under this agreement is under consideration to be listed on the Environmental Protection Agency List of Violating Facilities.

(3) To include substantially this certification, including this subparagraph, in every nonexempt subagreement.

B. The project sponsoring organization signatory to this agreement certifies as follows:

(1) To comply with all the requirements of section 114 of the Clean Air Act as amended (42 U.S.C. Section 7414) and section 308 of the Federal Water Pollution Control Act (33 U.S.C. Section 1318), respectively, relating to inspection, monitoring, entry, reports, and information, as well as other requirements specified in section 114 and section 308 of the Air Act and the Water Act, issued there under before the signing of this agreement by NRCS.

(2) That no portion of the work required by this agreement will be performed in facilities listed on the EPA List of Violating Facilities on the date when this agreement was signed by NRCS unless and until the EPA eliminates the name of such facility or facilities from such listing.

(3) To use their best efforts to comply with clean air standards and clean water standards at the facilities in which the agreement is being performed.

(4) To insert the substance of the provisions of this clause in any nonexempt subagreement.

C. The terms used in this clause have the following meanings:

(1) The term “Air Act” means the Clean Air Act, as amended (42 U.S.C. Section 7401 et seq.).

(2) The term “Water Act” means Federal Water Pollution Control Act, as amended (33 U.S.C. Section 1251 et seq.).

(3) The term “clean air standards” means any enforceable rules, regulations, guidelines, standards, limitations, orders, controls, prohibitions, or other requirements which are contained in, issued under, or otherwise adopted pursuant to the Air Act or Executive Order 11738, an applicable implementation plan as described in section 110 of the Air Act (42 U.S.C. Section 7414) or an approved implementation procedure under section 112 of the Air Act (42 U.S.C. Section 7412)

(4) The term “clean water standards” means any enforceable limitation, control, condition, prohibition, standards, or other requirement which is promulgated pursuant to the Water Act or contained in a permit issued to a discharger by the Environmental Protection Agency or by a State under an approved program, as authorized by section 402 of the Water Act (33 U.S.C. Section 1342), or by a local government to assure compliance with pretreatment regulations as required by section 307 of the Water Act (33 U.S.C. Section 1317)

(5) The term “facility” means any building, plan, installation, structure, mine, vessel, or other floating craft, location or site of operations, owned, leased, or supervised by a

sponsor, to be utilized in the performance of an agreement or subagreement. Where a location or site of operations contains or includes more than one building, plan, installation, or structure, the entire location will be deemed to be a facility except where the Director, Office of Federal Activities, Environmental Protection Agency, determines that independent facilities are collocated in one geographical area.

21. Assurances and Compliance.
As a condition of the grant or cooperative agreement, the sponsor assures and certifies that it is in compliance with and will comply in the course of the agreement with all applicable laws, regulations, Executive orders and other generally applicable requirements, including those set out below which are hereby incorporated in this agreement by reference, and such other statutory provisions as a specifically set forth herein.

State, Local, and Indian Tribal Governments: OMB Circular Nos. A-87, A-102, A-129, and A-133; and 7 CFR Parts 3015, 3016, 3017, 3018, 3021, and 3052.

Nonprofit Organizations, Hospitals, Institutions of Higher Learning: OMB Circular Nos. A-110, A-122, A-129, and A-133; and 7 CFR Parts 3015, 3017, 3018, 3019, 3021 and 3052.

22. Examination of Records.
The sponsors must give the NRCS or the Comptroller General, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to this agreement, and retain all records related to this agreement for a period of three years after completion of the terms of this agreement in accordance with the applicable OMB Circular.

23. Signatures

The signing of this plan was authorized by a resolution by the Lower Elkhorn Natural Resources District governing body and adopted at an official meeting held on _____(Date).

By: Lower Elkhorn
Natural Resources District

_____
Brian Bruckner
General Manager

Date: _____

_____ _____
Address Zip Code

_____ _____
Secretary Address Zip Code

Date: _____

Natural Resources Conservation Service
United States Department of Agriculture

Approved By:

_____
Robert Lawson
State Conservationist
1121 Lincoln Mall, Room 360
Lincoln, NE 68508

Date: _____

SUMMARY (OMB FACT SHEET)

Summary of Watershed Plan – Environmental Assessment

For
North Fork Elkhorn River Watershed
Antelope, Cedar, Knox, and Pierce Counties, Nebraska
Lower Elkhorn Natural Resources District
1st and 3rd CONGRESSIONAL DISTRICTS

Authorization: Public Law 83-566 Stat. 666 as amended (16 U.SC. Section 1001 et. Seq.) 1954

Sponsor: Lower Elkhorn Natural Resources District (LENRD)

Purpose and Need for Action: The purpose of the proposed action is to provide flood prevention (flood damage reduction) within and near the communities of Pierce and Osmond. The project is needed as areas in the watershed are regularly subject to riverine and flash flooding, including extensive flooding in 2019.

Proposed Action: The proposed action would use funds allocated for projects authorized under Public Law 83-566 to manage peak runoff in the watershed to protect land and community infrastructure from flood related damages. The communities within the watershed, especially Pierce and Osmond, experience frequent flooding which causes street and property damage, and prevents emergency vehicles from assisting the public.

Description of the Preferred Alternative/Plan: The preferred alternative includes two combined alternatives; one in the City of Osmond and one in the City of Pierce. . Due to the geographic separation of the two communities, the proposed action is presented as two separate alternatives, which when combined make up the final preferred alternative. In Osmond, the preferred alternative includes the installation of a road raise along 4th St and a berm parallel to N Park St to prevent floodwater from entering the City, as well as nonstructural improvements to homes south of Highway 20. In Pierce, the preferred alternative includes construction of two diversion channels and two stormwater pumping stations to prevent interior flooding sources from building up within the City; and improvements to the existing levee to prevent floodwater from the North Fork Elkhorn River from entering the City.

Resource Information

Table S-1: North Fork Elkhorn River Watershed Information

Eight-Digit Hydrologic Unit Number	10220002
Longitude and Latitude	-97.569°, 42.348°
North Fork Elkhorn River Watershed (acres)	226,059
– Cropland	185,005
– Grassland	25,075
– Forest	3,610
– Developed	10,995
– Miscellaneous	1,374
Land Ownership	Private: 99% State-Local: 1% Federal: 0%
Prime Farmland and Farmland of Statewide Importance (acres)	Prime Farmland: 117,456 ac Farmland of Statewide Importance: 16,541 ac Prime Farmland if Drained: 16,110 ac

Climate:

The climate of the watershed is considered humid continental, characterized by hot, humid summers and cold winters. Precipitation is distributed throughout the year and amounts to an average of 27-28 inches of rain annually. Precipitation is distributed throughout the year, with May through August seeing the most significant amounts of rainfall.

Topography:

The watershed drains in a southern direction from the uplands where the North Fork Elkhorn River and tributaries originate, south to the confluence with Willow Creek, located on the southern edge of Pierce. From there, the North Fork Elkhorn River continues south to Norfolk, NE, emptying into the Elkhorn River. The watershed lies primarily in the Plains and Rolling Hills topographic regions, though a southern portion of the watershed enters the Valleys region.

Table S-2: Population and Demographics of the North Fork Elkhorn River Watershed

Total population	4,631
Percent minority	5.5%
Percent of population below poverty level	8.4%
Percent of children below poverty level	11.2%
Number of Farms	3,439
Average size (acres)	574
Number of Minority Farmers	235

Data sources: US Census Bureau, 2022, and Census of Agriculture, 2022.

Table S-3: Alternatives Considered

Alternative	Meets Purpose and Need	Included in Final Array of Alternatives
No Action – represents the future conditions if there is no Federal investment and no projects are implemented.	n/a	**Yes**
A: Single Dam – construct a large dam on the North Fork Elkhorn River upstream of Osmond.	Yes	No[1]
B: Detention Cells – construct up to seven excavated cells in and near Pierce and Osmond to temporarily detain floodwater and release it over time.	Yes	No[1]
C: Channel Widening – widen the North Fork Elkhorn River near Osmond to improve conveyance of floodwater.	No[2]	No
D: Levee Improvements and Diversion Channels – Construct two diversion channels, pumping stations, and levee improvements in Pierce.	Yes	**Yes**
E: Levee and Diversion Channel – Construct a levee and diversion channel south of Highway 20 in and near Osmond.	Yes	No[1]
F: Road Raise, Berm, and Nonstructural – Construct a road raise along 4th St and berm east of N Hill St in Osmond and make nonstructural improvements to flood prone homes.	Yes	**Yes**

[1] *Not reasonable.*

[2] *Not effective in reducing flooding.*

Mitigation: Installation of the preferred alternative would include the following mitigation and conservation measures:

- Historic Properties and Cultural Resources: Approximately 109 acres of the area of potential effect could not be investigated for historic properties. NRCS has executed a Programmatic Agreement with the Nebraska State Historic Preservation Office pursuant to 36 CFR 800.14(b) to allow for phased identification and evaluation of historic properties. A cultural resources investigation of the uninvestigated portion of the APE and additional National Historic Preservation Act Section 106 consultation will be required before construction can begin.
- Wetlands: Mitigation required due to 5.615 acres of permanent wetland impacts. Mitigation is anticipated to be accomplished by creation of 22.460 acres of new wetlands onsite. Final needs will be determined during design and permitting.
- Streams: Mitigation required due to 0.094 acres of permanent stream impacts. Mitigation is anticipated to be accomplished via functional uplift of existing stream channels onsite. Final needs will be determined during design and permitting.
- Threatened and Endangered Species: Conservation measures include construction timing, biological surveys, and approved seeding plans. These measures are implemented to

prevent adverse impacts on protected species, including the northern long-eared bat, whooping crane, migratory birds, and eagles.

Project Costs: Table S-4 summarizes the distribution of project costs between the Sponsor and NRCS for the preferred alternative.

Table S-4: Distribution of Total Project Costs

	NRCS $	NRCS %	Sponsor $	Sponsor %	Total $
Construction	$13,766,200	67%	$6,783,400[1]	33%	$20,549,600
Engineering	$3,288,200	100%	0	0%	$3,288,200
Real Property Rights	0	0%	$1,045,245	100%	$1,045,245
Permitting	0	0%	$822,200	100%	$822,200
Project Administration	$514,100	50%	$514,100	50%	$1,028,200
Total	$17,568,500	66%	$9,164,945	34%	$26,733,445

Note: Totals may not sum due to rounding.
[1] includes the cost of legal fees and land appraisals. Also includes construction costs that are defined as real property rights in the 2014 Title 390-National Watershed Program Manual, Part 506, subpart E, Section 506.50(K)(12)(4th edition).

Project Benefits: Table S-5 summarizes monetary project benefits and the benefit cost ratio of the project. Flood reduction benefits include avoided losses of property and income.

Table S-5: Comparison of Preferred Alternative Benefits and Costs

Works of Improvement	Reduced Building-Related Damages	Reduced Business Income & Wage Losses	Total Annualized Benefits	Average Annual Cost	Benefit Cost Ratio
Osmond Alternative	$81,600	$82,500	$164,100	$137,800	1.2
Pierce Alternative	$900,200	$529,300	$1,429,500	$752,600	1.9
Total	**$981,800**	**$611,800**	**$1,593,700**	**$890,400**	**1.8**

Notes: Totals may not sum due to rounding. Prepared: November 2024.
Price base: 2024 dollars amortized over 100 years at a discount rate of 2.75 percent.

Direct Beneficiaries: These consist of both onsite and offsite populations benefiting from the preferred alternative. Onsite beneficiaries include the approximately 2,600 residents of the Cities of Pierce and Osmond who will directly benefit from reduced volume and velocity of floodwater entering the cities. Offsite beneficiaries include people who use roads that are protected from

flooding by the project. Based on Nebraska Department of Transportation figures available for major roads in the area, this could include as many as 6,600 vehicles per day.

Project Schedule: Construction is anticipated to be completed in 2032, assuming federal funding is available (Table S-6).

Table S-6: Project Funding Schedule

Year	PL 83-566 Funds	Other Funds	Total
2027	$3,373,883	$1,130,928	$4,504,812
2028	$2,838,923	$2,264,563	$5,103,487
2029	$2,838,923	$1,442,363	$4,281,287
2030	$2,838,923	$1,442,363	$4,281,287
2031	$2,838,923	$1,442,363	$4,281,287
2032	$2,838,923	$1,442,363	$4,281,287
Total	$17,568,500	$9,164,945	$26,733,445

Notes: Totals may not sum due to rounding.

Period of Analysis: The period of analysis is estimated to be 105 years (project life plus length of time to install proposed practices).

Project Life: The project was designed to have a lifespan of 100 years.

Environmental Effects and Impacts: Table S-7 summarizes resource concerns where impacts were identified due to the preferred alternative.

Table S-7: Summary of Resource Concerns and Impacts of the Preferred Alternative

Environmental Concern	Levee Improvements and Diversion Channels	Road Raise, Berm, and Nonstructural Measures
Soil Resources		
Land Use	Construction of the alternative would remove approximately 16 acres of cropland from production. This is a negligible impact on the watershed scale, and the predominately agricultural nature of land use in the area would not be affected.	Construction of the alternative would remove approximately 0.5 acres of cropland from production. This is a negligible impact on the watershed scale, and the predominately agricultural nature of land use in the area would not be affected.
Prime and Unique Farmland	Construction of the alternative would permanently convert approximately 20 acres of USDA designated prime farmland. Per consultation required by the Farmland Protection Policy Act, no further consideration for protection or evaluation is necessary.	Exempt from FPPA consideration due to the project's location in an urban development area.
Geology	This alternative would neither disturb nor enhance geological units. Geologic/geotechnical conditions that may impact the design of this alternative would be thoroughly explored during the design phase. There are no faults near the project sites.	This alternative would neither disturb nor enhance geological units. Geologic/geotechnical conditions that may impact the design of this alternative would be thoroughly explored during the design phase. There are no faults near the project sites.
Water Resources		
Waters of the United States	Construction of the alternative would permanently impact 5.615 acres of wetlands, 0.002 acres of intermittent stream, 0.074 acres of ephemeral stream, and 0.018 acres of canal due to construction activities. It is anticipated that this would be permitted under Clean Water Act Section 404 and would require mitigation via wetland creation and stream function uplift.	Construction of the alternative would permanently impact 0.011 acres of ephemeral stream due to construction activities. It is anticipated that this would be permitted under Clean Water Act Section 404 and would not require mitigation.

Environmental Concern	Levee Improvements and Diversion Channels	Road Raise, Berm, and Nonstructural Measures
Streams and Water Quantity	There would be no change to surface water quantity under non-flooding conditions. There would be no depletion of flows to the Platte River.	There would be no change to surface water quantity under non-flooding conditions. There would be no depletion of flows to the Platte River.
Wetlands	Construction would permanently impact 5.615 acres of wetlands due to construction activities. Mitigation would establish new wetland areas. The project complies with the Food Security Act and Executive Order 11990.	Construction would not impact any wetlands. The project complies with the Food Security Act and Executive Order 11990.
Surface Water Quality	The alternative would have no impact on surface water quality. No water would be detained, and pollutants would continue to move through the watershed.	The alternative would have no impact on surface water quality. No water would be detained, and pollutants would continue to move through the watershed.
Groundwater Quantity	The alternative would not provide any opportunities for groundwater recharge, nor would it contribute to any pumping or depletion of groundwater resources.	The alternative would not provide any opportunities for groundwater recharge, nor would it contribute to any pumping or depletion of groundwater resources.
Groundwater Quality	The alternative would result in small beneficial indirect improvements to groundwater quality. Construction of the alternative would remove cropland from production, reducing pollutant loading to groundwater from agricultural chemicals.	The alternative would result in small beneficial indirect improvements to groundwater quality. Construction of the alternative would remove cropland from production, reducing pollutant loading to groundwater from agricultural chemicals.
Regional Water Management Plans	The alternative would be compliant with the goals of regional water management plans as there would be no depletion of flows to the Platte River.	The alternative would be compliant with the goals of regional water management plans as there would be no depletion of flows to the Platte River.
Floodplain Management	The alternative would reduce the overall flooding area and depth up to and including the 100-year recurrence interval, reducing the flood hazard and floodplain areas. Revisions to the regulatory floodplain would need to be coordinated with FEMA.	The alternative would reduce the overall flooding area and depth up to and including the 100-year recurrence interval, reducing the flood hazard and floodplain areas. Revisions to the regulatory floodplain would need to be coordinated with FEMA.

Environmental Concern	Levee Improvements and Diversion Channels	Road Raise, Berm, and Nonstructural Measures
Federally Authorized Levee System	Construction of this alternative would involve beneficially altering an existing Federally Authorized Levee. All levee alterations would follow USACE regulations and requirements and receive USACE authorization for construction.	This alternative would not impact any Federally Authorized Levee System.
Plant and Animal Resources		
Fish and Wildlife (Including Coordination Requirements)	The alternative would not reduce flooding outside of developed areas and would not provide flood protection to fish and wildlife. The alternative complies with the Endangered Species Act, Fish and Wildlife Coordination Act, and Nongame and Endangered Species Act.	The alternative would not reduce flooding outside of developed areas and would not provide flood protection to fish and wildlife. The alternative complies with the Endangered Species Act, Fish and Wildlife Coordination Act, and Nongame and Endangered Species Act.
Threatened and Endangered Species	Conservation measures would be utilized to ensure any potential adverse impact is minimized for any identified Threatened and Endangered Species. Measures may include construction timing, biological surveys, and approved seeding plans.	Conservation measures would be utilized to ensure any potential adverse impact is minimized for any identified Threatened and Endangered Species. Measures may include construction timing, biological surveys, and approved seeding plans.
Invasive Species	Best management practices would be used during construction to minimize the potential spread or introduction of any invasive species. Practices may include using approved native seed mixes for vegetation establishment, and cleaning construction equipment before moving between sites.	Best management practices would be used during construction to minimize the potential spread or introduction of any invasive species. Practices may include using approved native seed mixes for vegetation establishment, and cleaning construction equipment before moving between sites.

Environmental Concern	Levee Improvements and Diversion Channels	Road Raise, Berm, and Nonstructural Measures
Migratory Birds and Eagles	Best management practices would be used during construction to minimize the potential for adverse effects to migratory birds and eagles. Practices may include timing to avoid construction during the migration season. The project complies with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.	Best management practices would be used during construction to minimize the potential for adverse effects to migratory birds and eagles. Practices may include timing to avoid construction during the migration season. The project complies with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.
Fish and Wildlife Habitat		
Forest Resources	Construction of this alternative would impact approximately 2.7 acres of scattered trees. These are not cohesive woodlands. No mitigation would be required.	Construction of this alternative would not impact any trees.
Riparian Areas	Construction of this alternative would impact approximately 0.05 acres of riparian areas.	This alternative would not impact any riparian areas.
Human Resources		
Flood Damages	The alternative would have a beneficial effect due to reduced flooding resulting in approximately 80 buildings being removed from the inundation area of a 100-year flood.	The alternative would have a beneficial effect due to reduced flooding resulting in approximately 15 buildings being removed from the inundation area of a 100-year flood.
Costs	The alternative would have a beneficial effect due to reduced flooding resulting in an annualized damage reduction of approximately $1,429,500.	The alternative would have a beneficial effect due to reduced flooding resulting in an annualized damage reduction of approximately $164,100.

Environmental Concern	Levee Improvements and Diversion Channels	Road Raise, Berm, and Nonstructural Measures
Historic Properties and Cultural Resources	NRCS cannot make a determination of effect at this time because the entire Area of Potential Effect (APE) could not be investigated for cultural resources due to lack of access to portions of the APE. NRCS has executed a Programmatic Agreement pursuant to 36 CFR 800.14(b) with the Nebraska State Historic Preservation Office and other consulting parties to allow for phased identification and evaluation of historic properties. NRCS will conduct additional cultural resource inventories and consult on the effects of the undertaking during the design phase of the project.	NRCS cannot make a determination of effect at this time because the entire Area of Potential Effect (APE) could not be investigated for cultural resources due to lack of access to portions of the APE. NRCS has executed a Programmatic Agreement pursuant to 36 CFR 800.14(b) with the Nebraska State Historic Preservation Office and other consulting parties to allow for phased identification and evaluation of historic properties. NRCS will conduct additional cultural resource inventories and consult on the effects of the undertaking during the design phase of the project.
Local and Regional Economy	The alternative would improve the local and regional economy by reducing the frequency and severity of flooding damage.	The alternative would improve the local and regional economy by reducing the frequency and severity of flooding damage.
Public Health and Safety	The alternative would improve public health and safety by reducing the frequency and severity of flooding damage experienced by residents of the watershed.	The alternative would improve public health and safety by reducing the frequency and severity of flooding damage experienced by residents of the watershed.
Recreation	The alternative would improve access to recreation sites by reducing flood-related issues such as road closures.	The alternative would improve access to recreation sites by reducing flood-related issues such as road closures.
Ecosystem Services		
Provisioning	This alternative would have a minor adverse effect to food production capacity by removing 16 acres of cropland from production.	This alternative would have a minor adverse effect to food production capacity by removing 0.5 acres of cropland from production.
Regulating	This alternative would produce an annualized benefit of approximately $1,429,500 in regulating services.	This alternative would produce an annualized benefit of approximately $164,100 in regulating services.
Cultural	This alternative would improve public safety by reducing the likelihood of flooding damage and its associated stressors.	This alternative would improve public safety by reducing the likelihood of flooding damage and its associated stressors.

Major Conclusions: Implementation of this Plan would result in no outstanding 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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CHAPTER 1. PURPOSE AND NEED FOR ACTION

1.01 PURPOSE AND NEED STATEMENT

The purpose of this project is to reduce flood damages to rural communities in the North Fork Elkhorn River watershed. The PL 83-566 authorized project purpose is flood prevention (flood damage reduction).

The project is needed due to the long history of flooding damage that has occurred throughout the watershed, impacting communities as well as rural areas. Flash flooding from heavy rainfall and riverine flooding from the overtopping of the North Fork of the Elkhorn River and its tributaries, combined with topographic factors in the region, cause damages throughout the watershed. Most recently, extensive flooding events occurred in the watershed in 2019. The 2019 event caused floodwater to reach depths of up to three feet in Osmond, overtopping Highway 20 and damaging buildings and utilities. Pierce experienced extensive street flooding, including overtopping of Highway 13, as well as flood damages to buildings and utilities. Flooding impacts the local economy, makes travel difficult or impossible, threatens lives, and damages structures and property.

The Natural Resources Conservation Service (NRCS) National Watershed Program Manual defines this purpose of flood prevention (or flood damage reduction) as measures installed to prevent or reduce damages caused by floodwater. Flood damage reduction is further defined as the control and disposal of surface water caused by abnormally high direct precipitation, stream overflow, or floods aggravated or caused by wind or tidal effects.

Flood damage reduction and mitigation measures reduce or prevent floodwater damages by reducing runoff, erosion, and sediment; modifying the susceptibility of improvements in the floodplain to damage; removing damageable property from the floodplain; or reducing the frequency, depth, or velocity of flooding. Measures may also include actions that prevent encroachment into the floodplain.

The project needs have been focused into two regions based on concerns, geography, and feasibility:

- Reduce flood damages in the City of Osmond
- Reduce flood damages in the City of Pierce

1.02 PROJECT OVERVIEW

PROJECT BACKGROUND

In 2023, the Watershed and Flood Prevention Operations (WFPO) program planning process began through an agreement between the Lower Elkhorn Natural Resources District (LENRD)

and NRCS. The focus of this planning process was on identifying and evaluating alternatives to reduce the flood hazard risk in the watershed. LENRD is the Sponsoring Local Organization (SLO) for this project.

Established in 1972, Nebraska's Natural Resources Districts are local government units involved in a variety of projects and programs to conserve and protect the state's natural resources. They are locally controlled, tax funded, and watershed based. The LENRD has a responsibility to its constituency to provide guidance on comprehensive natural resources management projects with specific authority, by Nebraska state statute (Neb. Rev. State. Sec. 2-3203), which provides taxing authority, eminent domain ability, and outlines management duties specific to flood control, soil erosion, irrigation runoff, and groundwater quantity and quality.

This Watershed Plan and Environmental Assessment (Plan-EA) is prepared under the authority of WFPO (Public Law 83-566, Stat. 666 as amended) and in accordance with the National Environmental Policy Act (NEPA) (40 CFR parts 1500-1508) and following the guidelines of NRCS Title 390 – *National Watershed Program Manual* and *Principles, Requirements, and Guidance for Water and Land Related Resources Implementation Studies* (PR&G) of the Water Resources Development Act of 2007 (PL 100-114).

PLANNING AREA

The North Fork Elkhorn River Watershed is located in northeast Nebraska (Figure 1). While it is located primarily within the LENRD and Pierce County, small portions of the headwaters fall within the Upper Elkhorn Natural Resources District and Lewis and Clark Natural Resources District, and Knox, Antelope, and Cedar Counties. The watershed is rural and dependent upon an agricultural economy, with only small communities present (Table 8).

Table 8: Communities Located within the Watershed

Name	Population	Name	Population
City of Pierce	1,845	Village of Magnet	43
City of Plainview	1,282	Village of Foster	42
City of Osmond	794	Village of Wausa	592

Source: U.S. Census Bureau, 2020

Watershed boundaries (Figure 1) were derived from Hydrologic Unit Code (HUC) boundaries, and consist of three complete HUC10s (1022000201, 1022000202, and 1022000205), and a small portion of a fourth HUC10 (1022000203) near the City of Pierce. The primary tributary of this HUC10 (Yankton Slough) flows into the North Fork Elkhorn River near Pierce, roughly at the midway point of the existing Pierce levee. Due to the location of this confluence, the downstream point of delineation for the watershed boundary was placed above the confluence of Yankton Slough so as to keep the watershed under 250,000 acres and thereby within the authority of PL

83-566. The entire watershed area, including the Yankton Slough watershed, was modeled for hydraulic and hydrologic analysis.

Construction of any potential alternatives sited within the study area downstream of the confluence of Yankton Slough and the North Fork Elkhorn River would not be eligible for PL 83-566 funds.

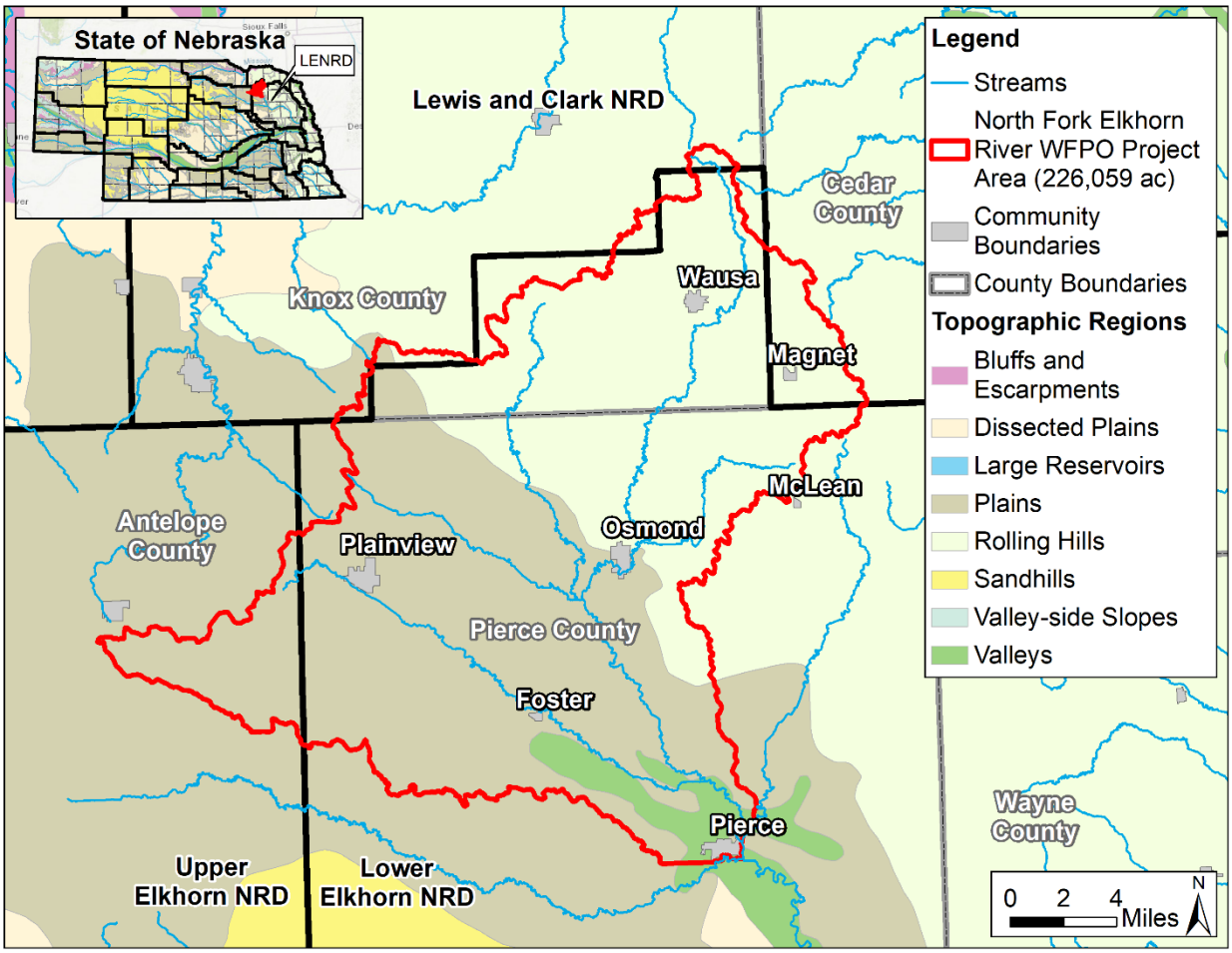

Figure 1: North Fork Elkhorn River Watershed in Relation to Nebraska Topographic Regions

Topography

The watershed drains in a southern direction from the uplands where the North Fork Elkhorn River and tributaries originate, south to the confluence with Willow Creek, located on the southern edge of Pierce. From there, the North Fork Elkhorn River continues south to Norfolk, NE, where it empties into the Elkhorn River. The watershed lies primarily in the *Plains* and *Rolling Hills*

topographic regions, though a southern portion of the watershed enters the *Valleys* region (CSD, 2001):

- *Plains* are flat areas located above valleys and are composed of either sandstone or alluvial sediments overlain by loess.
- *Rolling Hills* are characterized by moderate to steep slopes and a rounded appearance. In this area, Rolling Hills are comprised of eroded glacial till overlain by loess.
- *Valleys* are flat areas located along streams that are composed of alluvial sediments.

Climate

The climate is considered "Humid Continental" on the Köppen-Geiger Climate Classification System (Kottek et al., 2006) and is characterized by large seasonal temperature differences with hot, humid summers and cold winters. Annual precipitation averages 27-28 inches, distributed throughout the year, with May through August seeing the most significant amounts of rainfall.

PLANNING PROCESS

This Plan-EA is focused on establishing a strategy to address flooding issues for the communities of Osmond and Pierce, and protecting roads, bridges, and property. To ensure an objective alternatives analysis process, several sets of screening criteria were developed as existing resource concerns were identified (see Chapter 2). Then, using agency and public input gained through the scoping process, these screening criteria were further refined. The screening criteria ultimately were used to identify alternatives and evaluate them (see Chapter 4). These screening criteria are organized as: problems, opportunities, objectives, and constraints. The following sections identify and discuss each.

RELATED PROJECTS AND STUDIES

Historically, there have been several flood damage reduction projects investigated or constructed in this watershed, including the following:

- In 1963, the Pierce levee was constructed under the supervision of the U.S. Army Corps of Engineers (USACE). The levee system consists primarily of a levee on the right bank of the North Fork Elkhorn River that protects the City of Pierce on its north, east, and south sides, as well as a shorter levee on the left bank and channel widening and redirection on the North Fork Elkhorn River (USACE, 1983). A System-Wide Improvement Framework (SWIF) was developed for the Pierce levee system in 2016, following an unacceptable rating of the levee during a routine inspection in 2010 (JEO, 2016).
- In 1975 the Missouri River Basin Commission completed the Platte River Basin Level B Study, which identified two potential dam sites in the watershed. One site north of Osmond would have a capacity of 16,000 ac-ft, the other site northwest of Osmond would have a capacity of 9,600 ac-ft (Laurel J. Hamilton, US Army Corps of Engineers, personal communication, January 4, 2024).

- In 2019 the Osmond Drainage Study and Risk Evaluation was developed in response to the severe flooding in the city that year. A conceptual-level study was completed on flood storage in the form of a dry dam upstream of Osmond, four different levee options, and a flood preparedness plan. Additional alternatives discussed were nonstructural actions and participation in the WFPO program (JEO, 2020b).
- In 2022, NRCS completed a Preliminary Investigation Feasibility Report (PIFR) which determined the watershed was feasible for the WFPO program.
- In 2023, the City of Pierce completed the Pierce Internal Drainage Study in response to repeated internal flooding that is amplified by closures of gravity drain gates within the levee system during high flow events within the river. This study was not intended to address flooding from external sources. The study recommended several culverts, berm improvements, and water detention to meet either 10-year or 100-year storm event capacity, depending on the city's priorities and budget (Ocken & Bash, 2022).

1.03 PROBLEMS AND OPPORTUNITIES

FLOOD DAMAGES

Flooding occurs regularly across the watershed, especially along the North Fork Elkhorn River itself, and frequently results in road overtopping and property damage in the cities of Osmond and Pierce. The most catastrophic flooding took place in March 2019, when a combination of rapid snowmelt, rainfall, frozen ground, and ice jams resulted in historic flooding along the North Fork Elkhorn River. Portions of Osmond were flooded with depths of two to three feet, and Highway 20 near Osmond was overtopped. Damages in Osmond were estimated to be $1,500,000. Similar flooding was reported in Pierce. While the Pierce levee did not fail during this event, it has been noted that a failure would be catastrophic (JEO, 2020a).

Flooding within the watershed comes in several forms, not all directly from the North Fork Elkhorn River. Flash floods from tributaries cause water to cover major roads, and North Fork Elkhorn River to overflow, and cause damage to local properties and infrastructure. Outside of the watershed's communities, the majority of land is used for agriculture. Flooding can affect all areas of the watershed: roads and bridges are inundated and damaged, access to emergency services is delayed, and farm to market access is interrupted.

PROJECT OPPORTUNITIES

At the initiation of this project, the LENRD was determined to fully understand the flood risks across the watershed through a comprehensive preliminary analysis. This analysis relied on the scoping process; input from communities, agencies, and the public; and available hydrologic modeling and study data. This preliminary analysis also allowed the project teams to screen areas for a reasonable probability to meet WFPO program requirements. Those areas that appeared to be most feasible were carried forward for additional alternatives identification and evaluation.

Those that did not appear to be feasible were not considered further. The Cities of Osmond and Pierce are the communities within the watershed with elevated flood risk and that also had potential alternatives that would be both technically feasible and publicly supported.

Opportunities are defined as the desirable, future conditions that may be achieved through the implementation of project alternatives. A variety of opportunities exist to reduce flood risk within the watershed, which may also offer other incidental benefits, such as:

- Reduction in future flood damages
- Reduce the need for mandatory flood insurance within the floodplain project area
- Improved water quality
- Reduced runoff and erosion
- Improved soil health
- Improved or increased wildlife and aquatic habitat areas
- Reduced damages to, or protection of, cultural resources

1.04 OBJECTIVES AND CONSTRAINTS

FEDERAL OBJECTIVE AND GUIDING PRINCIPLES

The Federal Objective is to maximize sustainable economic development, avoid the unwise use of flood-prone areas, protect and restore natural systems, and mitigate any unavoidable impacts. With the Federal Law passage of the 2007 Water Resources Development Act, Congress directed the federal government to update and consolidate its past guidance to ensure investments meet the Federal Objective. The original Principles and Guidelines (P&G) was replaced by Principles, Requirements and Guidelines (PR&G) as of April 2019. The PR&G allow for:

"… maximizing public benefits (of all types) relative to costs, the use of quantified and unquantified information in the tradeoff analysis, flexibility in decision making to promote localized solutions, ability to rely on the best available science and objectivity, and advance transparency for Federal investments in water resources."

The PR&G further state:

"Federal investments in water resources as a whole should strive to maximize public benefits, with appropriate consideration of costs. Public benefits encompass environmental, economic, and social goals; include monetary and non-monetary effects; and allow for the consideration of both quantified and unquantified measures."

The PR&G also requires benefits and costs to be evaluated in an ecosystem service framework that includes economic, social, and environmental values. The framework classifies ecosystem services into four broad categories of provisioning, regulating, cultural, and supporting services.

The primary services impacted by flood mitigation projects are regulating and cultural services. Projects designed to provide additional irrigation water may primarily impact provisioning services. Supporting services, such as nutrient cycling, underlie most regulating and provisioning services.

PROJECT OBJECTIVE

Objectives are statements that describe the desired results by solving the problems and taking advantage of the opportunities over the period of analysis. In addition to the Federal Objectives listed above, the following objective was identified:

- Reduce flooding damages to buildings and improve access for emergency services during flooding events within Pierce and Osmond for the lifespan of the project (100 years after construction is completed).

PROJECT CONSTRAINTS

Constraints are factors that would make it more difficult to plan and implement a potential project. They are things that must be avoided or cannot be changed while meeting the objectives. The following constraints were identified:

- **Constraint 1:** Avoid increasing flood risks to properties and communities downstream of the North Fork Elkhorn River Watershed.
    - There are additional communities downstream of the project area along the North Fork Elkhorn River. Transferring flood risks downstream only serves to impose the threat of flood damage and potential loss of life onto people who live outside of the project watershed. Protecting the citizens of Pierce and Osmond would be meaningless if the tradeoff places other people in danger.
- **Constraint 2:** Avoid impacts to the existing BNSF Railway right of way in Osmond.
    - Working with the railway on projects adds significant hurdles to implementation, often increasing the time it takes to complete, increasing design costs, and constrains the potential alternatives to those which are acceptable to the railway. Additionally, increasing flood elevations would increase the risk of train derailment, or potentially prevent the use of a section of track until inspection and/or repair can be accomplished.
- **Constraint 3:** Avoid adverse effects to the existing levee in Pierce.
    - This levee system falls under the USACE Section 408 program, which means it cannot be altered without permission granted by the Secretary of the Army and any alterations must follow USACE regulations and requirements.

CHAPTER 2. SCOPE OF THE ENVIRONMENTAL ASSESSMENT

This chapter contains a summary of the issues and resources identified through the project scoping process. Issues that were considered but were found not to require detailed discussion in the plan are also identified in this chapter and eliminated from further discussion within the Plan-EA. Issues and resources that were not eliminated are further discussed in Chapter 3 and Chapter 5.

The NRCS, LENRD, citizens, and property owners of the North Fork Elkhorn River Watershed, and other project partners discussed resource concerns during scoping meetings. These meetings were held as part of the overall scoping process, to help identify what resources or issues needed to be analyzed during the project. The Plan-EA was shaped by the information gathered during these meetings, in addition to required scoping items. This chapter provides a summary of the resource concerns that were identified through input from scoping meetings, as well as concerns that were judged not to be relevant to this Plan-EA. Input from partner agencies and the public was utilized to determine which resources were of the greatest concern to this Plan-EA, as summarized in Table 9. Additional information on scoping meetings is available in Chapter 6. The following meetings were held:

- November 6, 2023 – Public Scoping Meeting in Osmond, NE
- November 8, 2023 – Public Scoping Meeting in Pierce, NE
- November 28, 2023 – Agency Scoping Meeting held virtually

Table 9: Summary of Scoping for the Plan-EA

Resource Concern	Relevant?	Reasoning
Soil Resources		
Land Use	Yes	Potential changes to or impacts on land use will be investigated for each alternative.
Prime & Unique Farmland	Yes	Prime farmland is known to exist in the watershed, some of which may be impacted by flooding or alternatives (NRCS, 2023). Potential conversion of farmland to non-agricultural use will be reviewed by NRCS in compliance with the Farmland Protection Policy Act.
Geology	Yes	Geological conditions such as the types of soils and sediments located in the watershed may impact the development of potential alternatives.
Water Resources		
Waters of the United States	Yes	Aquatic resources (streams, wetlands, etc.) are known to be in the watershed. Waters of the United States and wetlands could potentially be impacted by the project.
Streams and Water Quantity	Yes	Alternatives may alter alignment or change flow in some streams. Additionally, potential depletions of

Resource Concern	Relevant?	Reasoning
		instream flows to the Platte River will be investigated for proposed alternatives.
Wetlands	Yes	Wetlands are known to be in the watershed. Alternatives analysis will address NRCS policy (Food Security Act, Swampbuster provisions), Executive Order 11990, and provisions of Section 404 of the CWA.
Surface Water Quality	Yes	There are impaired waterbodies designated within the watershed (NDEE, 2023).
Groundwater Quantity	Yes	Water table elevations may be affected by alternatives.
Groundwater Quality	Yes	Groundwater is the primary source of drinking water in this region.
Regional Water Management Plans	Yes	Watershed is included in, or drains into areas addressed by, several regional water management plans.
Coastal Zone Management Areas	No	Watershed is not located near any coastal zones (NOAA, 2024).
Floodplain Management	Yes	Developed and agricultural areas of the watershed are located in the floodplain (FEMA, 2023).
Federally Authorized Levee System (Section 408)	Yes	There is a federally authorized levee system located in the City of Pierce.
Wild & Scenic Rivers	No	No Wild & Scenic Rivers (NWSR, 2023) or Nationwide Rivers Inventory listed segments (NPS, 2023) exist in or near the watershed.
Sole Source Aquifers	No	No sole source aquifers exist in the watershed (USEPA, 2023).
Air Resources		
Air Quality	No	All counties in the watershed are currently meeting all national ambient air quality standards (USEPA, 2024). No alternatives will harm air quality or violate the Clean Air Act.
Clean Air Act	No	There are no National Ambient Air Quality Standard violations in the watershed (USEPA, 2024). No alternatives will harm air quality or violate the Clean Air Act.
Plant and Animal Resources		
Fish and Wildlife (including coordination requirements)	Yes	A variety of fish and wildlife species inhabit the watershed.
Threatened & Endangered (T&E) Species	Yes	The project is subject to the Endangered Species Act (ESA) and species have known ranges in the watershed.
Ecologically Critical Areas	No	The watershed does not contain any areas designated as ecologically critical areas, critical habitat, etc.

Resource Concern	Relevant?	Reasoning
Invasive Species	Yes	A variety of invasive species have the potential to exist in the watershed and could potentially be introduced or spread.
Migratory Birds / Bald & Golden Eagles	Yes	Migratory birds and eagles exist in the watershed.
Fish and Wildlife Habitat		
Forest Resources	Yes	Woodlands exist in the watershed and may be impacted by flooding.
Essential Fish Habitat	No	No designated essential fish habitat is within the watershed (NOAA, 2023)
Coral Reefs	No	There are no coral reefs in the watershed.
Natural Areas	No	The watershed does not contain any designated natural areas.
Riparian Areas	Yes	Riparian areas may be affected by alternatives.
Human Resources		
Flood Damages	Yes	Flood damages are the primary concern within the watershed.
Costs	Yes	Costs are a required criterion of PR&G.
Parklands, monuments, and historical sites	No	No nationally designated areas, including National Historic Landmarks (NHL) or National Historic Trails, exist within the watershed (NPS, 2024).
Historic Properties and Cultural Resources	Yes	There are three properties on the National Register of Historic Places in the watershed (NRHP) (NPS, 2023). However, there are numerous properties that are potentially eligible for listing in the watershed. Potential impacts to historic properties and cultural resources will be investigated for each alternative.
Social Issues	No	There are no predominant social issues or controversy associated with flooding or potential alternatives, and public safety is addressed separately.
Local & Regional Economy	Yes	Flooding may inhibit economic growth.
Potable Water Supply	No	No lack of potable water in the watershed.
Public Health & Safety	Yes	Flooding poses a threat to public health and safety
Recreation	Yes	Flooding may impact recreation opportunities
Scenic Beauty	No	No identified areas exist within the watershed.
Scientific Resources	No	No known scientific features exist within the watershed (see Appendix C).
Ecosystem Services		
Regulating Services	Yes	Regulation of flood damage is relevant to this study.
Provisioning Services	Yes	Agricultural lands exist within the watershed.
Cultural Services	Yes	Improved public safety may benefit cultural services.

Resource Concern	Relevant?	Reasoning
Supporting Services	No	Supporting services contribute to the other services and are not quantified by this study.

CHAPTER 3. AFFECTED ENVIRONMENT

3.01 INTRODUCTION

This chapter contains a synopsis of the relevant resource concerns identified through project scoping and shown in Chapter 2. An evaluation of how each is impacted by proposed project alternatives is provided in Chapter 5.

Information is provided at both the watershed perspective and within the affected resource areas (ARA) or area of potential effect (APE). Both the ARA and APE are the geographic area within which an undertaking may directly or indirectly impact the environment, and which form the basis for each alternative to be evaluated for potential impacts. The APE is utilized for evaluating potential effects on cultural and historic properties (including visual effects), while the ARA is utilized for all other environmental resources. Maps of the ARA and APE can be found in Appendix C. Care was taken to properly define the ARA to ensure any possible lateral effects to wetlands due to drainage could be evaluated. These distances were established based on soils, alternative designs, and procedures from the NRCS National Engineering Handbook (NEH Part 650, Chapter 14, Appendix G).

3.02 SOIL RESOURCES

LAND USE

All land use types produce runoff; however, some are greater contributors than others. Farmland has higher runoff rates due to the limited perennial vegetation. Developed and urban regions can produce a disproportionate amount of runoff compared to their size due to the lack of natural vegetation and large areas of impervious materials. Natural areas of grassland and forest have lower rates of runoff due to increased infiltration rates. Land use within the watershed (Figure 2) is dominated by agriculture, with 82% (approximately 185,005 acres) of the area used for cropland and 11% (approximately 25,075 acres) of the area used for pasture in 2023 (USDA, 2023). The rest of the watershed consists of smaller amounts of forest, urban, and water/wetlands. Within the ARA, cropland and pasture usage are as follows:

- Pierce ARA
  - Cropland: 35% (215 ac)
  - Pasture: 30% (180 ac)
- Osmond ARA
  - Cropland: 30% (9 ac)
  - Pasture: 26% (8 ac)

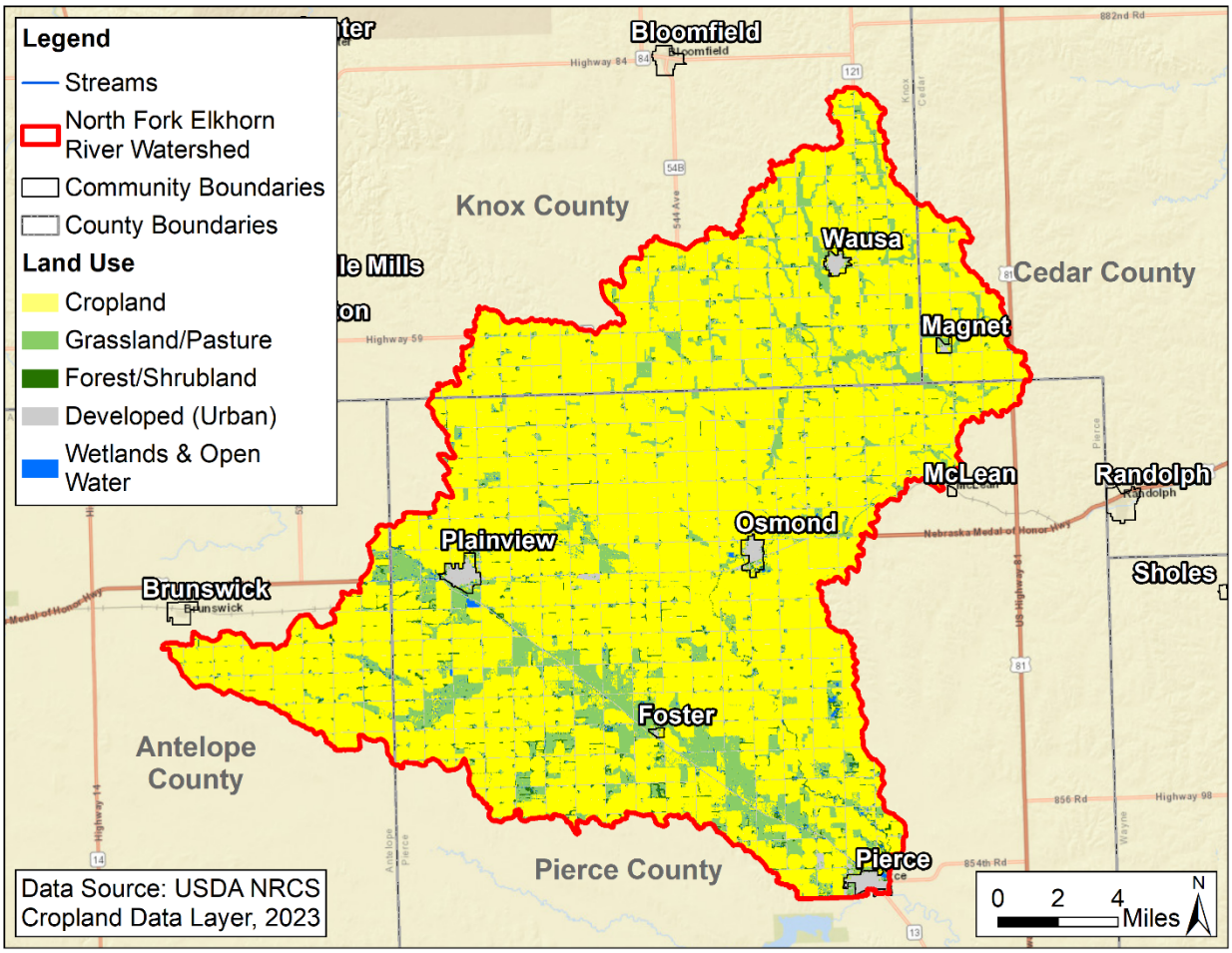

Figure 2: Land Use in the North Fork Elkhorn River Watershed

PRIME AND UNIQUE FARMLAND

The Farmland Protection Policy Act (FPPA) was passed by Congress as part of the Agriculture and Food Act of 1981. The FPPA is intended to minimize the impact Federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. For the purposes of FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance (NRCS, 2012):

- **Prime farmland** is land that has the best combination of physical and chemical characteristics for producing agricultural crops and livestock with minimum uses of fuel, chemicals, labor, and tolerable rates of soil erosion.
- **Unique farmland** is non-prime farmland that is used for production of specific high-value crops such as citrus, tree nuts, olives, etc.

- **Farmland that is of statewide or local importance** is used to produce food, feed, fiber, forage, or oilseed crops, as determined by the appropriate State or unit of local government agency, with the approval of the Secretary of Agriculture (NRCS, 2012).

Note that not all areas that have been classified as prime or unique farmland are necessarily actively in use as cropland at any given time. Within the watershed, there are approximately 117,456 acres of prime farmland, 16,541 acres of farmland of statewide importance, and 16,110 acres which would be prime farmland if drained (NRCS, 2023). These areas are shown in Figure 3. Additional information concerning the conversion of prime and unique farmland is included in Chapter 5. Prime farmland within the ARA is as follows:

- Pierce ARA
    - Prime Farmland: 42 ac
    - Farmland of Statewide Importance: 128 ac
    - Prime Farmland if Drained: 157 ac
- Osmond ARA
    - Prime Farmland: 29 ac

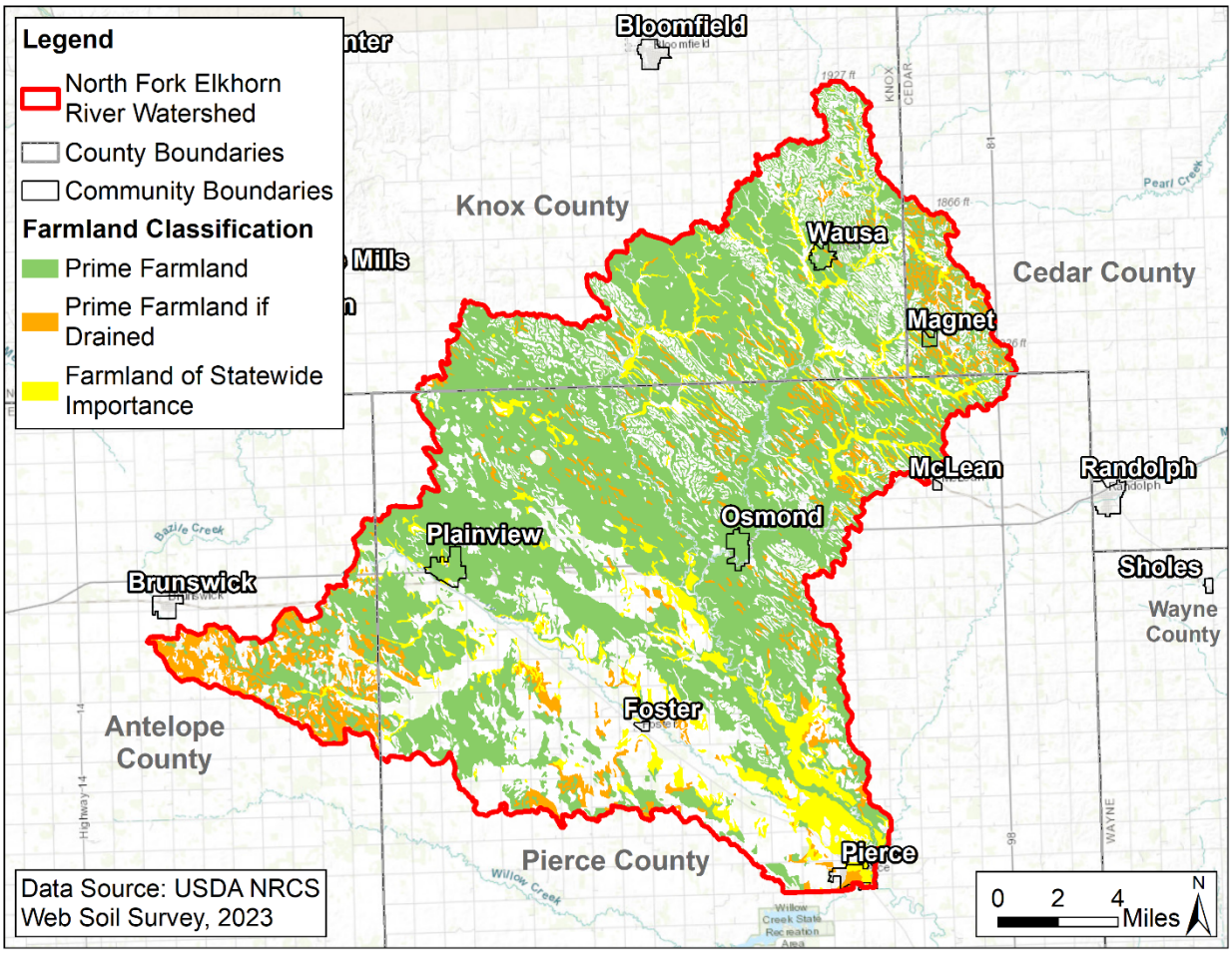

Figure 3: Prime and Unique Farmland in the North Fork Elkhorn River Watershed

GEOLOGY

Bedrock within the study area is mapped as the Ogallala Group, which was deposited during the Miocene epoch in Nebraska. The Ogallala Group is composed of deposits originating from eroded Rocky Mountains sediment, and as such, the materials can be complex and varied. However, most sediments of the Ogallala Group generally include sands, gravels, sandstones, siltstones, claystones, and conglomerates (Burchett et al., 1988). Additionally, within the region, the Ogallala Group hosts the important High Plains Aquifer hydrogeologic unit, which is sometimes locally referred to as the Ogallala Aquifer. The landscape of northeastern Nebraska today is essentially the product of glacial ice, flowing water, and wind active during the Pleistocene and Holocene epochs of the Quaternary Period (Joeckel, 2017). During the Pleistocene epoch (about two million to 10,000 years ago), continental glaciers traversed the northern Great Plains multiple times. Glacial ice repeatedly blocked and diverted rivers, formed lakes, and filled valleys with sediment. Rivers carried meltwater from glaciers that contained heavy amounts of sand and silt, which was

then deposited along floodplains. These glaciers extended across eastern Nebraska, where they left behind deposits of till primarily consisting of clay, silt, sand, and gravel (Wayne, 2011). Wind eroded these deposits, creating dune fields and leaving a layer of loess on the uplands. These deposits have since been further modified by climatic, and more recently anthropogenic, conditions.

A preliminary geological and geotechnical exploration was completed within the ARA. This exploration included 14 soil borings (12 in Pierce and 2 in Osmond). All borings were conducted within the geologic floodplain of the North Fork Elkhorn River. Alluvial soils within the floodplain generally consist of silts and clays near the surface, with deeper deposits consisting of fine to coarse sand with interbedded clay layers. The existing soils encountered across the boring sites consist primarily of alluvial deposits ranging in moisture contents, consistency, and plasticity. Primary bedrock within the region is the Ogallala Group, which is largely deeply underlain by Cretaceous or Permian/Pennsylvanian limestones and shales. Groundwater was encountered in all borings at depths ranging from 4 to 19 feet below ground. The soil conditions appear generally suitable for support of the proposed projects (Thiele, 2024). Additional information is included in Appendix D, as well as the full Preliminary Geotechnical Investigation report within Appendix E.

3.03 WATER RESOURCES

WATERS OF THE UNITED STATES

The United States Clean Water Act (CWA) of 1972 establishes the basic structure for regulating discharge of pollutants into the waters of the United States and regulates the quality standards for surface waters. The discharge of dredged or fill material into waters of the United States, including wetlands, is regulated through Section 404 of the CWA. In Nebraska, any discharge of dredged or fill material requires authorization from the Secretary of the Army, acting through the United States Army Corps of Engineers (USACE). Section 402 of the CWA regulates sewer discharges and stormwater discharges from developments, construction sites, or other areas of soil disturbance. In Nebraska, the NDEE is responsible for administering Section 402 through the National Pollutant Discharge Elimination System (NPDES). Detailed information concerning wetlands and other aquatic resources impacted by this project will be presented in Chapter 5, with supporting information provided in Appendix E. The USACE is a cooperating agency for this NEPA document and will use the analysis to assist in project review for meeting requirements for Section 404 of the Clean Water Act.

STREAMS AND WATER QUANTITY

According to the United States Geological Survey (USGS) National Hydrography Dataset (NHD) there are approximately 693 cumulative miles of streams in the watershed (Figure 4). USGS data classifies 92 miles of streams as perennial, which includes the North Fork Elkhorn River, West Branch North Fork Elkhorn River, Dry Creek, and Breslau Creek. The remaining streams in the

watershed are classified as intermittent (USGS, 2023). There are no significant lakes or reservoirs within the watershed. NHD streams within the ARA are as follows:

- Pierce ARA
  - Intermittent Streams: 0.7 mi
  - Perennial Streams: 0.8 mi
- Osmond ARA
  - N/A

As the Elkhorn River is a tributary to the Platte River, altering the hydrology in the watershed could impact the hydrology of the Platte River. Due to the cumulative effects of many water depletion projects in the Platte River basin, the Nebraska Game and Parks Commission (NGPC) considers any depletion of flows, direct or indirect, from the Platte River system to be significant. However, the USFWS and NRCS agree that actions which result in annual cumulative depletions of flows to the Platte River that are 25 acre-feet or less in Nebraska have “no adverse effect” on flows in the Platte River and to associated federally or state listed species and designated critical habitat.

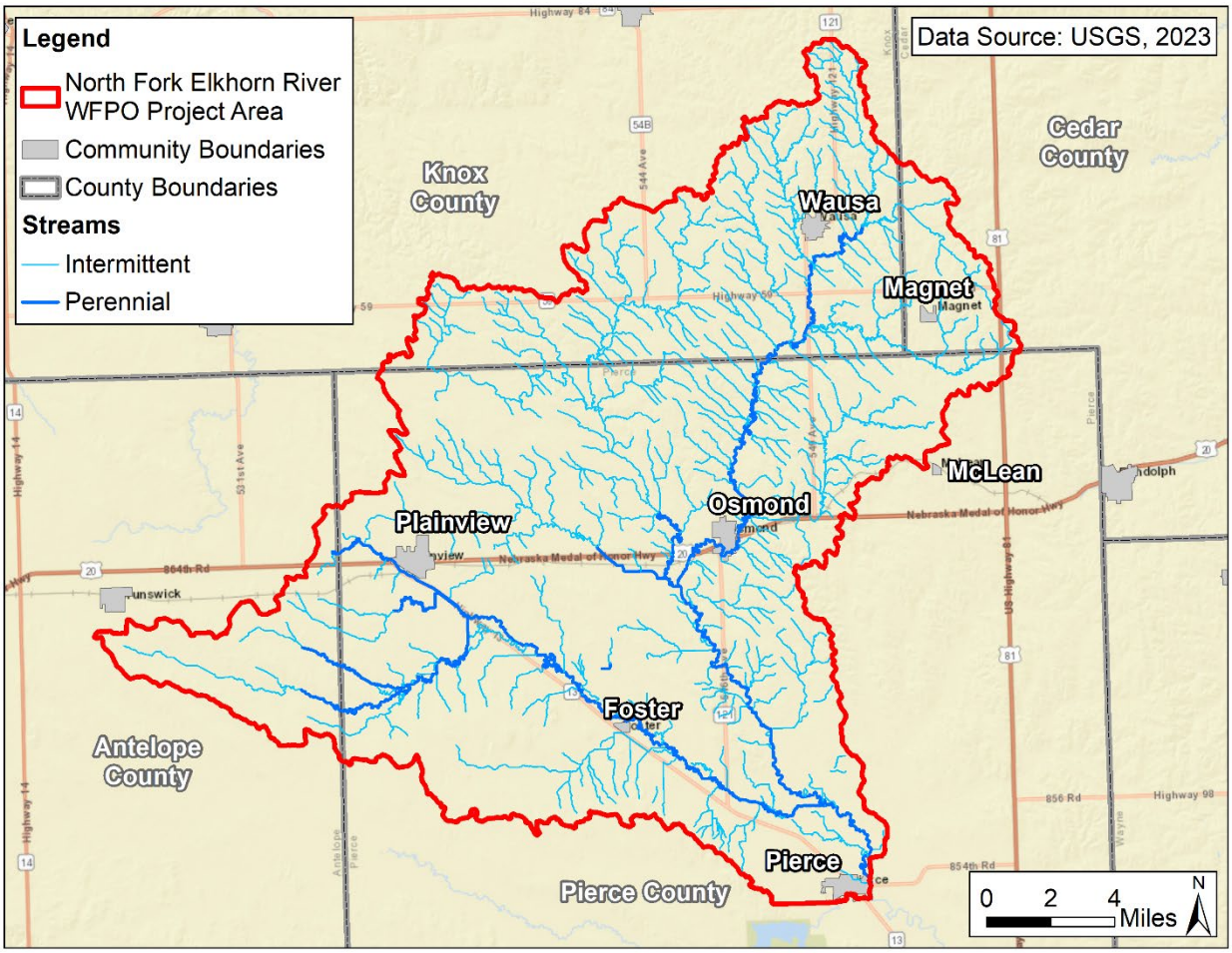

Figure 4: Stream Network within the North Fork Elkhorn River Watershed

WETLANDS

A wetland delineation, conducted in accordance with USACE's 1987 Wetland Delineation Manual and regional supplement to the manual was conducted within the ARA. This included a desktop review conducted using a variety of data sources, as well as in-field work conducted in July 2024. Additional details are included in the wetland delineation reports in Appendix E. The results of the wetland delineations are summarized in Table 10.

Table 10: Summary of Wetland Delineation Results

Type (Cowardin | Nebraska Subclass)	Total Delineated Area (ac)
Pierce ARA	
PEMA/C | Floodplain Depression	16.389
PEMA/C | Lacustrine Fringe	1.446
PEMA/C | N/A	0.113
PEMA/C | Riverine Channel	17.266
PFOA/C | Riverine Channel	1.862
PUBA/C | Riverine Channel	0.128
Osmond ARA	
PEMA/C | Floodplain Depression	0.043

SURFACE WATER QUALITY

The United States Clean Water Act (CWA) of 1972 establishes the basic structure for regulating discharge of pollutants into the waters of the United States and regulates the quality standards for surface waters. These standards are the basis of water quality enforcement in Nebraska. Due to the nature of the project and the requirements set out by the CWA, alternatives will likely require this project to obtain a 404 permit.

The Nebraska Department of Environment and Energy (NDEE) is responsible for implementing the CWA Section 319 Program for the State of Nebraska. This program focuses on the control of nonpoint sources of water pollution for waterbodies, based on meeting water quality standards laid out in Sections 401 and 404 of the CWA, and Nebraska Administrative Code Title 117, which provides numerical water quality standards for all surface waters within Nebraska. NDEE assigns one or more beneficial uses to all designated surface waters within or bordering the State. These beneficial uses are based on the location and characteristics of each stream or lake. Water quality criteria are assigned to each waterbody based on their beneficial use and vary by pollutant. When a waterbody fails to meet its assigned beneficial use, it can be considered impaired and placed on the 303(d) List of Impaired Waters. The watershed contains two impaired waterbodies: the lower segment of Dry Creek, and a segment of the North Fork Elkhorn River. Both of which are impaired due to elevated levels of *E. coli* bacteria. The ARAs do not contain any impaired streams or waterbodies.

GROUNDWATER QUANTITY

There is no shortage of groundwater in the region and much of the watershed has experienced increases in the water table. Between predevelopment and the spring of 2023, the water table has experienced little change throughout the watershed. The greatest changes are found near Wausa, where the water table has lowered between 5 and 20 feet; and near Pierce the water table has increased between 5 and 10 feet (UNL-CSD, 2024). Predevelopment is generally identified as the early 1950s, prior to the widespread use of irrigation wells in Nebraska. Note that these measurements are broad and meant to be interpreted on a regional scale, therefore no site-specific information is available at the ARA level.

GROUNDWATER QUALITY

Groundwater is the sole source of drinking water for approximately 88% of Nebraska residents (NDEE, 2023). In the North Fork Elkhorn River Watershed, 100% of public and private drinking water supply is sourced from groundwater. In Nebraska, the primary pollutant of concern that impacts groundwater quality is nitrate-nitrogen (nitrate). Nitrate leaching into groundwater is common in agricultural areas where it is widely found in fertilizers and is sampled for frequently.

The Nebraska Quality-Assessed Agrichemical Contaminant database (NQAAC) is maintained by NDEE and contains groundwater sample results collected by multiple state and local agencies from thousands of wells throughout the state. Based on information available through NQAAC, wells in Pierce County have a median nitrate concentration of 10.7 mg/L (NDEE, 2024). The United States Environmental Protection Agency's maximum contaminant level is 10 mg/L of nitrate allowable in drinking water. No site-specific information is available at the ARA level.

REGIONAL WATER MANAGEMENT PLANS

The watershed is located within the study area of the following management plans:

- Lower Elkhorn River Basin Water Quality Management Plan (LENRD, 2019)
    - Identifies the most effective and efficient methods of addressing nonpoint source pollution in the Lower Elkhorn River Basin.
- Lower Platte River Basin Coalition Basin Water Management Plan (LPRBC, 2017)
    - Cooperative planning effort between multiple agencies to characterize and sustain the long-term balance between water uses and supplies throughout the Lower Platte River Basin.
- LENRD Voluntary Integrated Management Plan (LENRD, 2018a)
    - Identifies goals and objectives with a purpose of sustaining the balance between water supply and uses in the Lower Platte River Basin.
- LENRD Groundwater Management Plan (LENRD, 2018b)
    - Characterizes groundwater resources and demands within the LENRD and identifies goals and objectives related to groundwater management.

- LENRD Drought Management Plan (LENRD, 2017)
    - Identifies processes in order to respond to and manage the impacts of drought events in the LENRD.

None of the identified regional water management plans above contains goals related to flood prevention and/or flood damage reduction.

FLOODPLAIN MANAGEMENT

The regulatory floodplain is a geographic area delineated by the Federal Emergency Management Agency (FEMA) to determine levels of flood risk and administer the National Flood Insurance Program (NFIP). The extents of the 100-year floodplain have not been made available digitally by FEMA through the National Flood Hazard Layer (NFHL) for the entirety of the watershed at the time of this writing. Therefore, a combination of available NFHL information, and floodplain areas digitized from FEMA Flood Insurance Rate Maps (FIRMs) for the LENRD Hazard Mitigation Plan (FEMA, 2023; LENRD, 2020) are shown in Figure 5.

Four towns in the watershed (Osmond, Pierce, Plainview, and Wausa) participate in the NFIP. Osmond has zoning in place to prevent any additional homes from being built in the flood-prone area located south of the BNSF railroad tracks. Pierce also has floodplain regulations in their zoning. Three watershed counties (Antelope, Knox, and Pierce Counties) participate in the NFIP. Three counties (Antelope, Cedar, and Knox Counties) have floodplain zoning regulations.

Because of the inconsistent data quality, more specific floodplain zones, such as floodway, were unable to be determined and mapped. Based on the available data, approximately 22,427 acres of the watershed, or 10% of the total area, falls within the 100-year floodplain. Approximately 189 acres of this floodplain fall within the Cities of Osmond and Pierce, putting them at greater risk of flooding. The Pierce ARA contains 116 acres of floodplain, and the Osmond ARA contains 14 acres of floodplain, all of which is classified as Zone A floodplain by FEMA.

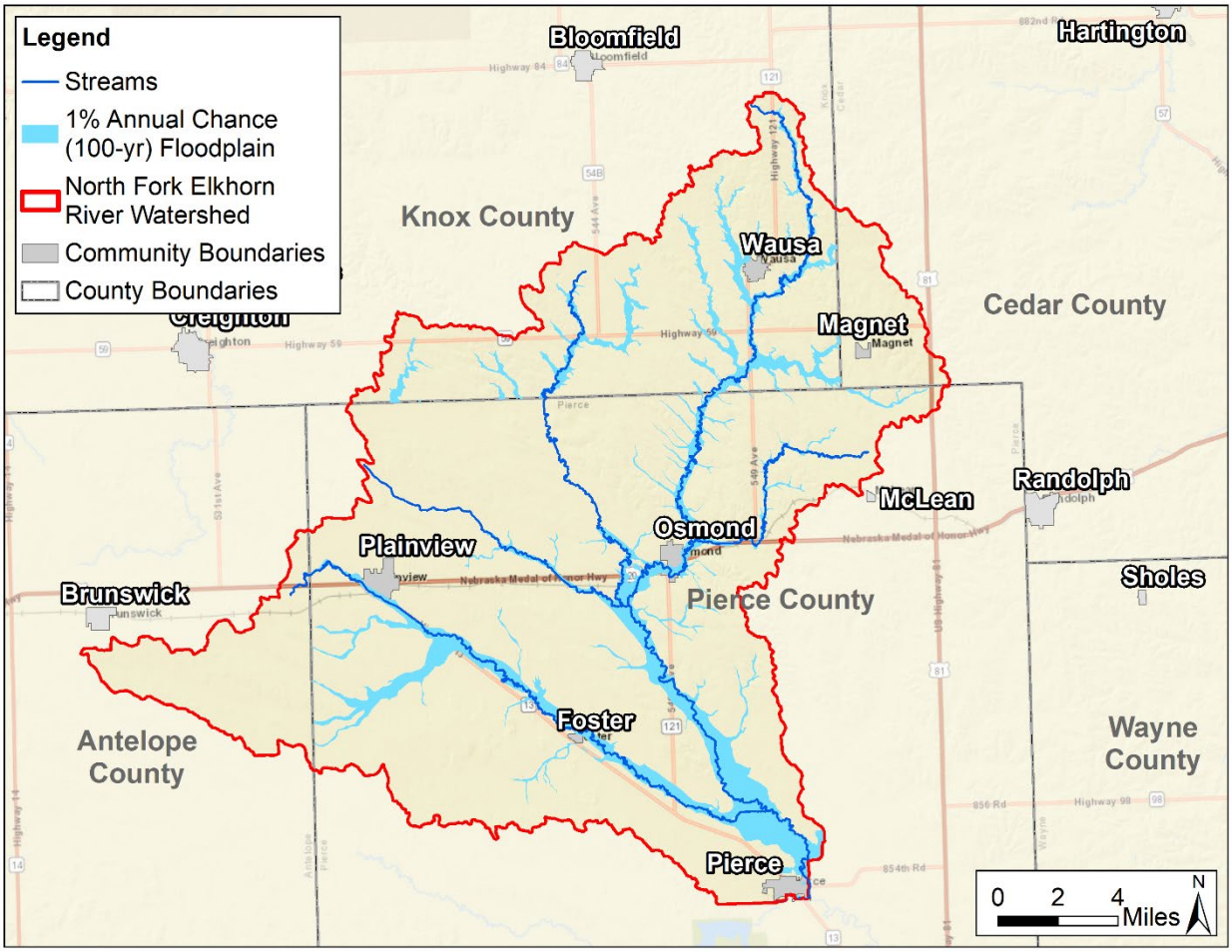

Figure 5: 100-Year Floodplain in the North Fork Elkhorn River Watershed

FEDERALLY AUTHORIZED LEVEE SYSTEM

Per the National Levee Database (USACE, 2024), the watershed contains two segments of Federally Authorized Levees, both located in Pierce. These consist of the North Branch Elkhorn right bank (RB) levee and left bank (LB) levee (Figure 6). These levees were originally built to protect Pierce to the 100-year storm standard. The levees were completed in 1964 and provided flood risk reduction benefits for approximately 735 buildings at the time. This levee system falls under the USACE Section 408 program, which means it cannot be altered without permission granted by the Secretary of the Army and any alterations must follow USACE regulations and requirements. Recent inspections of the levees have identified issues which, if left unaddressed, could increase the chance of a levee breach (USACE, 2024).

The Pierce-North Branch Elkhorn RB system is listed as a FEMA Accredited Levee System with a FIRM effective date of September 1985. To remain accredited during the next FEMA remapping process, the levee must meet the design requirements of 44 CFR 65.10 set by FEMA. Upon

review of available data, it is apparent the existing levee does not meet the design requirements for minimum freeboard and therefore requires improvements to restore the system to its originally authorized purpose. This levee system would fall under a Class I levee system per NRCS 356-CPS, March 2022.

Additionally, while construction of this levee helped to protect Pierce from riverine flooding, it did not address the residual risk of interior flooding issues. During a flood event, water that would normally pass through the levee is instead trapped inside Pierce where it builds up against the landside of the levee. Interior flooding has a history of damage. During the spring floods of 2019 the Premier Estates nursing and critical care facility was forced to evacuate 42 residents before the facility was inundated and significantly damaged by rising floodwater. These residents were ultimately displaced from Pierce for more than four months while the facility was repaired (Siouxland Proud, 2019).

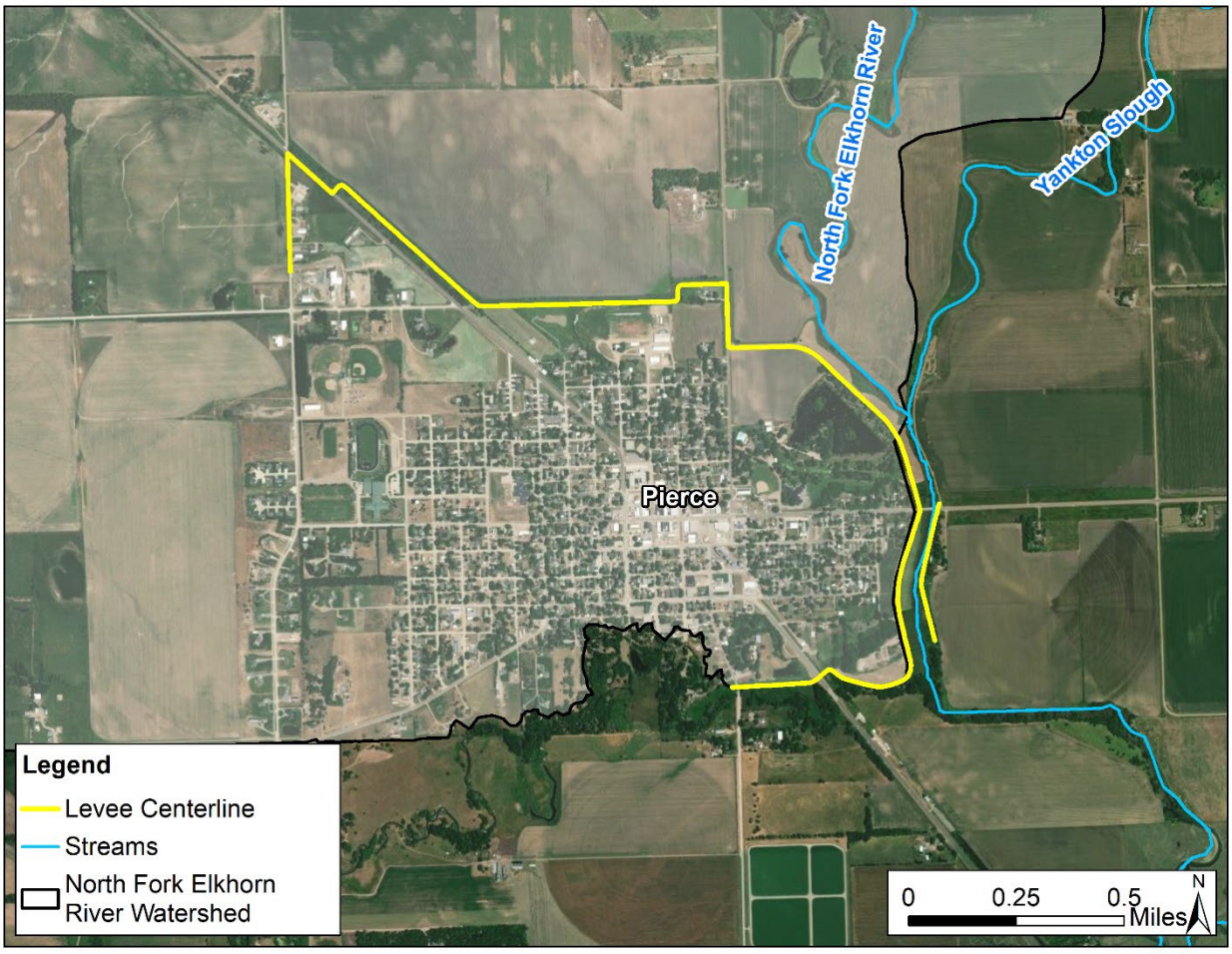

Figure 6: Location of Pierce Levee

3.04 PLANT AND ANIMAL RESOURCES

FISH AND WILDLIFE (INCLUDING COORDINATION REQUIREMENTS)

The North Fork Elkhorn River Watershed falls into Nebraska's Tallgrass Prairie Ecoregion, which covers roughly the eastern quarter of the state. Once characterized as a sea of grass extending for hundreds of miles, less than 1% of tallgrass prairie remains in the continental United States. In Nebraska, approximately 2% of the state's tallgrass prairie remains. The region is home to over 300 species of resident and migratory birds, 55 mammal species, 53 amphibian and reptile species, and uncounted insects. Vegetation is diverse and includes hundreds of species ranging from deciduous woodlands to saline wetlands. Streams in the region were historically meandering and braided with wide, shallow channels and floodplains composed of wet meadows and freshwater marshes (Schneider et al., 2011).

Several laws, rules, regulations, or executive orders are directly related to the fish and wildlife resources within the watershed, including coordination with federal and state agencies. This Plan-EA is subject to the following:

- Endangered Species Act (ESA)
- Fish and Wildlife Coordination Act (FWCA)
- Nongame and Endangered Species Conservation Act (NESCA)
- Section 12 of P.L. 83-566

Coordination with USFWS and NGPC is documented within Chapter 6 and Appendix A. The USFWS is a cooperating agency for this NEPA document and will use the analysis to assist in future project reviews.

THREATENED AND ENDANGERED SPECIES

The Endangered Species Act of 1973 provides a framework to conserve and protect threatened and endangered species, and their habitats. The USFWS maintains and enforces the national list of threatened and endangered species and assists states in developing conservation programs. In Nebraska, the NGPC maintains the state list of threatened and endangered species. The Fish and Wildlife Coordination Act of 1934, as amended through PL 116-188, directs the USFWS to investigate and report on any proposed Federal actions and provide recommendations to minimize impacts on fish and wildlife resources.

Information from the following resources was utilized to compile the initial list of species that may existing within the watershed area:

- NGPC Scoping Letter, dated December 27, 2023 (see Appendix A)
- NGPC Conservation and Environmental Review Tool (CERT) for full watershed
    - Accessed on March 17, 2025 (NGPC, 2025)

- USFWS Information for Planning and Consultation (IPaC) Tool for full watershed
    - Accessed on March 17, 2025 (USFWS, 2025)

CERT and IPaC reports are available in Appendix E.

American Burying Beetle (*Nicrophorus americanus*) – Federally and State Threatened

The American burying beetle is the largest carrion beetle in North America, reaching lengths of 1.0 – 1.8 inches. The beetles are black with orange-red markings. The species is nocturnal, burying themselves under vegetation litter or burrowing into soil in the daytime. At night, they fly to find carrion and are active from late spring through early fall. The beetles are native to 35 states and three eastern Canadian provinces, and occupy a variety of habitats, burying themselves in soil to hibernate for the winter. Risks such as habitat loss or alteration and artificial lights affect most populations, as well as impacts due to agricultural land uses. This species may occur within the watershed in locations where perennial vegetation exists on areas with mesic soil conditions.

Eastern Black Rail (*Laterallus jamaicensis ssp. Jamaicensis*) – Federally and State Threatened

The Eastern black rail is a sparrow-sized marsh bird, and the smallest rail in North America. Adults have an average length of four to six inches and a wingspan of 8.7 – 11 inches. The birds are gray black in coloration, with white speckled upperparts, and has a grayish crown, chestnut-colored nape of the neck, and a short tail. The birds are secretive and difficult to detect. In some locations, males will sing throughout the day and night, while in others they only sing at night. During breeding and wintering seasons, Eastern black rails fly very little and will flush for only a short distance when pursued, mostly remaining on the ground and running quickly through dense vegetation. This species is unlikely to occur within the watershed due to their transient migrant nature in Nebraska.

Northern Long-Eared Bat (*Myotis septentrionalis*) – Federally and State Endangered

The Northern long-eared bat is a medium-sized bat about 3 to 3.7 inches in length with a wingspan of 9 to 10 inches. The species range includes 37 states and much of Canada. The bats spend winter hibernating in caves and mines with constant temperatures, high humidity, and little air movement. During the summer, the bats roost singly or in colonies underneath bark, in cavities or crevices of trees. The greatest threat to Northern long-eared bats is white-nose syndrome, a fungal infection which affects them during hibernation. This species may occupy woodlands and forests, especially in proximity to riparian areas where trees are used as roosting sites and foraging occurs in close proximity.

Pallid Sturgeon (*Scaphirhynchus albus*) – Federally and State Endangered

The pallid sturgeon is a prehistoric fish species, with the sturgeon family having been in existence for about 70 million years. They have a cartilage skeleton, similar to sharks. The fish prefer large, deep turbid river channels, usually in strong current over firm sand or gravel. When young, the

fish eat aquatic insects, but after growing larger they primarily eat other fish. The pallid sturgeon can grow up to six feet long and weigh up to 80 lbs. They have a long flat head, and their bodies have rows of hard, bony plates instead of scales. The tail is long and slender, and the mouth contains no teeth. Pallid sturgeon have been known to live as long as 80 years. They are a migratory species, moving throughout the Missouri and Mississippi river systems. This species is not known to occur in the watershed except potentially where the North Fork joins the Elkhorn River and other locations downstream of that point.

Lake Sturgeon (*Acipenser fulvescens*) – Federally Proposed and State Threatened

Lake sturgeon are benthic fish that occupy bottom habitats of large freshwater lakes and rivers. The fish have a long lifespan with males living around 55 years and females living from 80-150 years. They can grow to be over six feet in length and weigh nearly 200 lbs. They spend the majority of their lives in lake and coastal systems, but migrate into large rivers to reproduce, laying their eggs in rocky, swift flowing portions of the river. Larval lake sturgeon are often found in riverine habitats with fine sediments and slightly slower water velocities. This species is not known to occur in the watershed except potentially where the North Fork joins the Elkhorn River and other locations downstream of that point

Interior Least Tern (*Antillarum athalassos*) – State Endangered

The Interior least tern is the smallest North American tern. Adults average 8-10 inches in length, with a 20-inch wingspan. Adults are gray above and white below, with a black cap, black nape and eye stripe, white forehead, yellow bill with a black or grown trip, and yellow to orange legs. They have narrow, pointed wings, and a forked tail. Nesting habitat is typically bare or sparsely vegetated sand, sandbars, and islands. The birds prefer open habitat and tend to avoid thick vegetation. This species may occupy open sandbars, especially in the lower portion of the watershed, near where the North Fork empties into the Elkhorn River and other points downstream.

Sturgeon Chub (*Macrhybopsis gelida*) – Federally Proposed and State Endangered

The sturgeon chub is a small minnow species reaching up to four inches in length. It is recognized by its long, flat snout with a barbell at the corner of its mouth. The fish are brown to olive colored on their back and white or silver on their belly with relatively large and clear fins. The sturgeon chub is found in fast, free-flowing rivers with high turbidity and low visibility. It is believed that reproduction occurs in late spring to early summer. Spawning takes place by broadcast in fast-moving water. This species is not known to occur in the watershed except potentially where the North Fork joins the Elkhorn River and other locations downstream of that point

Piping Plover (*Charadrius melodus*) – Federally and State Threatened

Piping plover are small shorebirds with a sand-colored upper body, white underside, and orange legs. During breeding season, adults have a black forehead, black breast band, and orange bill.

They are migratory birds, breeding in the Northern Great Plains, Atlantic Coast, and shorelines of the Great Lakes in the spring and summer, and wintering in the Gulf of America. The birds prefer wide, flat, sandy beaches with little vegetation. Nesting territories often include small creeks or wetlands. This species may occupy open sandbars, especially in the lower portion of the watershed, near where the North Fork empties into the Elkhorn River and other points downstream.

Rufa Red Knot (*Calidris canutus rufa*) – Federally and State Threatened

The rufa red knot is a stocky, robin-sized shorebird with a relatively short bill and legs, and a wingspan of approximately 20 inches. The birds have a proportionately small head, small eyes, and short neck, and a black bill that tapers from a stout base to a relatively fine length. The rufa red knot is easily recognized during the breeding season by its distinctive red plumage. Nonbreeding season plumage is dusky or pale ashy gray above, with feathers on the back narrowly edged in white. The birds prefer coastal marine and estuarine habitats with large areas of exposed intertidal sediments. The birds annually migrate between the far north of the central Canadian Arctic to the extreme south of Tierra del Fuego, making them one of the longest-distance migrants in the animal kingdom. This species is unlikely to occur within the watershed due to their transient migrant nature in Nebraska.

Scaleshell Mussel (*Leptodea leptodon*) – Federally and State Endangered

The scaleshell mussel is a small freshwater mussel. It is oval with a thin outer shell that is smooth and yellow green to brown in color with numerous faint green rays. The outer shell is thin and in females looks like scales. The interior is faint pink to purple in color and is iridescent like the inside of an abalone shell. The mussel reaches lengths of up to four inches. They are most likely to be found in clear, fast-moving streams and rivers with gravel or sand bottoms. They burrow into the gravel or sand and require good water quality to thrive. This species is unlikely to occur within the watershed and is primarily found in large turbid rivers such as the Missouri River and in associated backwaters and lower tributaries.

Small White Lady's Slipper (*Cypripedium candidum*) – State Threatened

A native, long-lived perennial orchid, small white lady's slipper grows from a fleshy rhizome. It forms in clumps with as many as 50 single stems coming from a single rhizome. The plant grows to heights of four to 14 inches with two to four leaves forming on the top half of the stem. Leaves are long and slender with parallel veins. One flower forms per stem from mid-May to mid-June. The lower lip of the flower is an inflated white to pale purple pouch. Extending from the sepals on the stem into the pouch is a bright yellow upper lip which is often splashed with red speckles. A single leaf extends over the flower. The plant is found in wet meadows and moist prairies with deep, moist soils and full sun. This species may occur in locations where high quality vegetated wet meadows exist within the watershed.

Western Prairie Fringed Orchid (*Platanthera praeclara*) – Federally and State Threatened

The Western prairie fringed orchid grows from a fleshy, tuberous root and has a single stem with alternate leaves. The long leaves come together at the base of the stem and the veins are parallel. The plant can grow up to three feet in height, but an average height is 18 to 30 inches. The flowers form an open arrangement at the top of the stem. Approximately two dozen creamy white or greenish flowers are present on each stalk. The lower lip of the flowers is divided into three feathery and fringed lobes. The flower can be found in the tallgrass prairie landscape. In eastern Nebraska they are found in upland prairies and loess soils. In central and northeast Nebraska, they grow in wet prairies and meadows. This species may occur in locations where high quality vegetated wet meadows exist within the watershed.

Whooping Crane (*Grus americana*) – Federally and State Endangered

Whooping cranes are one of the rarest birds in North America. Standing nearly five feet tall with a wingspan of 7.5 feet, the birds are white with rust-colored patches on the tops and backs of their heads. They have yellow eyes and long, black legs and bills. Their primary wing feathers are black but are only visible during flight. The birds breed in northern Canada and winter in southern Texas. They begin their fall migration south in mid-September and begin the spring migration north in late March or early April, migrating over 2,000 miles each year. This species may occur occasionally during migratory periods in the spring and fall and use open channel streams and associated wetlands on the eastern edge of the migratory range in Nebraska.

Proposed and Candidate Species

The following list includes species which may be found in the watershed and are undergoing review and are subject to reclassification before the project moves into the implementation phase. These species include:

- Proposed Species
  - Blanding's Turtle (*Emydoidea blandingii)*
  - Tricolored Bat (*Perimyotis subflavus*)
  - Hoary Bat (*Lasiurus cinereus*)
  - Plain Pocketbook Mussel (*Lampsilis cardium*)
  - Plains Topminnow (*Fundulus sciadicus*)
  - Regal Fritillary (*Speyeria idalia*)
  - Monarch (*Danus plexippus*)
  - Suckley's Cuckoo Bumble Bee (*Bombus suckleyi*)

INVASIVE SPECIES

Invasive species are non-native to an ecosystem. Once established, these species may cause irreparable harm, introduce disease, out-compete native species, change habitat, damage equipment or infrastructure, and negatively impact local and national economies. While there is

not a complete list of locations where invasive species are found, the Nebraska Invasive Species Council (NISC) maintains information on potential and known invasive species in Nebraska.

There are dozens of invasive species that have the potential to spread within the watershed. This may include aquatic species, insects, plants, birds, mammals, and even pathogens. NISC prepared an *Adaptive Management Plan* in 2021 (NISC, 2021) to provide guidance on minimizing the impacts of non-native invasive species through prevention and management. Some of their strategies include outreach campaigns to educate residents about the harm invasive species can cause, watercraft inspection and decontamination, and systematic surveys of types, sizes, and locations of invasive species populations.

Potential invasive species that could impact the North Fork Elkhorn River watershed were identified using information provided by the NISC. A best available, although non-comprehensive, list of these potential invasive species is included in Table 11.

Table 11: Potential Invasive Species

Plant Species	Mammal & Bird Species	Insect Species	Aquatic Species
Canada Thistle (*Cirsium arvense*) Outproduces crops and grasses and inhibits growth.	Eurasian Collared-Dove (*Streptopelia decaocto)* Chases off native birds and carries parasites.	Emerald Ash Borer (*Agrilus planipennis Ledeb).* Destructive to ash trees.	Zebra and Quagga Mussels (*Dreissena polymorpha, Dreissena rostiformis)* Dense colonies decrease food supply for native species.
Creeping Foxtail (*Alopecurus arundinaceus*) Outcompetes native plants.	European Starling (*Sternus vulgaris)* Pest due to large presence at agriculture and livestock operations.	Spotted Lanternfly (*Lycorma delicatula)* Destructive to a wide variety of crops.	Asian Clam (*Corbicula fluminea)* Outcompetes native species and blocks irrigation and other pipes.
Downy Brome (*Bromus tectorum)* Outcompetes native grasses and spreads rapidly.	Feral Hog (*Sus scrofa)* Root and trample cropland and native grasslands.	Longhorned Beetle (*Anoplophora glabripennis)* Wood-boring insect that feeds on hardwoods.	Bighead Carp (*Hypophthalmichthys nobilis)* Outcompetes native species.
Garlic Mustard (*Alliaria petiolate)* Outcompetes native plants and kills butterfly larvae.	House Sparrow (*Passer domesticus)* Feed in large groups on grain in fields and storage.	Brown Marmorated Stink Bug (*Halyomorpha halys)* Feeds on a wide variety of crops.	Chinese Mystery Snail (*Cipangopaludina chinensis)* Outcompetes native species and carries parasites.
Japanese & Giant Knotweed (*Fallopia japonica, F. sachalinensis*)	Rock Dove / Feral Pigeon (*Columba livia)* Droppings spread disease and deteriorate buildings.	Cereal Leaf Beetle (*Oulema melanopus)* Destructive to grain crops.	Chytrid Fungus (*Batrachochytrium dendrobatidis)* Causes skin infection in amphibians.

Plant Species	Mammal & Bird Species	Insect Species	Aquatic Species
Dense, rapid growth alters habitat and increases riverbank erosion.			
Leafy Spurge (*Euphorbia esula*) Toxic to cattle, replaces native grasses.	-	Japanese Beetle (*Popillia japonica)* Destructive to a wide variety of plants.	Eurasian Watermilfoil (*Myriophyllum spicatum)* Outcompetes and displaces native aquatic plants.
Musk Thistle (*Carduus nutans*) Outcompetes native plants, dense colonies reduce yield.	-	Mountain Pine Beetle (*Dendroctonus ponderosae)* Destructive to pine trees.	Red Swamp Crayfish (*Procambarus clarkii)* Outcompetes native crayfish species.
Osage Orange (*Maclura pomifera)* Invades grasslands and displaces native plants.	-	Pine Shoot Beetle (*Tomicus piniperda)* Destructive to pine trees.	Rudd (*Scardinius erythrophthalmus)* Outcompetes native fish species and tolerant to poor water conditions.
Phragmites Common Reed (*Phragmites australis)* Forms large, dense stands, traps sediment, and harms water quality.	-	Sirex Woodwasp (*Sirex noctilio F.)* Destructive to pine trees.	Rusty Crayfish (*Orconectes rusticus)* Damages aquatic vegetation, reduces food sources for native aquatic species.
Plumeless Thistle (*Carduus acanthoides)* Outcompetes native plants and harms crop yield.	-	Spongy Moth (*Lymantria dispar)* Defoliates trees.	Silver Carp (*Hypophthalmichthys molitrix)* Outcompetes native fish species.
Purple Loosestrife (*Lythrum salicaria, L. virgatum)* Outcompetes native plants and harms crop yield.	-	-	White Perch (*Morone americana)* Feed on native minnows and fish eggs.

MIGRATORY BIRDS / BALD & GOLDEN EAGLES

The Migratory Bird Treaty Act of 1918 and the Bald and Golden Eagle Protection Act of 1940, both of which have been amended multiple times since their inception, prohibit the taking of protected migratory bird species, bald eagles, and golden eagles without special permission. Under these two acts, 'taking' includes the pursuit, hunting, shooting, wounding, killing, trapping, capturing, or collecting, or attempting to engage in any such conduct towards the birds themselves as well as any parts, such as eggs, feathers, nests, etc. 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 (turkey, quail, etc.).

In Nebraska the nesting season for migratory birds occurs between April 1 – July 15. There are exceptions to this range. For example, raptors can be expected to nest in woodland habitats from February 1 – July 15, whereas sedge wrens, which occur in some wetland habitats, normally nest from July 15 – September 10. Golden eagles can be found in the Nebraska panhandle and commonly range into the central portion of the state during spring and fall. Bald eagles can be found throughout the entire state year-round, especially near water in the winter and spring. Multiple migratory bird species are likely present within the watershed. According to the Nebraska Ornithologists' Union, 250 species of birds have been identified in Pierce County alone, many of them migratory (NOU, 2024).

Birds of conservation concern (BCC) are species, subspecies, and populations of migratory birds that are likely to become candidates for listing on the Endangered Species list and thus warrant particular concern during the planning process. Bird species of conservation concern, as detailed in the IPaC report accessed on March 17, 2025, include:

- American Golden Plover (*Pluvialis dominica*)
    - Found in burned, plowed, and harvested agricultural fields, pastureland, sod farms, estuaries, mudflats, prairie, and tundra.
- Bald Eagle (*Haliaeetus leucocephalus*)
    - Found within two and a half miles of the coast, bays, rivers, lakes, or other bodies of water.
- Black Tern (*Chlidonias niger*)
    - Found in large freshwater wetlands, usually in dense marshes on the edges of shallow lakes of the open prairies or northern forests.
- Bobolink (*Dolichonyx oryzivorus*)
    - Found in damp meadows and natural prairies, or hayfields.
- Chimney Swift (*Chaetura pelagica*)
    - Found in caves and hollow trees, or other artificial sites with vertical surfaces and low light.
- Franklin's Gull (*Leucophaeus pipixcan*)
    - Found in large prairie marshes with low vegetation density.
- Grasshopper Sparrow (*Ammodramus savannarum perpallidus*)
    - Found in grasslands, pariries, hayfields, and open pastures with patches of bare ground.
- Hudsonian Godwit (*Limosa haemastica*)
    - Found in freshwater tundra marshes and bogs, interior wetlands, coastal lagoons, marshes, and ocean coasts.
- Lesser Yellowlegs (*Tringa flavipes*)

    - Found in open deciduous or coniferous forest mosaics with wet or sedge meadows and marshes.
- Marbled Godwit (*Limosa fedoa*)
    - Found in shortgrass prairies near wetlands.
- Northern Harrier (*Circus hudsonius)*
    - Found in open habitats such as grasslands, marshes, meadows, and fields.
- Pectoral Sandpiper (*Calidris melanotos*)
    - Found in grassy shore edges, edges of tidal marshes, flooded fields, wet meadows, plowed fields, and dry prairie.
- Red-headed Woodpecker (*Melanerpes erythrocephalus*)
    - Found in forest edges, orchards, open pine woods, and groves of tall trees in open country.
- Ruddy Turnstone (*Arenaria interpres morinella*)
    - Found in high arctic tundra, along coastlines, and near marshes, streams, and ponds when migrating.
- Short-billed Dowitcher (*Limnodromus griseus*)
    - Found in mudflats, tidal wetlands, and shallow freshwater impoundments.
- Sprague's Pipit (*Anthus spragueii*)
    - Found in native mixed-grass prairie of the northern great plains.
- Western Grebe (*Aechmophorus occidentalis*)
    - Found on freshwater lakes and marshes with extensive open water, or brackish bays, estuaries, or sheltered coasts.
- Willet (*Tringa semipalmata*)
    - Found in marshes, wet meadows, mudflats, and beaches.

3.05 FISH AND WILDLIFE HABITAT

FOREST RESOURCES

Based on land use data, forested areas made up 2% (3,610 ac) of the watershed's total area in 2023 (USDA, 2023). Historically, woodlands were found primarily in stream valleys and riparian areas where they were protected from regular fires. Native woodlands in floodplain areas include mainly cottonwood (*Populus deltoides*), willows (*Salix Babylonic,* and *Salix nigra*), boxelders (*Aver negundo*), and American elm (*Ulmus americana*). Eastern redcedar (*Juniperus virginana)* has become more prominent during the last few decades and now dominates many prairies and woodlands. (Schneider et al., 2011). Forested areas make up 6% (40 ac) of the Pierce ARA, and 1% (0.4 ac) of the Osmond ARA.

RIPARIAN AREAS

Riparian areas are transition zones between terrestrial and aquatic ecosystems, generally along rivers, streams, or other bodies of flowing water. They are present throughout the watershed along

the North Fork Elkhorn River and its various tributaries. There are an estimated 1,374 acres of riparian areas within the watershed (USDA, 2023). These riparian areas are primarily located along stream corridors and surrounding wetlands throughout the watershed. The Pierce ARA contains an estimated 23 acres of riparian areas. There are no riparian areas in the Osmond ARA.

3.06 HUMAN RESOURCES

FLOOD DAMAGES

A detailed hydrologic and hydraulic flooding model was developed in order to understand the sources and severity of flooding within the watershed. More information about the modeling process is available in Appendix D. The results of the H&H model were utilized to determine the extents of existing flooding damages within Pierce and Osmond. Under the existing conditions of a 10-year (10% annual chance) flood event, it was found that approximately 38 buildings in Pierce and 24 buildings in Osmond are inundated. During a 100-year (1% annual chance) flood event, it was found that approximately 104 buildings in Pierce and 67 buildings in Osmond are inundated. Additionally, street flooding is a recurring issue in both communities. In Osmond, Highway 20 is inundated during a 100-year flooding event as well as local streets. Pierce experiences extensive street flooding during a 100-year flooding event, including Highway 13.

COSTS

To quantify the costs of flood damage, the project team calculated the estimated average annual monetary flood damages to buildings lands based on existing conditions in the watershed. Hydrologic and hydraulic modeling results were assessed using the Federal Emergency Management Agency's (FEMA) Hazards United States (HAZUS) program. Annualized flood damages were estimated to be approximately $2,921,600 between both Pierce and Osmond. Building damages include structural damages, content loss and inventory loss; as well as income losses derived from relocation expenses, capital related losses, wage losses, and the loss of rental income. Additional information about the economic analysis is available in Appendix D.

HISTORIC PROPERTIES AND CULTURAL RESOURCES

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 historic properties. Historic properties are 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.

Under Section 106 of the NHPA, consultation with the State Historic Preservation Office (SHPO), Recognized Tribes, and other interested parties, is required for any federal undertaking including watershed actions. The identification and analysis of historic properties for this watershed plan was carried out in accordance with the guidance found in the NRCS National Cultural Resources Procedures handbook.

The Area of Potential Effects (APE) of the alternatives described in Chapter 4.03 totals 826 acres and includes all areas that could be directly or indirectly affected by activities associated with construction of the levee improvements, diversion channel, road raises, berms, and floodproofing measures, utility relocates, access routes, staging areas, excavation, grading, tree removal, alterations to existing roads, levees, berms, drains, bridges, building removal or modifications, sediment disposal, borrow areas, etc., as well as visual and other effects to cultural resources. Maps of the APE can be found in Appendix C.

Buried Past Consulting, LLC., (Buried Past) completed a preliminary cultural resources desktop survey to identify known cultural resources and historic properties within the one mile of the APE. The review included all previously performed archaeological and architectural surveys, recorded archaeological sites, recorded historic architectural properties, NRHP listed properties, National Historic Landmarks, and National Historic Trails. One NRHP listed property, and three archeological sites are recorded within one mile of the APE. The NRHP listed property is the Meridian Highway, a 4.5-mile-long segment of a 1911 road. The road is approximately ½ mile east of the APE and will not be impacted by the project. The archeological sites include two flour mill sites and one lithic scatter. The Osmond Mill is outside the boundaries of the APE. The Pierce Milling Company is located within the boundaries of the APE. The lithic scatter is located ½ mile away from the APE and will not be impacted by the project.

Fieldwork was carried out by Buried Past between late July and early August 2024. The staff that completed the survey and prepared the report meet Secretary of Interior qualification standards for archaeologists and historians per 36 CFR 61. Survey methods followed the guidelines of the Nebraska SHPO and consisted of pedestrian inventory and subsurface testing (shovel tests and auger tests) of areas where ground disturbance may occur. Residential properties within and adjacent to the APE where no ground disturbance will occur were photographed and evaluated for the NRHP but were not subject to pedestrian inventory.

The Buried Past field investigation did not identify any archaeological sites during the survey. No cultural materials were observed on the ground surface or recovered from subsurface tests. The survey did not find any archaeological evidence of the Pierce Milling Company mill in Gilman Park. Remains of the mill foundations may still be present in the park, but it is likely that the site

has been negatively impacted by modern park construction. No cultural materials were observed on the surface of the architectural properties.

Thirty (31) architectural properties greater than 50 years of age were identified during the field inventory (see Table 12). Each of these architectural properties were evaluated for consideration to be listed in the NRHP following the guidelines in National Register Bulletin 15: *How to Apply the National Register Criteria for Evaluation*. Please see Appendix E for a copy of the cultural resources inventory report, which contains descriptions of each resource and the NRHP evaluations as well as information about previous cultural resource investigations and known sites in the vicinity of the APE.

NRCS determined that four of the architectural properties identified during the investigation were eligible for the NRHP under Criterion A because of association with significant events in local history (see Table 12). Both the St. Mary of the Seven Dolors Church and Architectural Resource #11 are outside of the APE and will not be affected by this project. No ground disturbance will occur near either resource and project features will not be visible from either resource. The historic portion of Gilman Park is approximately 300-500 meters from the proposed levee improvements, and there will be no changes to the historic features in the park. The levee is an existing feature on the park landscape, so visual impacts to the park will be negligible. The proposed alterations to the levee will not alter any characteristics of the levee that make it eligible for the NRHP.

After the cultural resource inventory was completed, the project alternatives were expanded to include non-structural measures, and three potential borrow sites. These areas have never been investigated for cultural resources, and historic properties may be present in these locations. If a historic property is present, project activities may damage or destroy all or part of the property. Additional cultural resource investigations are necessary to determine whether this undertaking will have an adverse effect on historic properties. The uninvestigated portion of the APE totals 198 acres including three borrow areas near Pierce totaling 90 acres, 26 acres in Pierce where landowners denied access to the cultural resource investigation, and 83 acres in Osmond where houses will be modified to reduce flood damage to the structures. NRCS determined that this undertaking would have no adverse effects on the Pierce Levee or Gilman Park, but that additional cultural resource investigations are needed for 198 acres of the APE that have not been investigated for historic properties. NRCS consulted with the Nebraska State Historic Preservation Office and other consulting parties (see Chapter 6.09 for a list of consulting parties) about the need to defer identification of historic properties on the 198 acres that were not included in the cultural resources investigation in accordance with 36 CFR 800.4(b)(2) and proposed a programmatic agreement executed pursuant to 36 CFR 800.14(b).

SHPO agreed to participate in the programmatic agreement as a signatory in an email dated February 28, 2025. The Northern Arapaho Tribe concurred with the No Adverse Effect determination in a letter dated March 12, 2025. The Pawnee Nation stated that the project should not adversely affect the cultural landscape of the Pawnee Nation. No objections to the

determination of effect or requests to participate in the programmatic agreement were received. Copies of Section 106 correspondence can be found in Appendix A.

The Programmatic Agreement will allow for deferred identification of historic properties prior to construction of the project. Additional cultural resource investigations will be completed by professionals who meet Secretary of Interior qualification standards for archaeologists, historians, and/or architectural historians per 36 CFR 61, and any cultural resources identified will be evaluated for inclusion in the NRHP following the guidelines in National Register Bulletin 15: *How to Apply the National Register Criteria for Evaluation*. NRCS will consult under NHPA Section 106 with all consulting parties identified in Chapter 6.09 after additional cultural resource investigations are completed. A copy of the Programmatic Agreement can be found in Appendix E.

Table 12. Cultural Resources within APE

Resource #	Description	NRHP Eligibility
1	Two residences on same property. One is a story and a half structure with a gambrel roof of indeterminate age with an attached single car garage. The other residence is a ca. 1925, single story structure with a two-car garage.	Not Eligible
2	Single story, Minimal Traditional style home with a gable and wing form. This structure dates to approximately 1950. There are two associated outbuildings of newer construction but indeterminate age.	Not Eligible
3	The property at this location is a one and a half story Minimal Traditional home with a gable and wing form and vinyl siding. The structure dates to approximately 1948.	Not Eligible
4	Single-story residence of indeterminate style with multiple additions, dating to approximately 1908. A modern detached garage and small shed of indeterminate age are also located on the property. A subsurface root cellar of indeterminate age with corrugated metal door is located between the garage and house.	Not Eligible
5	Two-story residence side gabled residence of indeterminate style with multiple additions. Among the additions to the house is a single car garage. The house has an approximate construction date of 1910. An early twentieth century single car detached garage is also located on the property.	Not Eligible
6	Ranch style residence with a cross hipped roof dating to approximately 1949. The house has an attached three car garage. A modern shed of indeterminate age is also located on the property.	Not Eligible
7	Ranch style residence with a single car attached garage dating to approximately 1962.	Not Eligible
8	Single-story residence in the Minimal Traditional style with a gable and wing form. The residence has a two-car attached garage and dates to approximately 1956.	Not Eligible

Resource #	Description	NRHP Eligibility
9	St. Mary of the Seven Dolors Catholic Church is a Gothic Revival brick structure, constructed in 1911 and dedicated in 1912. The 1912 structure replaced an original church building that was originally established in the 1890s in association with a mission parish. The 1912 church originally had a slate roof. Property is outside of the APE and will not be affected by this project.	Eligible
10	The Osmond ball park was established after 1920. By the 1940s, park improvements such as stadium seating for 400 people were being made. Subsequent improvements also were made in the 1950s. Survey documented early park buildings, a storage shed/garage, and the original ball diamond improvements, as well as modern utilities.	Not Eligible
11	Pony Pratt Truss Bridge dating to the late 1910s. The bridge is shown as crossing the North Fork of the Elkhorn in the 1920 atlas. The Pratt form is one of the earliest types of truss bridges. This particular Pratt example has additional counters that form an “X” within its panels which deviates from the standard form. Connections of the members within this bridge are completed with pins. Pinned connections appear on bridges in the first half of the use of truss bridges. Property is outside of the APE and will not be affected by this project.	Eligible
12	Single-story residence with no determinate style that dates to approximately 1930.	Not Eligible
13	One and a half story cross-gabled home in the Prairie style with attached single car garage. The house dates to approximately 1915. A modern metal shed is the outbuilding at the property.	Not Eligible
14	Single story, cross-gabled home of indeterminate style that dates to approximately 1930. Outbuildings include a modified barn/shed of indeterminate age with multiple additions, a chicken coop and modern utility shed	Not Eligible
15	Residence in the National Folk style with a centered gable and enclosed front porch. Multiple additions are on the rear of the structure. The house dates to approximately 1915. Outbuildings include a modern two car garage of indeterminate age, a lean-to shed and modern prefabricated shed.	Not Eligible
16	Residence in the Minimal Traditional style of indeterminate age and a detached two car attached garage. A detached two car garage is also located on the property.	Not Eligible
17	Ranch style residence with a cross gabled roof and a two-car attached garage. A detached carport is also on the property.	Not Eligible
18	Ranch style residence dating to 1956 with an attached two car garage/addition.	Not Eligible
19	One and a half story residence in the National Folk style with two gabled dormers and an addition on the rear of the home. The house dates to approximately 1909.	Not Eligible
20	Residence of indeterminate style with an attached two car garage dating to 1958	Not Eligible

Resource #	Description	NRHP Eligibility
21	Ranch style residence with brick wall cladding beneath the window line dating to 1961.	Not Eligible
22	Duplex residence created out of two Minimal Traditional homes dating to approximately 1961 joined by two single car garages.	Not Eligible
23	City park built on the remains of a flour mill. The park includes several historic buildings that were moved to this location and serve as the Pierce Couty Historical Society Museum. There are also concrete sculptures and historic plantings from a 1950s beautification effort. No ground disturbance is proposed within the eligible portion of the park. The visual impacts from the proposed levee modifications will be negligible.	Eligible
24	Ranch style residence with a cross gabled roof and a two-car attached garage. The house dates to approximately 1969. A detached two car garage of indeterminate age is also located on the property.	Not Eligible
25	One and a half story residence with Prairie elements and has multiple additions. The house dates to approximately 1915. Outbuildings include a garage.	Not Eligible
26	One and a half story residence with Queen Anne elements and multiple additions. The house dates to approximately 1900. The site also contains several delapidated outbuildings.	Not Eligible
27	Two-story house in the American Vernacular style with additions. Notable elements include fish scale shingles in the gable peaks and rock faced cement block on the first story. The house dates to approximately 1900. Outbuildings include a garage.	Not Eligible
28	American Vernacular gable and wing residence that has multiple additions. The house dates to approximately 1915. Outbuildings include a modern metal shed.	Not Eligible
29	Levee built by U.S. Corps of Engineers in 1963 and 1964. The levee will be modified by this undertaking, but the proposed improvements will not alter any characteristics that make the levee eligible for inclusion in the NRHP.	Eligible
30	Two-story residence in the American Vernacular style with an end gable with shingle details in the gable. The house dates to approximately 1900. Outbuildings are of indeterminate age and include a shed/garage with multiple additions and a shed/barn which has also been modified	Not Eligible
31	One and a half story bungalow. The house dates to approximately 1910. Outbuildings are of indeterminate age and small barn, wood garage/shed and two metal buildings.	Not Eligible

LOCAL AND REGIONAL ECONOMY

The 2022 Census of Agriculture reported 2,993 farming operations throughout the counties that make up the watershed covering more than 1,710,000 acres and being operated by 5,577

producers. Of these producers, 58% resided on their operations, and 46% farm as their primary occupation. The average producer was 56 years of age and had been working in agricultural operations for 27 years. The total market value of agricultural products sold totaled $2,154,100,000, and the average net cash income per operation was more than $736,000 (USDA, 2022).

Across the Cities of Osmond and Pierce and Pierce County, the largest employment sector is educational services and the healthcare industry, followed by retail trade for the City of Osmond, manufacturing for the City of Pierce, and agriculture for Pierce County (Table 13). Given the rural nature of the watershed, farm earnings are likely to be a more substantial component of the local economy than is reflected at the city scale.

Table 13: 2022 Census Economic Statistics

Employment Industry	City of Osmond	City of Pierce	Pierce County
Agriculture, forestry, fishing and hunting, and mining	6.5%	3.7%	13.2%
Construction	6.2%	4.7%	6.9%
Manufacturing	11.7%	15.7%	11.1%
Wholesale trade	4.3%	3.9%	2.6%
Retail trade	18.2%	8.2%	8.9%
Transportation and warehousing, and utilities	11.4%	3.8%	7.1%
Information	0.0%	6.7%	2.7%
Finance and insurance, and real estate and rental and leasing	3.7%	5.5%	5.9%
Professional, scientific, and management, and administrative and waste management services	4.3%	7.0%	5.1%
Educational services, health care and social assistance	20.3%	26.6%	23.9%
Arts, entertainment, recreation, and accommodation and food services	2.5%	8.0%	5.1%
Other services, except public administration	9.5%	4.1%	4.4%
Public administration	1.5%	2.1%	3.1%

Source: US Census Bureau, 2022

PUBLIC HEALTH AND SAFETY

The watershed contains portions of State Highway 13, State Highway 59, State Highway 98, State Highway 121, U.S. Highway 20, and U.S. Highway 81. These represent major commuting routes between communities and also serve as farm to market roads. The majority of other roads across the watershed are unpaved, making them especially vulnerable to flooding damage, and are the

responsibility of counties to maintain and repair. Within the communities, most streets are the responsibility of each city to maintain and repair. Flooded and damaged roads may impede watershed access to emergency services. In Osmond, Highway 20 is inundated during a 100-year flooding event as well as local streets. Pierce experiences extensive street flooding during a 100-year flooding event, including Highway 13.

A portion of railroad operated by BNSF Railway also runs through the watershed and is essential for ethanol production. The railroad crosses the North Fork Elkhorn River in three locations in and near Osmond. During the 2019 flood, the railroad was damaged, and operations were affected.

RECREATION

Public recreation opportunities within the watershed consists primarily of local city parks. There are no major public recreation sites within the watershed. The watershed falls within the Northeast Region of the NGPC Statewide Comprehensive Outdoor Recreation Plan (SCORP), which includes 16 counties and is the third most populous region in the state. In total, the Northeast Region contains 66,944 acres of public access recreation land and water. These recreation areas include 178 parks, 222 playgrounds, 190 ballfields, 62 soccer fields, 544 camping sites, 385 lakes/ponds, and over 81 miles of trails. Statewide, trails were voted the most important amenity to have at outdoor recreation areas. The Northeast region is home to the only free-flowing portion of the Missouri River to border Nebraska and Ashfall Fossil Beds State Historical Park (NGPC, 2020).

3.07 ECOSYSTEM SERVICES

As discussed in Chapter 1, the PR&G requires alternatives to be evaluated through an ecosystem services framework. Ecosystem services are the benefits (both tangible and intangible) that natural ecosystems provide to humans. An ecosystem services framework provides for an integrated approach that allows consideration and transparent evaluation of the benefits and trade-offs of potential alternatives. 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.

Each proposed action is linked to ecosystem features and the associated provisioning, regulating, or cultural services potentially affected. Supporting services, which refer to the underlying process that maintain conditions for life, allow the other services to exist and are not evaluated.

Based on public scoping comments, planning documents, watershed plans from surrounding areas, and discussion with the project sponsor, it was determined that the primary benefits resulting from a project would be reductions in damages to buildings, loss of business incomes, and loss of wages. Based on that information, regulating ecosystem service flows were the only service selected to be monetized for the economic evaluation of this Plan-EA.

REGULATING SERVICES

Regulating services maintain a world in which it is possible for people to live and provide critical benefits that buffer against environmental catastrophes. For the scope of this 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 water filtration and disease control (water quality, wetlands, and streams). Regulating services were the only ecosystem service monetized for the economic analysis portion of this study, as shown in Figure 7.

PROVISIONING SERVICES

The primary provisioning services provided within the North Fork Elkhorn River Watershed are the result of lands utilized for agriculture. As discussed in the Land Use section of this chapter, the watershed is dominated by agriculture, with 82% of the area utilized for cultivated cropland and 11% utilized for pasture. These areas directly contribute to provisioning services via food production. Approximately 12,950 acres of cropland and 7,780 acres of pasture fall within the regulatory floodplain. Flood impacts may harm the capacity for food production, thereby reducing provisioning services.

CULTURAL SERVICES

Public safety is the primary cultural service affected by flooding within the North Fork Elkhorn River Watershed. As discussed in the Human Resources section of this chapter ,residents are continually stressed and threatened by flooding under the existing watershed conditions. Evacuation, damage to homes, loss of income, and potential loss of life are all major factory caused by flooding which lessen public safety and adversely affect cultural services within the watershed.

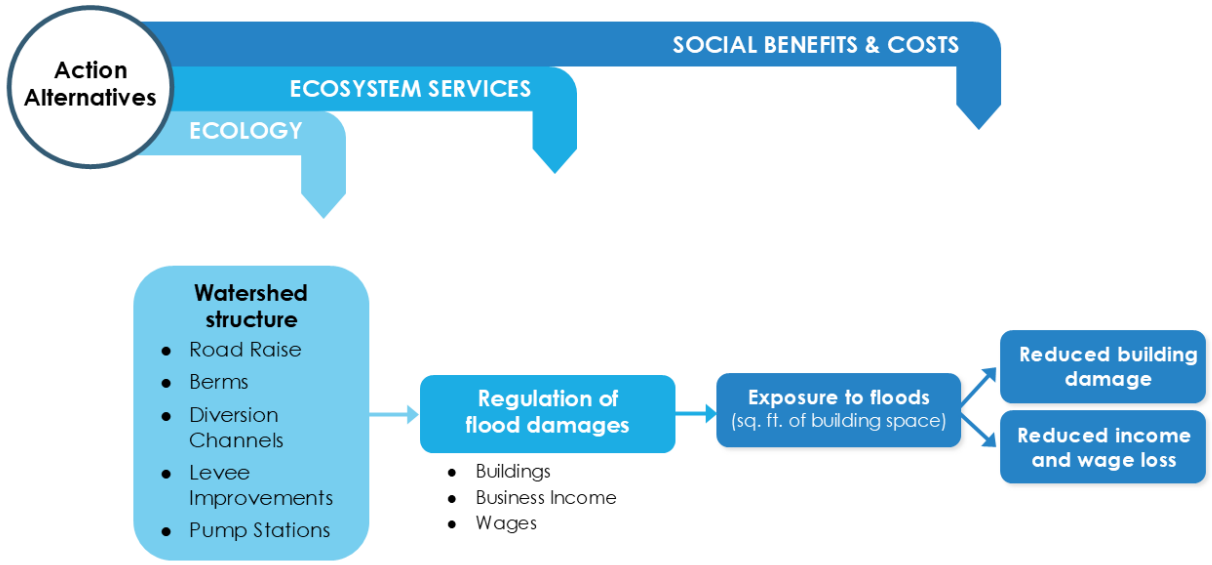

Figure 7: Ecosystem Services or Service Flows Selected for Economic Evaluation

CHAPTER 4. ALTERNATIVES

The purpose of this chapter is to document the range of alternatives considered for the North Fork Elkhorn River Watershed. All reasonable alternatives were rigorously explored and objectively evaluated through this process, and this chapter provides information on the evaluation process of each alternative. For those not selected for the Final Array of Alternatives, this chapter discusses the reasons for their elimination. Alternatives selected for inclusion in the Final Array of Alternatives underwent further evaluation, and documentation of their effects on resources of concern, including detailed information on impacts to wetlands or other aquatic resources, is presented in Chapter 5.

4.01 ALTERNATIVE FORMULATION PROCESS

IDENTIFYING PROJECT MEASURES

The first step in the formulation of alternatives is to identify management measures. Measures are the building blocks of alternatives, and they consist of a feature or an activity that can be implemented at a specific geographic site to address one or more planning objectives, including the project's purpose and need. Individual measures can sometimes be considered complete projects, but they can also be combined to form a complete and effective alternative. As initial evaluation of alternatives proceeds, it is not uncommon to identify opportunities to combine alternatives to improve project effectiveness or to help meet other project objectives.

Both structural and nonstructural measures were identified through the project scoping process, which included input from agencies and the public.

Structural Measures

Structural measures have historically been the technique most desired by the general public, as these modify flood patterns and move floods away from people. Below is a brief description of the structural measures identified for consideration:

- **Channel improvements** – This consists of improving a channel's ability to pass floodwaters, and could include various techniques such as channel widening, channel cleanout, improved bridges or culverts, and channel realignment.
- **Diversion channel** - Construct a channel to divert high flows around or away from flood risk areas.
- **Levee** – Construct a levee along a channel to contain or divert high flows.
- **Detention cell** – An excavated basin with earthen embankments to temporarily detain floodwater.
- **Constructed wetlands** - Construct wetlands to act as off-channel storage.

- **Dam** - Construct one or more dams upstream of flood risk areas to detain floodwater. Dams may be “wet” (permanent pools) or “dry” (designed to drain completely after flood events).

Nonstructural Measures

Nonstructural measures generally remove people from floods, leaving stormwater to pass unmodified. Nonstructural measures can include permanent or contingent measures applied to a structure and/or its contents to prevent or provide resistance to damage from flooding. This can also include nature-based measures, which are designed to restore, work in concert, or mimic natural processes, such as restoring floodplain hydrology. Nonstructural measures generally differ from structural measures in that they focus on reducing the consequences of flooding instead of focusing on reducing the probability of flooding. Below is a brief description of the nonstructural measures identified for consideration:

- **Conservation measures upstream** - Changes in land use and land management practices throughout the watershed to reduce runoff, primarily accomplished through conversion of cropland to grass and/or adoption of best management practices.
- **Flood-proofing structures** – This includes various possible improvements to existing buildings within flood risk areas and may include elevating structures, filling basements, installing flood vents, or installing other flood-proofing materials.
- **Property acquisitions** – This generally involves purchasing flood-prone properties, removing the buildings, and maintaining the land as open space. Relocations of structures to an area outside of the floodplain may also be included. May also include acquiring flood-prone lands and maintaining them as open space.
- **Floodplain regulation and zoning** – Adoption of regulations to control development and prevent encroachment within floodplain areas.

SCREENING CRITERIA FOR ALTERNATIVES EVALUATION

Alternatives were evaluated using a set of screening criteria developed specifically for this project. The screening criteria were developed and refined using agency and public input gained through the scoping process. Additionally, the criteria helped to identify which alternatives were likely to conform to State and Federal requirements. In addition to the project’s purpose and need, screening criteria were identified in Chapter 1 as objectives and constraints.

Project Objective

- Reduce flooding damages to buildings and improve access for emergency services during flooding events within Pierce and Osmond for the lifespan of the project (100 years after construction is completed).

Project Constraints

- **Constraint 1:** Avoid increasing flood risks to properties and communities downstream of the North Fork Elkhorn River Watershed.
- **Constraint 2:** Avoid impacts to the existing BNSF Railway right of way in Osmond.
- **Constraint 3:** Avoid adverse effects to the existing levee in Pierce.

Formulation and evaluation of alternatives also took the following into consideration, adhering to PR&G guidance:

- **Completeness** is the extent to which an alternative provides and accounts for all features, investments, and/or other actions necessary to realize the planned effects, including any necessary actions by others.
- **Effectiveness** is the extent to which an alternative alleviates the specified problems and achieves the specified opportunities.
- **Efficiency** is the extent to which an alternative is the most cost-effective means of alleviating the specified problems and constraints and realizes the specified opportunities and objectives.
- **Acceptability** is the viability and appropriateness of an alternative from the perspective of the Nation's general public and consistency with existing Federal laws, authorities, and public policies.

FORMULATION OF ALTERNATIVES

Once project measures were identified and screening criteria were developed, the next steps included identifying and formulating measures into a reasonable range of specific alternatives for detailed evaluation. A range of alternatives is necessary to ensure the analysis of significantly different approaches to addressing the problems and opportunities associated with the project's purpose and need.

Only measures that provided combined beneficial effects that outweighed combined adverse effects were included. Conservation measures upstream and constructed wetlands as measures did not meet this criterion and were not developed into alternatives.

The no action alternative is included in this analysis and is required to be carried forward into the final array of alternatives. It is the most likely future condition if none of the action alternatives are selected. The conditions of the alternative are utilized as the baseline to evaluate the effectiveness of the other alternatives in reducing flooding damages. This is also known as the Future Without Federal Investment (FWOFI).

4.02 DETAILED STUDY

EVALUATION PROCESS

The following sections document the detailed analysis of each alternative identified. As each alternative was investigated and refined, some were eliminated from further consideration once it was clear they would not be effective, became unreasonable, or failed to meet other screening criteria. Alternatives eliminated from further review are included within this section to document their consideration, analysis, and reasons for elimination. This screening process not only helps to identify the best alternative(s) for consideration but allows for the wise use of the limited planning resources.

The initial screening included the use of hydrologic and hydraulic modeling of the watershed to gauge the performance of each alternative at reducing flooding. Further evaluation of potentially effective alternatives included an analysis on impacts to resources of concern, primarily wetlands and aquatic resources, to help identify alternatives which had the least adverse environmental impacts. Consideration of providing flood protection up to the 500-year recurrence event was considered for each alternative to protect critical facilities such as the Premier Estates nursing and critical care facility which was damaged during the 2019 flood. However, this level of protection was determined to be impractical and too costly to achieve a positive benefit – cost ratio. Further risk mitigation for such facilities may include individual structure floodproofing actions.

Following the detailed study of each alternative, those that met planning requirements and screening criteria were included in the Final Array of Alternatives. The Final Array of Alternatives then underwent further evaluation (documented in Chapter 5) before being selected as the preferred alternative(s) (documented in Chapter 7). A wide array of nonstructural and nature based-based alternatives were identified and evaluated. Additionally, opportunities for combining nonstructural measures with structural measures were assessed.

ALTERNATIVE A – SINGLE DAM

Alternative A would consist of a single dam located on the North Fork Elkhorn River upstream of Osmond (Figure 8). This alternative would greatly reduce flood extents and eliminate the majority of flooding in downtown Osmond. Remaining flood depths in agricultural areas near Osmond would decrease significantly, in some locations by several feet. The dam would have a drainage area of 83.1 square miles and a permanent pool area of 1,120 acres. Thirty structures from roughly six homesteads would fall within the top of dam pool and need to be acquired prior to construction. Because of its position approximately one mile upstream of Osmond, it would be classified as a high hazard dam.

By reducing flood damages in the City of Osmond, this alternative was found to meet the purpose and need of this project. It would reduce occurrences of road overtopping during flood events and change the extent and depth of flooding, meeting the project objective. Because of its placement upstream of Osmond and retention of floodwater, it would satisfy Constraint 1. The dam's location would also satisfy Constraints 2 and 3. However, due to the large amount of land rights and impacts to structures that would be required to construct the alternative it was found to not be

efficient. **Due to a lack of efficiency, this alternative was not carried forward into the final array of alternatives.**

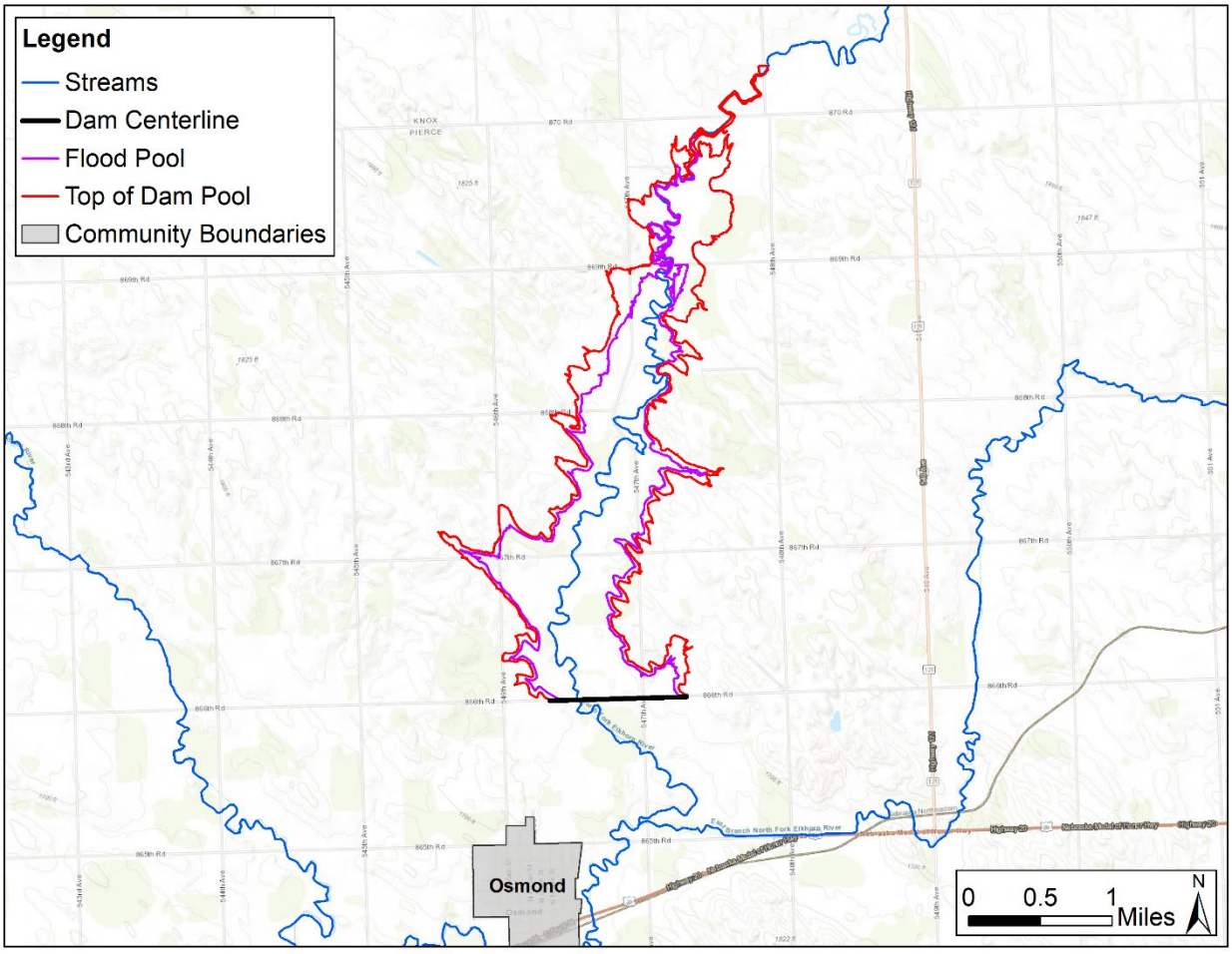

Figure 8: Potential Large Dam Location

ALTERNATIVE B – DETENTION CELLS

Alternative B would consist of up to seven detention cells in and near the Cities of Osmond and Pierce (Figure 9). Just upstream of Osmond, one large detention cell would result in little change to flood extents within the city, although flood depth would decrease marginally across the flooded area. Detention cells in and near Pierce would decrease flood extents slightly in specific locations throughout the city, as well as result in modest decreases to flood depths. Detention cells would be excavated to a depth of approximately 5 feet. Detention cells would primarily be located on land currently used for agricultural production and were sited to avoid structural impacts. The combined area of the detention cells would be approximately 200 acres.

Alternative B would reduce some occurrences of road overtopping and reduce the extent and depth of flooding, meeting the project objective. Because of the retention of floodwater, this alternative would satisfy Constraint 1. Refinement of the design and careful selection of the final footprint of each detention cell could likely satisfy Constraints 2 and 3. While Alternative B has the potential to be acceptable and complete, the relatively small amount of flood damage reduction provided by this alternative meant that it was not effective or efficient. **Due to a lack of efficiency and effectiveness, this alternative was not carried forward into the final array of alternatives.**

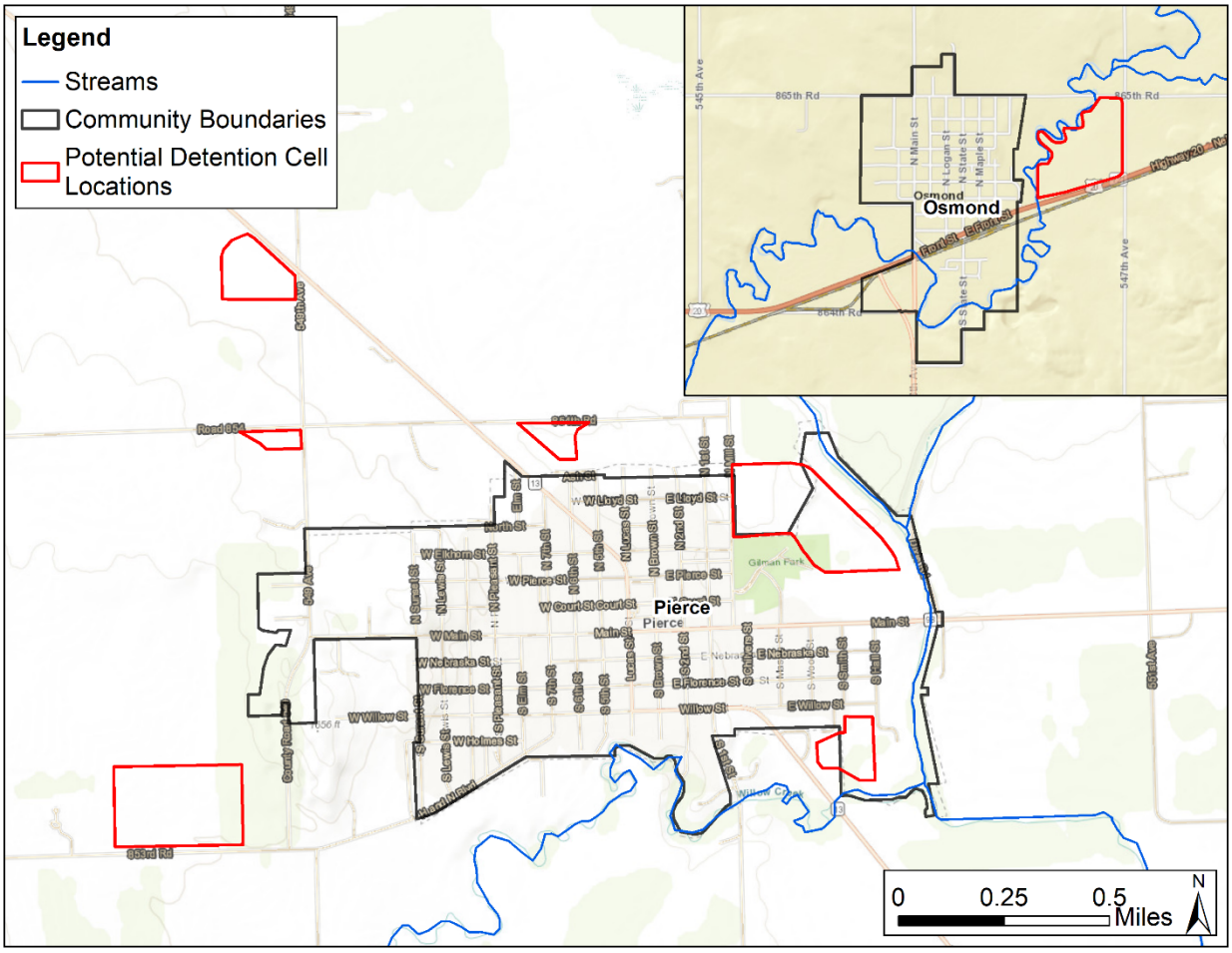

Figure 9: Potential Detention Cell Locations

ALTERNATIVE C – CHANNEL WIDENING

Alternative C would consist of widening a portion of the channel of the North Fork Elkhorn River, south of where it crosses Highway 20 in and near the City of Osmond (Figure 10). The new channel width would be approximately 200 ft. This alternative would result in minor decreases in flooding extents and moderate decreases in flood depths in and near Osmond. An existing

railroad berm is present near the targeted channel area, and the impact of its removal on hydrological dynamics was investigated. No significant decrease in flooding was seen with the removal of the berm, so this removal was not included as part of Alternative C. Channel widening activities were constrained to not require replacement or modification of the existing railroad or highway bridge crossings at the upstream and downstream extent of the site. Preliminary modeling showed that this alternative could not successfully reduce flood depths or extents by any consequential amount. Therefore, this alternative would not meet the purpose and need of the project. **Due to not achieving the project's purpose and need, this alternative was not carried forward into the final array of alternatives.**

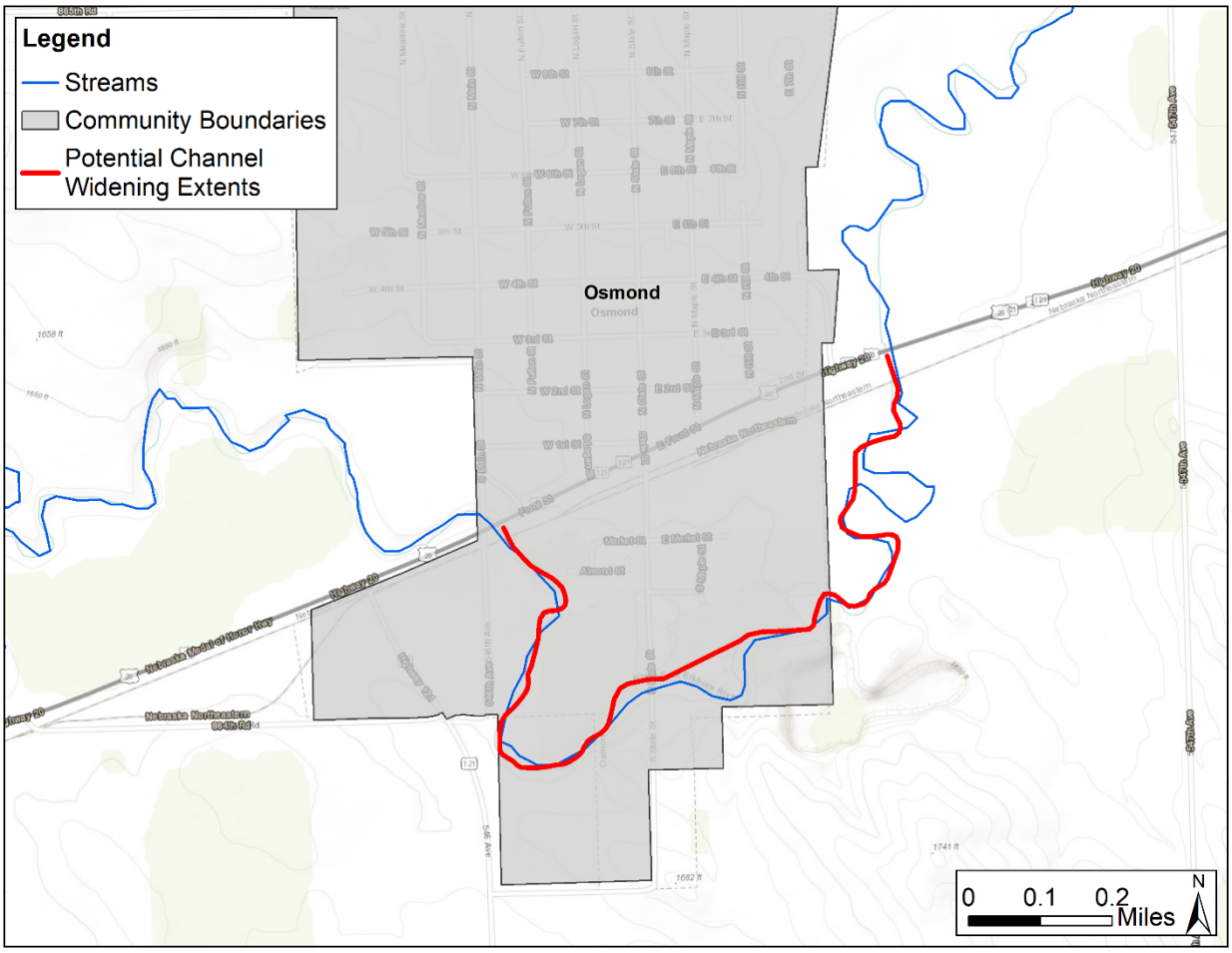

Figure 10: Potential Channel Widening Extents

ALTERNATIVE D – LEVEE IMPROVEMENTS AND DIVERSION CHANNELS

Alternative D would consist of two diversion channels, two stormwater pumping stations, and levee improvements in Pierce (Figure 11). The diversion channels and pumping stations would work together to reduce interior flooding, while the levee improvements would reduce exterior

flooding. Levee improvements would consist of increasing the height of the existing levee and installing seepage berms along the interior of the levee. This alternative would greatly reduce flood extents and depth throughout Pierce. These measures are all interdependent to provide a complete alternative. Interior drainage issues would not exist had the levee not been built, and therefore the additional measures to mitigate interior flooding are interdependent with the levee improvements which will provide protection from exterior flooding sources.

This alternative was found to meet the purpose and need of the project. It would reduce occurrences of road overtopping and reduce the extent and depth of flooding, meeting the project objective. It would not significantly push floodwater out of the watershed to downstream communities, satisfying Constraint 1. This alternative would affect only Pierce, satisfying Constraint 2. This alternative would alter the existing Pierce levee in a beneficial manner, compliant with all rules and regulations, satisfying Constraint 3. Additionally, it was found to be acceptable, complete, efficient, and effective. **Due to meeting all planning criteria, this alternative was carried forward into the final array of alternatives.**

Note that improvements made to the levee upstream of the confluence of the North Fork Elkhorn River and Yankton Slough are eligible for PL 83-566 funding. Improvements made downstream of the confluence are not eligible for PL 83-566 funding. This division of funding is included in the estimated costs used throughout this plan.

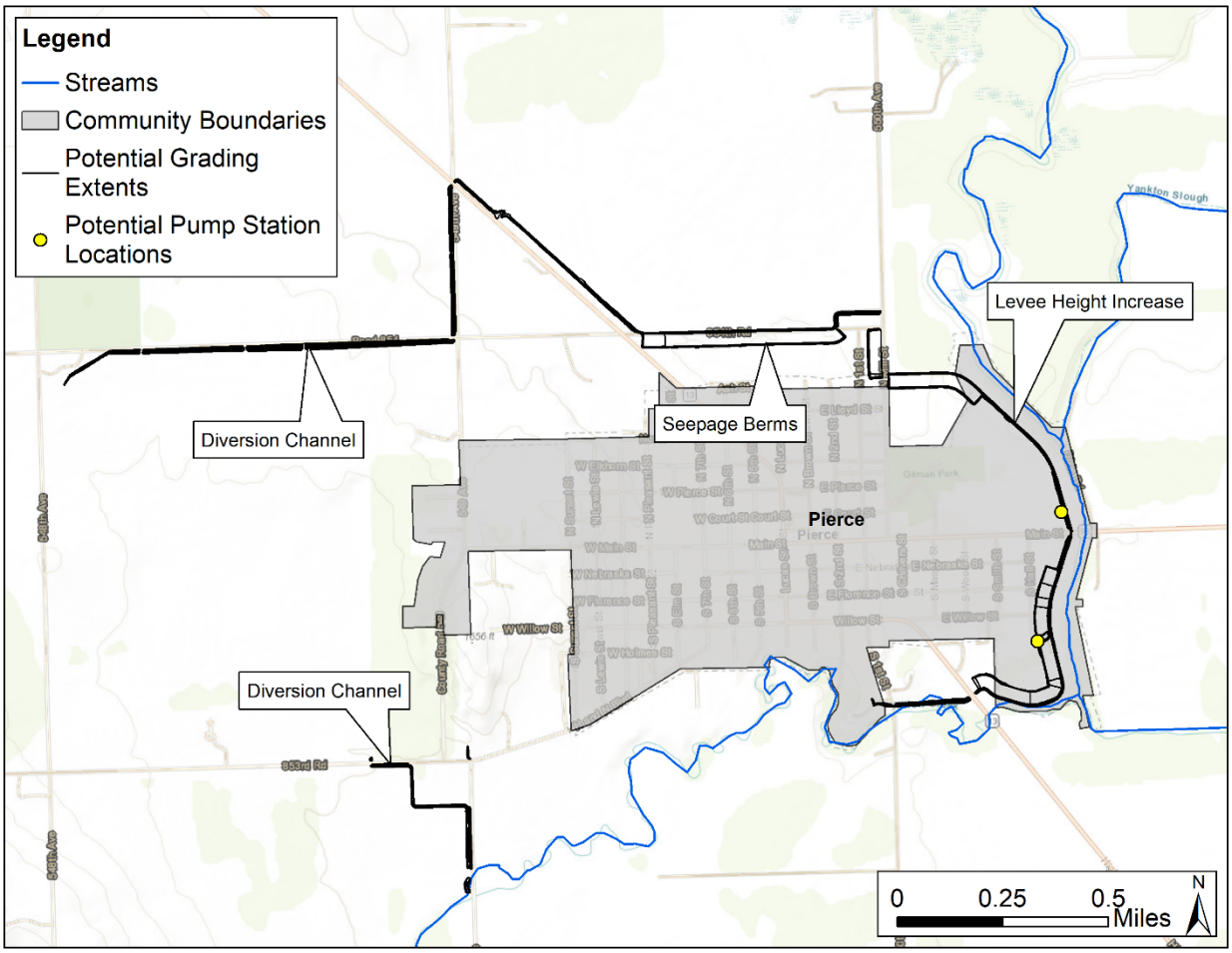

Figure 11: Potential Pierce Levee Improvements and Diversion Channels Locations

ALTERNATIVE E – LEVEE AND DIVERSION CHANNEL

Alternative E would consist of a levee and diversion channel along the North Fork Elkhorn River south of Highway 20 in and near Osmond (Figure 12). The levee would run for approximately 4,400 ft, and the diversion channel would run for approximately one mile with a depth of 12 ft. This alternative would significantly reduce flood extents and depths in Osmond south of Highway 20 and in agricultural land west of Osmond.

Preliminary modeling showed that this alternative would result in only limited flooding reduction, and downtown Osmond would continue to flood at the existing depths and extents. Therefore, this alternative was unable to meet the purpose and need of the project. **Due to not achieving the project's purpose and need, this alternative was not carried forward into the final array of alternatives.**

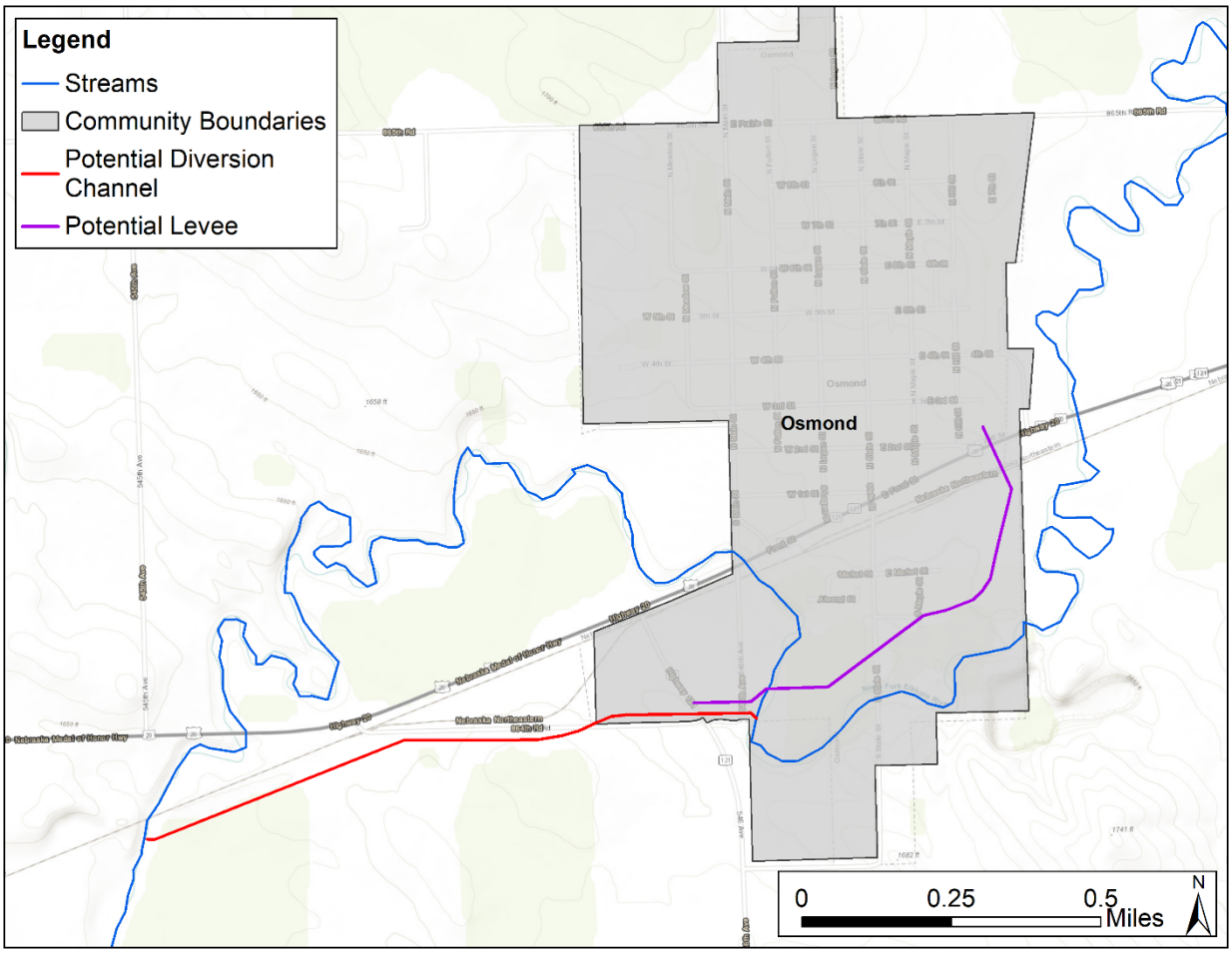

Figure 12: Potential Osmond Levee and Diversion Channel Location

ALTERNATIVE F – ROAD RAISE, BERM, AND NONSTRUCTURAL

Alternative F would consist of a road raise, construction of a berm, and nonstructural improvements to homes in Osmond (Figure 13). This alternative would successfully prevent floodwater from entering the majority of the City of Osmond, thereby reducing flooding damage.

The road raise would occur along 4th Street, east of N Hill Street. The road raise would run approximately 1,100 ft. The road elevation would be raised an average of three feet, with a maximum raise of 6.25 ft. The road raise would prevent floodwater from entering the central

portion of Osmond but also results in increases in floodwater depth to the northeast. Therefore, a berm was also sited to provide protection to the northeast portion of Osmond. The berm would be constructed east of N Park Street, running north-south on the east side of the houses built there. The berm would run approximately 650 ft with a maximum height of 7.6 ft. These structural solutions are interdependent upon each other and would provide flood protection to buildings north of Highway 20.

To protect homes located south of Highway 20, nonstructural measures were also investigated. A dozen homes which had experienced repetitive flooding damage were identified. Common nonstructural measures were explored for each home, including elevation, flood vents, flood walls, berms, sewer backflow preventers, floodproofing, acquisition and demolition, etc. While the final nonstructural measure will ultimately be decided by the Sponsor and homeowner, it was assumed that each of these homes would be elevated above the base flood elevation for cost estimating purposes.

By reducing flood damages within Osmond, this alternative would meet the project purpose and need. Occurrences of road overtopping would be reduced, and the extents of flooding would change permanently; therefore, this alternative would satisfy both project objectives. No significant amount of additional floodwater would be transferred downstream, satisfying Constraint 1. The project locations would avoid the BNSF right of way, satisfying Constraint 2. The location of the project would also satisfy Constraint 3. This alternative was found to be acceptable, complete, efficient, and effective. **Due to meeting all planning criteria, this alternative was carried forward into the final array of alternatives.**

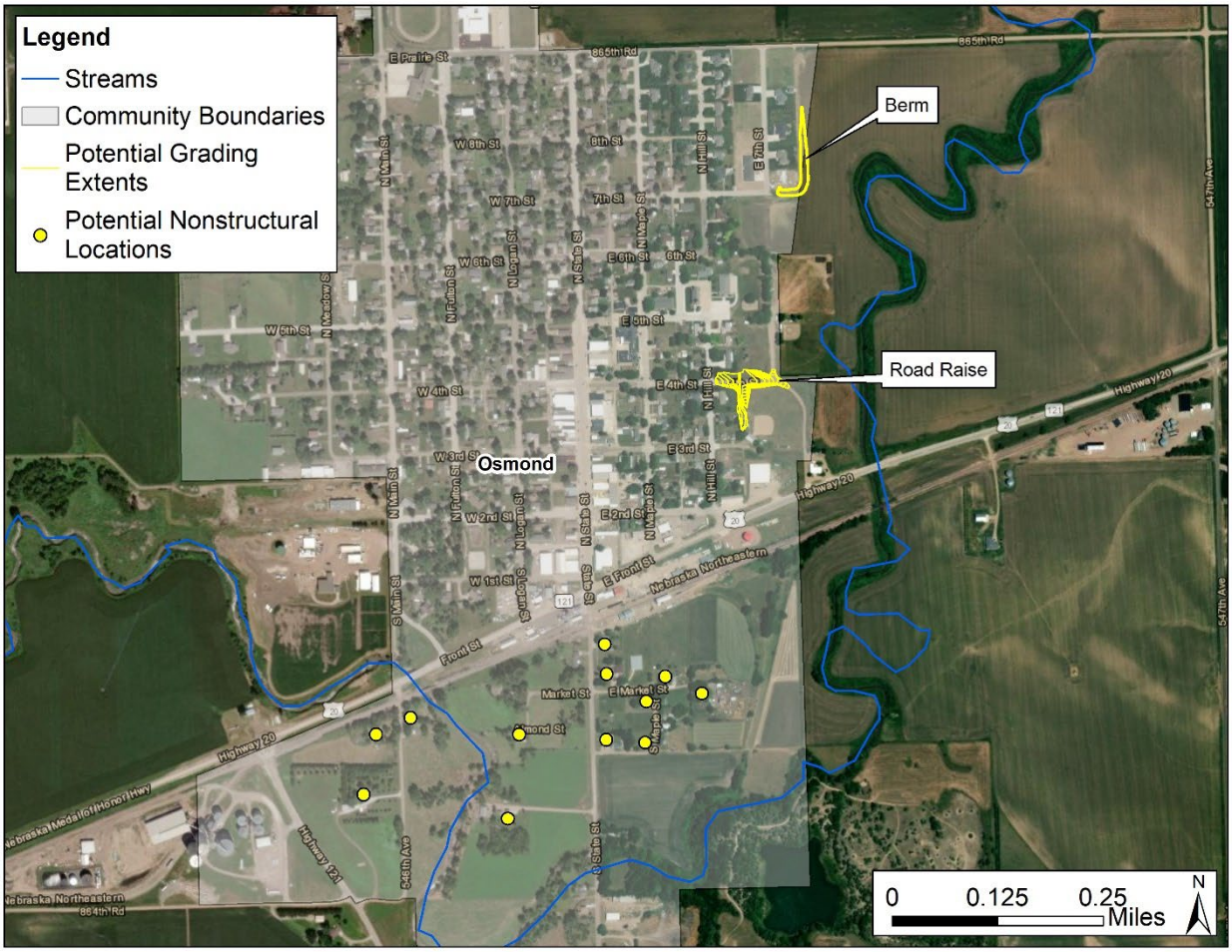

Figure 13: Potential Road Raise, Berm, and Nonstructural Locations

SUMMARY

A summary of the detailed alternatives analysis, and whether each alternative was carried forward for inclusion in the Final Array of Alternatives, is presented in Table 14.

Table 14: Summary of Alternatives Preliminary Screening Evaluation

	Alternatives						
Screening Criteria	**No Action**	**Alternative A Single Dam**	**Alternative B Detention Cells**	**Alternative C Channel Widening**	**Alternative D Levee Improvements and Diversion Channels**	**Alternative E Levee and Diversion Channel**	**Alternative F Road Raise, Berm, and Nonstructural**
Purpose & Need Reduce flood damages in Osmond and/or Pierce.	No, does not satisfy.	Yes, would reduce flooding in Osmond.	Yes, would reduce flooding in Osmond and Pierce.	No, does not satisfy.	Yes, would reduce flooding in Pierce.	No, does not satisfy.	Yes, would reduce flooding in Osmond.
Contribution to Planning Objective							
Objective: Reduce flooding damages to buildings and improve access for emergency services during flooding events within the communities of Pierce and Osmond for the lifespan of the project.	No, would not satisfy Objective 1.	Yes, would reduce occurrences of road overtopping.	Yes, would reduce occurrences of road overtopping.	N/A	Yes, would reduce occurrences of road overtopping.	N/A	Yes, would reduce occurrences of road overtopping.
Response to Planning Constraints							
Constraint 1: Avoid increasing flood risks to properties and communities downstream of the	Yes, would satisfy Constraint 1.	Yes, would not transfer flood risk downstream.	Yes, would not transfer flood risk downstream.	N/A	Yes, would not transfer flood risk downstream.	N/A	Yes, would not transfer flood risk downstream.

	Alternatives						
Screening Criteria	**No Action**	**Alternative A Single Dam**	**Alternative B Detention Cells**	**Alternative C Channel Widening**	**Alternative D Levee Improvements and Diversion Channels**	**Alternative E Levee and Diversion Channel**	**Alternative F Road Raise, Berm, and Nonstructural**
North Fork Elkhorn River Watershed.							
Constraint 2: Avoid impacts to the existing BNSF Railway right of way in Osmond.	Yes, would satisfy Constraint 2.	Yes, would not impact BNSF Railway.	Yes, would not impact BNSF Railway.	N/A	Yes, would not impact BNSF Railway.	N/A	Yes, would not impact BNSF Railway.
Constraint 3: Avoid adverse effects to the existing levee in Pierce.	Yes, would satisfy Constraint 3.	Yes, would not impact levee.	Yes, would not impact levee.	N/A	Yes, would alter levee beneficially.	N/A	Yes, would not impact levee.
Response to Evaluation Criteria							
Acceptability	No, not acceptable.	Yes, dams are acceptable.	Yes, detention cells are acceptable.	N/A	Yes, levees and diversion channels are acceptable.	N/A	Yes, road raises, berms, and nonstructural improvements are acceptable.
Completeness	Yes, complete.	Yes, no actions other than those described would be included in	Yes, no actions other than those described would be included in	N/A	Yes, no actions other than those described would be	N/A	Yes, no actions other than those described would be included in

	Alternatives						
Screening Criteria	**No Action**	**Alternative A Single Dam**	**Alternative B Detention Cells**	**Alternative C Channel Widening**	**Alternative D Levee Improvements and Diversion Channels**	**Alternative E Levee and Diversion Channel**	**Alternative F Road Raise, Berm, and Nonstructural**
		this alternative.	this alternative.		included in this alternative.		this alternative.
Efficiency	No, not efficient.	No, the exorbitant cost of land acquisition and construction would render this alternative not efficient.	No, would not alleviate specified problems to a great enough extent to justify the cost.	N/A	Yes, would reduce flooding and meet other planning guidelines in the most cost-effective way.	N/A	Yes, would reduce flooding and meet other planning guidelines in the most cost-effective way.
Effectiveness	No, not effective.	Yes, this alternative would effectively reduce flooding to the City of Osmond.	No, flood damages would continue to occur in Osmond. And Pierce.	N/A	Yes, this alternative would effectively reduce flooding to the City of Pierce.	N/A	Yes, this alternative would effectively reduce flooding to the City of Osmond.
Carried Forward into Final Array of Alternatives?	**Yes**	**No**	**No**	**No**	**Yes**	**No**	**Yes**

4.03 FINAL ARRAY OF ALTERNATIVES

The alternatives described below were selected for inclusion into the Final Array of Alternatives. Further evaluation of these alternatives is documented within Chapter 5. This included site visits, field data collection and a more refined analysis of economics, environmental and social impacts, cultural and social issues, permitting requirements, and refined engineering designs.

NO ACTION

The no action alternative, or FWOFI, is the most likely future condition if none of the action alternatives are selected. In this alternative there would be no implementation of any flood damage reduction measures, and the potential for flood damages in the watershed would continue. The conditions of this alternative were utilized as the baseline to evaluate the effectiveness of the other alternatives.

ALTERNATIVE D – LEVEE IMPROVEMENTS AND DIVERSION CHANNELS

This alternative consists of constructing a northwest diversion channel (C1-10), a southwest diversion channel (C1-30), two stormwater pumping stations, and a variety of levee improvements (L1-20) including seepage berms and height increase. C1-10 runs along 854th Road and 549th Ave to reduce flows entering Pierce from the northwest. C1-30 connects the drainage area north of 853rd Road and west of 549th Ave to Willow Creek, rerouting flows coming from the west into Pierce. The two stormwater pumping stations are located on the land side of the existing Pierce levee, in sump locations north and south of Highway 98 to mitigate flood risk due to localized internal drainage. These measures are all interdependent to provide a complete alternative. Interior drainage issues would not exist had the levee not been built, and therefore the additional measures to mitigate interior flooding are interdependent with the levee improvements which will provide protection from exterior flooding sources.

As previously described in section 3.03, the existing Pierce – North Branch Elkhorn River right bank levee does not meet the current design requirements of 44 CFR 65.10 set by FEMA. Once the proposed improvements to the levee have been made, the levee system will be able to meet the requirements of USACE, FEMA, and NRCS CPS-356.

This alternative successfully reduces flooding within Pierce. This alternative satisfies the project purpose and need in addition to all objectives and constraints. **Therefore, this alternative meets all planning criteria and was carried forward into the final array of alternatives.**

Note that improvements made to the levee upstream of the confluence of the North Fork Elkhorn River and Yankton Slough are eligible for PL 83-566 funding. Improvements made downstream of the confluence are not eligible for PL 83-566 funding. This division of funding is included in the estimated costs used throughout this plan.

ALTERNATIVE F – ROAD RAISE, BERM, AND NONSTRUCTURAL

This alternative consists of constructing a road raise (F1-1) and berm (F1-2) which work interdependently to prevent floodwater from entering Osmond and making nonstructural improvements to up to a dozen homes to reduce flooding damage. This alternative successfully reduces flooding within Osmond. This alternative satisfies the project purpose and need in addition to all objectives and constraints. **Therefore, this alternative meets all planning criteria and was carried forward into the final array of alternatives.**

CHAPTER 5. ENVIRONMENTAL CONSEQUENCES

This chapter provides a detailed summary of the potential economic, environmental, and social effects of each alternative carried forward into the final array of alternatives, as discussed in Chapter 4 (Table 15). This analysis compares alternatives through the planning process, uses an ecosystem tradeoff analysis, and evaluates each alternative relative to identified resource concerns. NRCS form NE-CPA-52 was completed separately and is available upon request.

Table 15: Alternatives Selected for Detailed Study

Name	Description
No Action Alternative	This alternative represents future conditions if there is no federal investment, and no projects are implemented.
Alternative D – Levee Improvements and Diversion Channels	This alternative includes constructing two diversion channels in addition to levee improvements to reduce flooding damages in Pierce.
Alternative F – Road Raise, Berm, and Nonstructural	This alternative includes a road raise, construction of a berm, and nonstructural improvements to homes to reduce flooding damages in Osmond.

The effects of alternatives relative to resource concerns are defined in Table 16. This language is utilized throughout Chapter 5 to characterize the impacts that a given alternative may have.

Table 16: Definitions of Effects on Resource Concerns

Type	
Direct	Caused by the action and occurring at the same time and place.
Indirect	Caused by the action but occurring later in time and/or further away in distance.
Intensity	
No effect	Will not be changed by the alternative.
Negligible	The change will be so small as to be barely perceptible.
Minor	The change will be detectable but not substantial.
Major	The change will be substantial and/or significant.
Duration	
Short-term	Temporary, lasting during construction or shortly after.
Long-term	Persisting for the lifespan of the project.
Permanent	Lasting indefinitely.
Nature of Impact	
Adverse	The change will be negative.
Beneficial	The change will be positive.
Neutral	Neither adverse nor beneficial.

5.01 EVALUATION OF ALTERNATIVES THROUGH THE PLANNING PROCESS

SUMMARY AND COMPARISON OF ALTERNATIVES

This section compares the alternatives on how well they resolve the problems identified, their performance against the project objectives, their constraints, and evaluation criteria of completeness, acceptability, efficiency, and effectiveness. A summary of this comparison is provided in Table 17.

Table 17: Summary and Comparison of Alternatives – Planning Process

Item or Concern	No Action	Alternative D Levee Improvements and Diversion Channels	Alternative F Road Raise, Berm, and Nonstructural
Alternative Major Features / Works of Improvement by Authorized Purpose			
Flood Prevention			
	None	Northwest Diversion C1-10	Road Raise F1-1
	-	Southwest Diversion C1-30	Berm F1-2
	-	Levee Improvements L1-20	Nonstructural Improvements to Homes
Project Objective			
Objective: Reduce flooding damages to buildings and improve access for emergency services during flooding events within the communities of Pierce and Osmond for the lifespan on the project.	No. Flooding would still occur, interfering with emergency service access.	Yes. This alternative would reduce flooding damages as well as occurrences of road overtopping in Pierce, improving access for emergency services.	Yes. This alternative would reduce flooding damages as well as occurrences of road overtopping in Osmond, improving access for emergency services.
Constraints			
Constraint 1: Avoid increasing flood risks to properties and communities downstream of the North Fork Elkhorn River Watershed.	Yes, would satisfy constraint 1.	Yes. This alternative would not increase downstream flooding	Yes. This alternative would not increase downstream flooding
Constraint 2: Avoid impacts to the existing BNSF Railway right of way in Osmond.	Yes, would satisfy constraint 2.	Yes, would not impact the BNSF Railway.	Yes, would not impact the BNSF Railway.

Constraint 3: Avoid adverse effects to the existing levee in Pierce.	Yes, would satisfy constraint 3.	Yes, would alter the levee beneficially.	Yes, would not affect the levee.
Evaluation Criteria			
Acceptability	No	Yes	Yes
Completeness	Yes	Yes	Yes
Efficiency	No	Yes	Yes
Effectiveness	No	Yes	Yes

RISK AND UNCERTAINTY

Estimating cost and benefits for the alternatives includes consideration of risk factors and uncertainty values that could affect the project in the future, including:

- The alternative cost and benefits were based on an evaluated life of 100 years.
- Engineering estimates were used for cost and included contingencies to help account for unforeseen circumstances and risks.
- Estimated project costs and benefits may change due to factors outside of the control of the Sponsor.
- The basis for the engineer's estimate is a combination of similar project experience and professional judgment.

Climate change is expected to result in increased heavy precipitation and runoff events nationally, including Nebraska, which is likely to lead to increases in flood frequency, intensity, or water volumes. The design of the proposed alternative considers some variation and allows for additional freeboard. Implementation of the alternative would improve resiliency in the watershed to climate change induced flooding events. Still, any changes to the parameters and assumptions used in the analysis could lead to different conclusions regarding the economic efficiency of investing public monies in the watershed as described in this Plan-EA.

Preliminary geological investigation found that soils across the project sites appears generally suitable for support of the proposed improvements. However, during detailed design, additional issues may arise, and possible conflicts may occur with the preliminary geological recommendations. Additional geological exploration will be conducted during the design phase of the project.

Potential borrow sites were identified, but fieldwork for those sites was unable to be completed during the planning phase. This work will be completed during the design phase. A map of the potential sites is included in Appendix C. Final selection and fieldwork for those sites will be completed during the design phase. This would include investigation for environmental impacts, investigation for cultural resources and historic properties, and investigation of geotechnical properties to ensure the proper soils are present. If the borrow site investigation yields any impacts to any of the identified criteria, a Supplemental Plan-EA would need to be prepared, or an alternate borrow site would need to be identified and investigated. Preliminary geological

investigation within the watershed and discussions with local sponsors has led the design team to be confident that borrow materials can be obtained with no significant impacts, and therefore there is a low risk of additional planning being needed.

During the fieldwork phase of the Plan-EA, several landowners in the Pierce region denied access to their property for investigation of cultural resources and wetland delineations. It is anticipated that the Sponsor will have to pursue additional fieldwork on these properties during the design phase.

No field work related to the nonstructural elements of the Osmond alternative was completed. Final homeowner approval to participate in the project will be completed during the design phase. At that time field work will be complete and site-specific NEPA review through an Environmental Evaluation will be completed. The Osmond ARA/APE was expanded to include the area surrounding these homes but is subject to change following review by NRCS.

5.02 EVALUATION OF ALTERNATIVES THROUGH THE ECOSYSTEM SERVICES TRADEOFF ANALYSIS

A summary of each action alternative's impact on ecosystem services in the watershed and fulfillment of federal investment principles in water resources is shown in Table 18. Additional discussion is provided in Appendix D. The Preferred Alternative was created and supported through a local stakeholder process led by the NRD. As part of this process, stakeholders were invited to provide public comment and input into the design and evaluation of the Preferred Alternative.

Due to this input, the Preferred Alternative is the locally preferred alternative. The FWOFI is the alternative in that, without federal investment, there would be no change in the structure of the watershed. The Preferred Alternative is the environmentally preferred alternative as defined in Section 101 of the National Environmental Policy Act, which states:

> *"…It is the continuing responsibility of the Federal Government to (1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations; (2) assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings; (3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences; (4) preserve important historic, cultural, and natural aspects of our national heritage, and maintain wherever possible an environment which supports diversity and variety of individual choice; (5) achieve balance between population and resource use which will permit high standards of living and wide sharing of life's amenities; and (6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources."*

In terms of tradeoff, the preferred alternatives' investment in the watershed would generate significant public benefit by decreasing damages to buildings, decreasing loss of labor income, and decreasing farm productivity loss as compared to the Future Without Federal Investment (FWOFI). The benefits of the preferred alternatives outweigh the costs. While the FWOFI does not require any investment of public money, the tradeoff of avoiding monetary investments in infrastructure is accepting higher levels of building damages, income loss, and farm productivity loss in the watershed as compared to the preferred alternatives.

Table 18: Summary of Selected Alternatives and Ecosystem Services

	FWOFI Alternative	Road Raise, Berm, and Nonstructural[1]	Levee Improvements and Diversion Channels[1]
Alternatives			
Locally Preferred		X	X
Nonstructural		X	
Environmentally Preferable		X	X
Maximum Net Monetized Benefits Plan		X	X
Socially Preferred		X	X
Preferred Alternative		X	X
Guiding Principles			
Healthy and Resilient Ecosystems	Does not meet guiding principle as there would be no protection to ecosystems harmed by flooding.	Meets the guiding principle as ecosystems harmed by flooding would be protected.	Meets the guiding principle as ecosystems harmed by flooding would be protected.
Sustainable Economic Development	Does not meeting guiding principle as this would not reduce the economic harm associated with flooding.	Meets the guiding principle as short-term economic benefits would be seen during construction, and long-term economic benefits would be provided by increased flood protection.	Meets the guiding principle as short-term economic benefits would be seen during construction, and long-term economic benefits would be provided by increased flood protection.
Watershed Approach	Does not meet guiding principle as there is no consideration of upstream or downstream impacts.	Meets the guiding principle as this alternative considers the potential transfer of flood damages downstream.	Meets the guiding principle as this alternative considers the potential transfer of flood damages downstream.
Public Safety	Does not meet guiding principle as flooding would continue to threaten public safety.	Meets the guiding principle as this alternative improves public safety through reduced flooding risk.	Meets the guiding principle as this alternative improves public safety through reduced flooding risk.
Floodplains	Does not meet the guiding principle as	Meets the guiding principle as developed areas would	Meets the guiding principle as developed

	developed areas would continue to be within the floodplain.	be removed from the floodplain.	areas would be removed from the floodplain.
Ecosystem Services Effects			
Provisioning			
Changes to Agricultural Production	Agricultural lands would continue to be damaged by flooding.	Construction of this alternative would remove approximately 0.5 acres of cultivated cropland from production. Flooding impacts to agricultural lands would not change.	Construction of this alternative would remove approximately 16 acres of cultivated cropland from production. Flooding impacts to agricultural lands would not change.
Regulating			
Flood Risk Reduction	Flooding damages would continue to impact the watershed. Osmond experiences $289,200 in annualized flooding damages. Pierce experiences $2,925,100 in annualized flooding damages.	This alternative would provide a flood damage reduction benefit to Osmond of approximately $164,100 annually.	This alternative would provide a flood damage reduction benefit to Pierce of approximately $1,429,500 annually.
Cultural			
Improved Public Safety	Public safety would continue to be threatened by flooding.	Public safety would be improved through reduced road overtopping, building inundation, infrastructure damage, etc.	Public safety would be improved through reduced road overtopping, building inundation, infrastructure damage, etc.
Economic Analysis			
Total Project Investment	$0	$4,075,645	$22,657,800
Annualized Project Investment	$0	$120,000	$667,400
Annualized OM&R Cost	$0	$17,800	$85,200
Total Annualized Project Costs	$0	$137,800	$752,600
Monetized Benefits for Ecosystem Services			
Provisioning	Not monetized	Not monetized	Not monetized
Cultural	Not monetized	Not monetized	Not monetized
Regulating			
Property-Related Damage Reduction	$0	$81,600	$900,200

Business and Wage Income Damage Reduction	$0	$82,500	$529,300
Total Annualized Monetized Benefits	$0	$164,100	$1,429,500
Total Annualized Monetized Costs	$0	$137,800	$752,600
Benefit-Cost Ratio	N/A	1.2	1.9
Annual Monetized Net Benefit	N/A	$26,300	$676,900
Regional Economic Development / Economic Impact Assessment			
Regional Employment	N/A	N/A	N/A
Regional Income	N/A	N/A	N/A
Regional Impacts	N/A	N/A	N/A

(1) Note that all costs and benefits for Action Alternative are compared to the Future Without Federal Investment (FWOFI) here and elsewhere in this document. Benefits and costs were calculated over a 100-year analysis period using a discount rate of 2.75 percent. All values reported in 2024 dollars.

5.03 EVALUATION OF ALTERNATIVES RELATIVE TO RESOURCE CONCERNS

SOIL RESOURCES

Land Use

No Action Alternative: Impacts would be indirect, permanent, and neutral. Existing land uses in the watershed would not change. The primary land uses in the watershed would continue to be agricultural. Flood waters would continue to cause scouring and sedimentation in agricultural fields.

Levee Improvements and Diversion Channels Alternative: This impact would be direct, negligible, permanent, and neutral. Construction of the alternative would remove approximately 16 acres of cultivated cropland from production, this amounts to a negligible change on the watershed scale. This change to land use could have an extremely minor impact on the local agricultural economy by reducing overall yield and could have a positive impact on local groundwater quality by reducing the agricultural pollutant loading. Outside of the area directly affected due to construction, the agricultural nature of the watershed would remain unchanged.

Road Raise, Berm, and Nonstructural Alternative: This impact would be direct, negligible, permanent, and neutral. Construction of the alternative would remove approximately 0.5 acres of cultivated cropland from production, this amounts to a negligible change on the watershed scale. This change to land use could have an extremely minor impact on the local agricultural economy by reducing overall yield and could have a positive impact on local groundwater quality by reducing the agricultural pollutant loading. Outside of the area directly affected due to construction, the agricultural nature of the watershed would remain unchanged.

Prime and Unique Farmland

No Action Alternative: This impact would be indirect, minor, permanent, and adverse. Flooding would continue to threaten prime and unique farmland in the watershed. While not all designated prime and unique farmland is actively used for crop production, the potential for future usage of prime farmland could be reduced due to flooding damages such as scour and debris buildup.

Levee Improvements and Diversion Channels Alternative: This impact would be direct, negligible, permanent, and adverse. In accordance with NEPA and FPPA requirements, anticipated impacts to prime and unique farmland were reviewed by the Nebraska NRCS Assistant State Soil Scientist. Per this consultation, construction of this alternative would result in 20 acres of prime and unique farmland being permanently converted. The FPPA consultation found that no protection or additional evaluation would be necessary for this project. The FPPA consultation letter is included in Appendix A.

Road Raise, Berm, and Nonstructural Alternative: This impact would be direct, negligible, permanent, and adverse. In accordance with NEPA and FPPA requirements, anticipated impacts to prime and unique farmland were reviewed by the Nebraska NRCS Assistant State Soil Scientist. Per this consultation, construction of this alternative is exempt. Therefore, no protection or additional evaluation would be necessary for this project. The FPPA consultation letter is included in Appendix A.

Geology

No Action Alternative: Impacts would be indirect, permanent, and neutral. Flooding would neither disturb nor enhance geological units.

Levee Improvements and Diversion Channels Alternative: Impacts would be indirect, permanent, and neutral. This alternative would neither disturb nor enhance geological units. Geologic conditions that may impact the design of this alternative would be thoroughly explored during the design phase. Per the USGS Quaternary Faults map, there are no active faults near the project sites.

Road Raise, Berm, and Nonstructural Alternative: Impacts would be indirect, permanent, and neutral. This alternative would neither disturb nor enhance geological units. Geological / geotechnical conditions that may impact the design of this alternative would be thoroughly explored during the design phase. Per the USGS Quaternary Faults map, there are no active faults near the project sites.

WATER RESOURCES

Detailed information concerning impacts to aquatic resources (including avoidance, minimization, and mitigation measures) are presented here when appropriate, with supporting information provided in Appendix E.

Waters of the United States

No Action Alternative: Impacts would be indirect, permanent, and neutral. There would be no placement of fill within any streams or waterbodies due to this alternative. This alternative would not require any review under the Clean Water Act.

Levee Improvements and Diversion Channels Alternative: This impact would be direct, minor, permanent, and adverse. All applicable provisions of the Clean Water Act would be complied with during the permitting and construction of this alternative. The project would be reviewed by USACE under CWA Section 404. It is anticipated that this project would be permitted under an Individual Permit. Final impacts and mitigation requirements would be verified during the design and permitting phases.

Steps were taken to avoid and minimize impacts on aquatic resources to the greatest extent possible. A summary of the remaining impacts is provided in Table 19. These are permanent impacts involving fill placement, excavation, or lateral drainage and would require mitigation. Further detail is provided in the Surface Water Quantity and Wetlands sections below, and in Appendix E.

Table 19: Summary of Impacts on Aquatic Resources in Pierce

Aquatic Resource Impacted	Classification	Total Impact (ac)
Stream	Ephemeral	0.074
Stream	Intermittent	0.002
Stream	Perennial	0.000
Canal	Canal	0.018
Wetland	PEMA/C	5.615
Wetland	PFOA/C	0.000
Wetland	PUBA/C	0.000

Road Raise, Berm, and Nonstructural Alternative: This impact would be direct, minor, permanent, and adverse. All applicable provisions of the Clean Water Act would be complied with during the permitting and construction of this alternative. The project would be reviewed by

USACE under CWA Section 404. It is anticipated that this project would be permitted under a Nationwide Permit. Final impacts and mitigation requirements would be verified during the design and permitting phases.

Steps were taken to avoid and minimize impacts on aquatic resources to the greatest extent possible. A summary of the remaining impacts is provided in Table 20. It is not anticipated that any mitigation actions would be required. Further detail is provided in the Surface Water Quantity and Wetlands sections below, and in Appendix E.

Table 20: Summary of Impacts on Aquatic Resources in Osmond

Aquatic Resource Impacted	Classification	Total Impact (ac)
Stream	Ephemeral	0.011
Stream	Intermittent	0.000
Stream	Perennial	0.000
Canal	Canal	0.000
Wetland	PEMA/C	0.000
Wetland	PFOA/C	0.000
Wetland	PUBA/C	0.000

Streams and Water Quantity

No Action Alternative: Impacts would be indirect, permanent, and neutral. This alternative would not directly alter any stream channels or impound any surface water. The hydrology of the watershed would be maintained as it currently exists, and tributaries would continue to flow to the Elkhorn River. There would be no depletion of Platte River flows.

Levee Improvements and Diversion Channels Alternative: Impacts would be direct, permanent, and neutral. This alternative would not impound any water and would only function during flooding events. Under normal flow conditions the hydrology of the watershed would be maintained, and tributaries would continue to flow to the Elkhorn River and eventually the Platte River as normal. This alternative would cause no depletion to existing flows in the Platte River system as no water would be detained. There would be no alteration of surface water quantity.

A jurisdictional determination alongside the Nebraska Stream Condition Assessment Procedure (NeSCAP) would be completed during the design phase. Mitigation requirements are determined by USACE based on the comparison of stream conditions before and after implementation of the project. Existing and proposed stream conditions would be analyzed using NeSCAP to determine if the overall function of the stream system would be improved following project implementation. If the function of the stream is uplifted, no additional mitigation actions would be required. If mitigation actions are required, they would be completed by improving existing stream channels within the ARA.

Road Raise, Berm, and Nonstructural Alternative: Impacts would be direct, permanent, and neutral. This alternative would not impound any water and would only function during flooding

events. Under normal flow conditions the hydrology of the watershed would be maintained, and tributaries would continue to flow to the Elkhorn River and eventually the Platte River as normal. This alternative would cause no depletion to existing flows in the Platte River system as no water would be detained. There would be no alteration of surface water quantity.

The project would be reviewed by USACE under CWA Section 404. It is anticipated that this alternative would be permitted under a Nationwide Permit. The majority of impacts were avoided by limiting grading extents to avoid known stream channels. All impacts are necessary to build these sites to meet current NRCS design standards. No mitigation would be required for this alternative.

Wetlands

Detailed information and maps of wetland impacts can be found in Appendix E. Wetland delineation reports are available upon request.

No Action Alternative: This impact would be indirect, minor, permanent, and adverse. There would be no direct placement of fill within wetlands due to this alternative. Wetlands would continue to be threatened by future flooding damage. While inundated during a flood, wetlands can become clogged by debris or scoured due to the erosive forces of floodwaters.

Levee Improvements and Diversion Channels Alternative: This impact would be direct, minor, permanent, and adverse. Construction of this alternative would result in 5.615 acres of wetlands being permanently impacted due to fill placement, excavation, or lateral drainage.

The project would be reviewed by USACE under CWA Section 404. It is anticipated that this alternative would be permitted under an Individual Permit. The majority of impacts were avoided and/or minimized by limiting grading extents and altering alignments to avoid known wetlands. All impacts are necessary to build these sites to meet current NRCS design standards. This project complies with the Food Security Act by not making the wetland areas easier to farm than they currently are or converting any wetlands to farmland. This project complies with Executive Order 11990 by adequately replacing impacted wetlands with new wetlands. Mitigation actions would be required for these wetland impacts. Additional information, including breakdowns by wetland subclass, is included in Appendix E.

Road Raise, Berm, and Nonstructural Alternative: This impact would be direct, minor, permanent, and adverse. Construction of this alternative would not impact any wetlands. The project would be reviewed by USACE under CWA Section 404. It is anticipated that this alternative would be permitted under a Nationwide Permit. All impacts were avoided. This project complies with the Food Security Act by not making the wetland areas easier to farm than they currently are or converting any wetlands to farmland. This project complies with Executive Order 11990 by adequately replacing impacted wetlands with new wetlands. No mitigation would be required. Additional information, including breakdowns by wetland subclass, is included in Appendix E.

Surface Water Quality

No Action Alternative: This impact would be indirect, minor, permanent, and adverse. This alternative would not cause any changes to the current conditions of surface water quality in the watershed. Surface water quality would continue to be harmed due to flooding. Pollutants carried by floodwaters would continue to move through the watershed, degrading surface water quality.

Levee Improvements and Diversion Channels Alternative: Impacts would be indirect, long-term, and neutral. This alternative is unlikely to impact surface water quality. The alternative would not impound any water. Under normal flow conditions, pollutants in runoff would continue to be transported through the watershed and accumulate in the same locations they do under current conditions.

Road Raise, Berm, and Nonstructural Alternative: Impacts would be indirect, long-term, and neutral. This alternative is unlikely to impact surface water quality. The alternative would not impound any water. Under normal flow conditions, pollutants in runoff would continue to be transported through the watershed and accumulate in the same locations they do under current conditions.

Groundwater Quantity

No Action Alternative: Impacts would be indirect, permanent, and neutral. This alternative would not cause any changes to existing groundwater quantity in the watershed. The no action alternative would not create any additional opportunities for groundwater recharge, nor would it cause any depletions of groundwater.

Levee Improvements and Diversion Channels Alternative: Impacts would be indirect, permanent, and neutral. This alternative would not cause any groundwater depletion and is not associated with any pumping of groundwater. As the alternative would not impound any water, there is little to no potential for groundwater recharge to occur.

Road Raise, Berm, and Nonstructural Alternative: Impacts would be indirect, permanent, and neutral. This alternative would not cause any groundwater depletion and is not associated with any pumping of groundwater. As the alternative would not impound any water, there is little to no potential for groundwater recharge to occur.

Groundwater Quality

No Action Alternative: This no effect impact would be indirect, permanent, and neutral. This alternative would have no effect on groundwater quality. Groundwater quality in this region is primarily driven by land use and management decisions such as application of fertilizer to agricultural lands. Leaching and travel of pollutants into and within an aquifer occurs over many

years. The no action alternative would not directly lead to any changes in land use or management and therefore would have no impact on existing groundwater quality.

Levee Improvements and Diversion Channels Alternative: This impact would be indirect, negligible, long-term, and beneficial. Groundwater quality in this region is primarily driven by land use and management decisions such as application of fertilizer to agricultural lands. This alternative has the potential to improve groundwater quality by reducing pollutant loading. Construction of this alternative would remove approximately 16 acres of cultivated cropland from production. Nitrate loss to groundwater from an irrigated cornfield in this region is estimated to be approximately 8.2 lbs/acre/year (Potter et al., 2006). Therefore, the overall nitrate load to groundwater in the watershed would be reduced by approximately 131.2 lbs./year under this alternative.

Road Raise, Berm, and Nonstructural Alternative: This impact would be indirect, negligible, long-term, and beneficial. Groundwater quality in this region is primarily driven by land use and management decisions such as application of fertilizer to agricultural lands. This alternative has the potential to improve groundwater quality by reducing pollutant loading. Construction of this alternative would remove approximately 0.5 acres of cultivated cropland from production. Nitrate loss to groundwater from an irrigated cornfield in this region is estimated to be approximately 8.2 lbs/acre/year (Potter et al., 2006). Therefore, the overall nitrate load to groundwater in the watershed would be reduced by approximately 4.1 lbs./year under this alternative.

Regional Water Management Plans

No Action Alternative: Impacts would be direct, permanent, and neutral. This alternative is not part of any existing regional water management plans nor any requirement of a regional water management plan. None of the regional water management plans identified in Chapter 3 of this Plan-EA contains goals directly related to flood prevention and/or flood damage reduction. This alternative would be compliant with the Lower Platte River Basin Coalition Basin Water Management Plan (LPRBC, 2017) as it would not result in any depletion of flows to the Platte River.

Levee Improvements and Diversion Channels Alternative: Impacts would be direct, permanent, and neutral. This alternative is not part of any existing regional water management plans nor any requirement of a regional water management plan. None of the regional water management plans identified in Chapter 3 of this Plan-EA contains goals directly related to flood prevention and/or flood damage reduction. This alternative would be compliant with the Lower Platte River Basin Coalition Basin Water Management Plan (LPRBC, 2017) as it would not result in any depletion of flows to the Platte River.

Road Raise, Berm, and Nonstructural Alternative: Impacts would be direct, permanent, and neutral. This alternative is not part of any existing regional water management plans nor any

requirement of a regional water management plan. None of the regional water management plans identified in Chapter 3 of this Plan-EA contains goals directly related to flood prevention and/or flood damage reduction. This alternative would be compliant with the Lower Platte River Basin Coalition Basin Water Management Plan (LPRBC, 2017) as it would not result in any depletion of flows to the Platte River.

Floodplain Management

No Action Alternative: Impacts would be indirect, permanent, and neutral. This alternative would have no effect on the current regulatory flood hazard areas or on the management of floodplain regions within the watershed. There would be no change to any mapped regulatory floodplains and residents living in the floodplain would continue to be required to purchase flood insurance.

Levee Improvements and Diversion Channels Alternative: This impact would be direct, major, long-term, and beneficial. This alternative would provide significant reductions to the extent and depth of all flooding recurrence intervals up to and including the 100-year event in the North Fork Elkhorn River Watershed within the City of Pierce. Note that flood risk remains during events greater (less frequent) than the 100-year recurrence interval. Figures showing modeled existing and proposed flooding conditions are included in Appendix C.

Project benefits are significant based on flood modeling developed for the purposes of this plan to assess existing and proposed flood risk conditions. Additional information about flood modeling is available in Appendix D. It is anticipated implementation of this alternative will result in a future revision to the regulatory floodplain based on the additional flood risk analysis detail for the watershed developed for this plan. To assure a successful map change and to support floodplain permitting for the project, based on the conceptual alternative presented in this plan it is anticipated a Conditional Letter of Map Revision (CLOMR) would be submitted prior to project construction, if the project is funded and implemented. Once the project is completed, a Letter of Map Revision (LOMR) would be requested from FEMA to ensure updated regulatory floodplain maps are developed.

Road Raise, Berm, and Nonstructural Alternative: This impact would be direct, major, long-term, and beneficial. This alternative would provide significant reductions to the extent and depth of all flooding recurrence intervals up to and including the 100-year event in the North Fork Elkhorn River Watershed within the City of Osmond. Note that flood risk remains during events greater (less frequent) than the 100-year recurrence interval. Figures showing modeled existing and proposed flooding conditions are included in Appendix C.

Project benefits are significant based on flood modeling developed for the purposes of this plan to assess existing and proposed flood risk conditions. Additional information about flood modeling is available in Appendix D. It is anticipated implementation of this alternative will result in a future revision to the regulatory floodplain based on the additional flood risk analysis detail for the

watershed developed for this plan. To assure a successful map change and to support floodplain permitting for the project, based on the conceptual alternative presented in this plan it is anticipated a Conditional Letter of Map Revision (CLOMR) would be submitted prior to project construction, if the project is funded and implemented. Once the project is completed, a Letter of Map Revision (LOMR) would be requested from FEMA to ensure updated regulatory floodplain maps are developed.

Federally Authorized Levee System

No Action Alternative: Impacts would be indirect, permanent, and neutral. This alternative would not alter the existing Federally Authorized Levee System in the watershed. The levee system would continue to exist in its current state.

Levee Improvements and Diversion Channels Alternative: This impact would be direct, major, long-term, and beneficial. This alternative would alter a portion of the Federally Authorized Levee System located within the watershed. The existing North Branch Elkhorn River right bank levee does not meet the design requirements for minimum freeboard and therefore requires improvements to restore the system to its originally authorized purpose. The North Branch Elkhorn right bank levee would be altered to meet current design requirements under the levee improvements portion of this alternative. That alteration would include the installation of seepage berms, increasing the overall height of the levee, modification or replacement of drainage structures, and installing two pump stations to reduce water buildup on the landside of the levee. All levee alterations would follow USACE regulations and requirements and receive USACE Section 408 authorization for construction. Once the improvements to the levee are completed, the levee system will be able to meet the requirements of USACE, FEMA, and NRCS CPS-356.

Road Raise, Berm, and Nonstructural Alternative: Impacts would be indirect, permanent, and neutral. This alternative would not alter the existing Federally Authorized Levee System in the watershed.

PLANT AND ANIMAL RESOURCES

Fish and Wildlife (Including Coordination Requirements)

No Action Alternative: This impact would be indirect, minor, permanent, and adverse. This alternative would allow the current conditions of flooding to continue affecting fish and wildlife populations and habitat throughout the watershed. Flooding can degrade water quality, aquatic / riparian habitat, and upland habitat by depositing debris and pollutants or scouring away vegetation and soil. Some species can be washed away or drowned by floodwater or become more susceptible to illness due to exposure to contaminants carried by floodwaters.

Levee Improvements and Diversion Channels Alternative: This impact would be indirect, minor, permanent, and adverse. This alternative would not reduce flooding outside of

Pierce. This alternative would allow the current conditions of flooding to continue affecting fish and wildlife populations and habitat throughout the watershed. Flooding can degrade water quality, aquatic / riparian habitat, and upland habitat by depositing debris and pollutants or scouring away vegetation and soil. Some species can be washed away or drowned by floodwater or become more susceptible to illness due to exposure to contaminants carried by floodwaters.

Road Raise, Berm, and Nonstructural Alternative: This impact would be indirect, minor, permanent, and adverse. This alternative would not reduce flooding outside of Osmond. This alternative would allow the current conditions of flooding to continue affecting fish and wildlife populations and habitat throughout the watershed. Flooding can degrade water quality, aquatic / riparian habitat, and upland habitat by depositing debris and pollutants or scouring away vegetation and soil. Some species can be washed away or drowned by floodwater or become more susceptible to illness due to exposure to contaminants carried by floodwaters.

Threatened and Endangered Species

Coordination with NRCS, USFWS, and NGPC was conducted to obtain feedback on the potential impacts that any of the alternatives had on streams or other bodies of water, and what recommendations were offered to minimize impacts to comply with the Fish and Wildlife Coordination Act.

The area of interest for the CERT environmental review report was updated to include only the ARA for each alternative, instead of the full watershed, and run on September 26, 2024 and again on June 20, 2025. Additionally, project activities within CERT were coded based on the appropriate NRCS Conservation Practice Standard codes. IPaC was also run for the ARAs on September 26, 2024 and again on June 20, 2025.

Please note that these findings are only associated with determining any significant impacts that would otherwise prevent the creation and signature of a FONSI. Consultation will need to occur with both USFWS and NGPC, through the creation of a Biological Assessment, for the preferred alternative selected prior to any construction efforts to ensure impacts are properly avoided, minimized, or mitigated. Determinations of potential effect from the alternatives are discussed for each species below.

American Burying Beetle (*Nicrophorus americanus*)

No Action Alternative: No effect. While no official surveys had been conducted at the time of this writing, this project is outside of the known habitat range of the American burying beetle.

Levee Improvements and Diversion Channels Alternative: May affect, not likely to adversely affect. While no official surveys had been conducted at the time of this writing, this project is outside of the known habitat range of the American burying beetle.

Road Raise, Berm, and Nonstructural Alternative: May affect, not likely to adversely affect. While no official surveys had been conducted at the time of this writing, this project is outside of the known habitat range of the American burying beetle.

Eastern Black Rail (*Laterallus jamaicensis ssp. Jamaicensis)*

No Action Alternative: No effect. The Eastern black rail is a transient migrant species in the state of Nebraska.

Levee Improvements and Diversion Channels Alternative: No effect. The Eastern black rail is a transient migrant species in the state of Nebraska.

Road Raise, Berm, and Nonstructural Alternative: No effect. The Eastern black rail is a transient migrant species in the state of Nebraska.

Interior Least Tern (*Antillarum athalassos)*

No Action Alternative: Flooding may cause habitat destruction through erosion, sedimentation, and degraded water quality. Impacts would be indirect, minor, temporary, and adverse.

Levee Improvements and Diversion Channels Alternative: May affect, not likely to adversely affect. The Interior least tern is dependent on open sandbar habitat on large rivers, including the Platte River, and adequate flows help maintain its habitat. This project would not result in any depletion to flows in the lower Platte River. Any suitable nesting habitat in the vicinity of the ARA is unlikely. A survey would be completed by a qualified biologist if construction occurs within sight or sound of suitable habitat between April 15 and August 15.

Road Raise, Berm, and Nonstructural Alternative: May affect, not likely to adversely affect. The Interior least tern is dependent on open sandbar habitat on large rivers, including the Platte River, and adequate flows help maintain its habitat. This project would not result in any depletion to flows in the lower Platte River. Any suitable nesting habitat in the vicinity of the ARA is unlikely. A survey would be completed by a qualified biologist if construction occurs within sight or sound of suitable habitat between April 15 and August 15.

Lake sturgeon (*Acipenser fulvescens*)

No Action Alternative: No effect. The lake sturgeon is dependent on adequate flows in the Elkhorn and lower Platte River to maintain its habitat. This alternative would not result in any depletion to riverine flows and would therefore not affect the habitat.

Levee Improvements and Diversion Channels Alternative: No effect. The lake sturgeon is dependent on adequate flows in the Elkhorn and lower Platte River to maintain its habitat. This project would not result in any depletion of riverine flows and would therefore not affect the habitat.

Road Raise, Berm, and Nonstructural Alternative: No effect. The lake sturgeon is dependent on adequate flows in the Elkhorn and lower Platte River to maintain its habitat. This project would not result in any depletion of riverine flows and would therefore not affect the habitat.

Northern Long-eared Bat (*Myotis septentrionalis)*

No Action Alternative: There would be no change in habitat for Northern long-eared bat (NLEB). Flooding would have minimal impacts on habitat for NLEB.

Levee Improvements and Diversion Channels Alternative: May affect, not likely to adversely affect. The NLEB range is within the ARA of this alternative; however, there are no known hibernacula within 5.0 miles, any known maternity roosts within 1.5 miles, or any known swarming/staging areas within the ARAs. NLEB may roost underneath bark, in cavities, or in crevices of both live and dead trees that would be cleared under this alternative. They may also roost under road bridges or in culverts. Conservation measures including dates to avoid disturbance to suitable habitat would be implemented as necessary to avoid adverse impacts.

Road Raise, Berm, and Nonstructural Alternative: May affect, not likely to adversely affect. The NLEB range is within the ARA of this alternative; however, there are no known hibernacula within 5.0 miles, any known maternity roosts within 1.5 miles, or any known swarming/staging areas within the ARAs. NLEB may roost underneath bark, in cavities, or in crevices of both live and dead trees that would be cleared under this alternative. They may also roost under road bridges or in culverts. Conservation measures including dates to avoid disturbance to suitable habitat would be implemented as necessary to avoid adverse impacts.

Pallid Sturgeon (*Scaphirhynchus albus)*

No Action Alternative: No effect. The pallid sturgeon is dependent on adequate flows in the Elkhorn and lower Platte River to maintain its habitat. This alternative would not result in any depletion to riverine flows and would therefore not affect the habitat.

Levee Improvements and Diversion Channels Alternative: No effect. The pallid sturgeon is dependent on adequate flows in the Elkhorn and lower Platte River to maintain its habitat. This project would not result in any depletion of riverine flows and would therefore not affect the habitat.

Road Raise, Berm, and Nonstructural Alternative: No effect. The pallid sturgeon is dependent on adequate flows in the Elkhorn and lower Platte River to maintain its habitat. This project would not result in any depletion of riverine flows and would therefore not affect the habitat.

Piping Plover (*Charadrius melodus)*

No Action Alternative: Flooding may cause habitat destruction through erosion, sedimentation, and degraded water quality. Impacts would be indirect, minor, temporary, and adverse.

Levee Improvements and Diversion Channels Alternative: May affect, not likely to adversely affect. The piping plover is dependent on open sandbar habitat on large rivers, including the Platte River, and adequate flows help maintain its habitat. This project would not result in any depletion to flows in the lower Platte River. Any suitable nesting habitat in the vicinity of the ARA is unlikely. A survey would be completed by a qualified biologist if construction occurs within sight or sound of suitable habitat between April 15 and August 15.

Road Raise, Berm, and Nonstructural Alternative: May affect, not likely to adversely affect. The piping plover is dependent on open sandbar habitat on large rivers, including the lower Platte River, and adequate flows help maintain its habitat. This project would not result in any depletion to flows in the lower Platte River. Any suitable nesting habitat in the vicinity of the ARA is unlikely. A survey would be completed by a qualified biologist if construction occurs within sight or sound of suitable habitat between April 15 and August 15.

Rufa Red Knot (*Calidris canutus rufa)*

No Action Alternative: No effect. The rufa red knot is a transient migrant species in the state of Nebraska.

Levee Improvements and Diversion Channels Alternative: No effect. The rufa red knot is a transient migrant species in the state of Nebraska.

Road Raise, Berm, and Nonstructural Alternative: No effect. The rufa red knot is a transient migrant species in the state of Nebraska.

Scaleshell Mussel (*Leptodea leptodon*)

No Action Alternative: Flooding may cause habitat destruction through scouring, sedimentation, and degraded water quality. Impacts would be indirect, minor, temporary, and adverse.

Levee Improvements and Diversion Channels Alternative: May affect, not likely to adversely affect. While no official surveys had been conducted at the time of this writing, the project area is outside of the known habitat range of the scaleshell mussel.

Road Raise, Berm, and Nonstructural Alternative: May affect, not likely to adversely affect. While no official surveys had been conducted at the time of this writing, the project area is outside of the known habitat range of the scaleshell mussel.

Small White Lady's Slipper (*Cypripedium candidum*)

No Action Alternative: No effect. Most of the project area is outside the known habitat range of the small white lady's slipper.

Levee Improvements and Diversion Channels Alternative: May affect, not likely to adversely affect. While no official surveys had been conducted at the time of this writing, the project area is outside of the known habitat range of the small white lady's slipper.

Road Raise, Berm, and Nonstructural Alternative: May affect, not likely to adversely affect. While no official surveys had been conducted at the time of this writing, the project area is outside of the known habitat range of the small white lady's slipper.

Sturgeon chub (*Macrhybopsis gelida*)

No Action Alternative: No effect. The sturgeon chub is dependent on adequate flows in the Elkhorn and lower Platte River to maintain its habitat. This alternative would not result in any depletion to riverine flows and would therefore not affect the habitat.

Levee Improvements and Diversion Channels Alternative: No effect. The sturgeon chub is dependent on Platte River flows to maintain its habitat. This project would not result in any depletion of flows in the Platte River and would therefore not affect the habitat.

Road Raise, Berm, and Nonstructural Alternative: No effect. The sturgeon chub is dependent on adequate flows in the Elkhorn and lower Platte River to maintain its habitat. This project would not result in any depletion of riverine flows and would therefore not affect the habitat.

Western Prairie Fringed Orchid (*Platanthera praeclara)*

No Action Alternative: No effect. The orchid's habitat consists of high quality, mesic prairies which may occur within the ARAs or on the lower Platte River corridor. As this alternative would not disturb and suitable habitat and would not result in any depletion of flows in the lower Platte River, it would not alter the orchid's habitat.

Levee Improvements and Diversion Channels Alternative: May affect, not likely to adversely affect. The orchid's habitat consists of high quality, mesic prairies. No surveys for the species have been conducted in the vicinity of the ARAs. Any suitable habitat will be surveyed during the flowering period by a qualified botanist prior to project implementation. Additionally, this project would not result in any depletion to flows in the lower Platte River and would not alter the orchid's habitat in that location.

Road Raise, Berm, and Nonstructural Alternative: May affect, not likely to adversely affect. The orchid's habitat consists of high quality, mesic prairies. No surveys for the species have been conducted in the vicinity of the ARAs. Any suitable habitat will be surveyed during the flowering period by a qualified botanist prior to project implementaiton. Additionally, this project would not result in any depletion to flows in the lower Platte Riverand would not alter the orchid's habitat in that location.

Whooping Crane (*Grus americana)*

No Action Alternative: No effect. This project (ARA's) is outside of the primary migration corridor for the whooping crane.

Levee Improvements and Diversion Channels Alternative: No effect. This project (ARA's) is outside of the primary migration corridor for the whooping crane.

Road Raise, Berm, and Nonstructural Alternative: No effect. This project (ARA's) is outside of the primary migration corridor for the whooping crane.

Invasive Species

No Action Alternative: This impact would be indirect, minor, permanent, and adverse. Floodwaters have the capability to carry and spread invasive species to new areas. Under the no action alternative, new invasive species may spread to the watershed, or existing invasive species may expand their presence in the watershed due to flooding events.

Levee Improvements and Diversion Channels Alternative: This impact would be direct, negligible, and short term. Invasive species would have the potential to be introduced or spread due to construction activities, but this alternative would minimize the potential effect of invasive species in the watershed due to measures which would be taken during construction. Seeding plans for each project site would include native species certified by the NRCS State Biologist to ensure erosion is minimized and invasive species or noxious weeds are not introduced or spread. Any watercraft or heavy construction equipment utilized will be cleaned, drained, dried, and properly decontaminated if transported between sites.

Road Raise, Berm, and Nonstructural Alternative: This impact would be direct, negligible, and short term. Invasive species would have the potential to be introduced or spread due to construction activities, but this alternative would minimize the potential effect of invasive species in the watershed due to measures which would be taken during construction. Seeding plans for each project site would include native species certified by the NRCS State Biologist to ensure erosion is minimized and invasive species or noxious weeds are not introduced or spread. Any watercraft or heavy construction equipment utilized will be cleaned, drained, dried, and properly decontaminated if transported between sites.

Migratory Birds and Eagles

No Action Alternative: This impact would be indirect, minor, long-term, and adverse. Flooding events have the potential to alter or destroy habitat utilized by migratory birds and eagles in the watershed.

Levee Improvements and Diversion Channels Alternative: This impact would be direct, negligible, short-term, and neutral. This alternative would minimize potential negative effects on migratory birds and eagles due to the utilization of best management practices during construction. The project would comply with the Migratory Bird Treaty Act (MBTA) and the Bald

and Golden Eagle Protection Act. To avoid impacts to migratory birds there would be no tree clearing from April 1 to July 15, or a nesting survey will be required. Eagle surveys would be conducted within ½ mile of each project site prior to construction. If bald eagles are nesting in the area, consultation with NGPC and USFWS would be initiated. Bird species of conservation concern, as detailed in the IPaC report for the project ARA accessed on September 26, 2024, include:

- Bald Eagle (*Haliaeetus leucocephalus*)
- Black Tern (*Chlidonias niger*)
- Bobolink (*Dolichonyx oryzivorus*)
- Chimney Swift (*Chaetura pelagica*)
- Franklin's Gull (*Leucophaeus pipixcan*)
- Grasshopper Sparrow (*Ammodramus savannarum perpallidus*)
- Hudsonian Godwit (*Limosa haemastica*)
- Lesser Yellowlegs (*Tringa flavipes*)
- Marbled Godwit (*Limosa fedoa*)
- Northern Harrier (*Circus hudsonius*)
- Pectoral Sandpiper (*Calidris melanotos*)
- Red-headed Woodpecker (*Melanerpes erythrocephalus*)
- Western Grebe (*Aechmophorus occidentalis*)

Road Raise, Berm, and Nonstructural Alternative: This impact would be direct, negligible, short-term, and neutral. This alternative would minimize potential negative effects on migratory birds and eagles due to the utilization of best management practices during construction. The project would comply with the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act. To avoid impacts to migratory birds there would be no tree clearing from April 1 to July 15, or a nesting survey will be required. Eagle surveys would be conducted within ½ mile of each project site prior to construction. If bald eagles are nesting in the area, consultation with NGPC and USFWS would be initiated. Bird species of conservation concern, as detailed in the IPaC report for the project ARA accessed on September 26, 2024, include:

- Franklin's Gull (*Leucophaeus pipixcan*)
- Northern Harrier (*Circus hudsonius*)

FISH AND WILDLIFE HABITAT

Forest Resources

No Action Alternative: This impact would be indirect, minor, permanent, and adverse. Woodlands would continue to be threatened by flooding in the watershed. The majority of wooded areas are established along waterways in this region and are particularly susceptible to the

erosive forces of floodwaters. Trees can be uprooted and carried downstream or undermined by erosion and left to die.

Levee Improvements and Diversion Channels Alternative: This impact would be direct, minor, permanent, and adverse. Approximately 2.7 acres of trees would be removed by the construction of this alternative. These trees do not represent cohesive forested/woodland areas but rather are composed of individual trees scattered throughout the project area. No mitigation would be required. This alternative would not provide flood protection for any woodlands.

Road Raise, Berm, and Nonstructural Alternative: This impact would be indirect, minor, permanent, and adverse. This alternative would not directly remove any trees but also would not provide flood protection to any woodlands. Woodlands would continue to be threatened by flooding in the watershed. The majority of wooded areas are established along waterways in this region and are particularly susceptible to the erosive forces of floodwaters. Trees can be uprooted and carried downstream or undermined by erosion and left to die.

Riparian Areas

No Action Alternative: This impact would be indirect, minor, permanent, and adverse. Riparian areas within the watershed would continue to be damaged by flooding. Floodwaters can scour away soil and vegetation within riparian areas or choke them with debris or sediment deposited by flooding. Many riparian areas are found adjacent to crop fields and have been altered and degraded over time to better suit agricultural purposes, making them even more susceptible to flood damage due to the lack of perennial vegetation. This alternative would not reduce the risk of flooding damage to any riparian areas.

Levee Improvements and Diversion Channels Alternative: This impact would be direct, minor, long-term, and adverse. The majority of the stream areas impacted by this alternative are made up of ephemeral streams and canals which do not support any riparian areas. A small portion of the intermittent stream would be impacted, which does support a riparian area. This would consist of approximately 0.05 acres of riparian area impacted by construction. This alternative would not reduce the risk of flooding damage to any riparian areas.

Road Raise, Berm, and Nonstructural Alternative: This impact would be indirect, minor, permanent, and adverse. This alternative would be constructed in the vicinity of an ephemeral channel which does not support any riparian area. Therefore, no riparian areas would be impacted directly. However, this alternative would not reduce the risk of flooding damage to riparian areas either. Riparian areas within the watershed would continue to be damaged by flooding.

HUMAN RESOURCES

Flood Damages

No Action Alternative: This impact would be indirect, major, permanent, and adverse. Under this alternative it is estimated that approximately $2,921,600 in flooding damage would continue to occur on an annualized basis in the watershed. This damage estimate includes structural damage to buildings and income losses to businesses. Monetary damage to agricultural lands was not estimated. An indirect effect of the no action alternative would be the continued threat of flood damage to the watershed. Under this alternative it is estimated that during a 100-year flooding event, 104 budlings in Pierce and 67 buildings in Osmond are inundated.

Levee Improvements and Diversion Channels Alternative: This impact would be direct, major, long-term, and beneficial. After the alternative is installed, approximately 80 buildings will be removed from the 100-year flood inundation area in the City of Pierce. This would greatly reduce flood damages in the City. The alternative is designed to reduce flood damage up to and including the 100-year recurrence interval. The potential for flood damage remains during events greater than the 100-year recurrence interval.

Road Raise, Berm, and Nonstructural Alternative: This impact would be direct, major, long-term, and beneficial. After the alternative is installed, approximately 15 buildings will be removed from the 100-year flood inundation area in the City of Osmond. This would greatly reduce flood damages in the City. The alternative is designed to reduce flood damage up to and including the 100-year recurrence interval. The potential for flood damage remains during events greater than the 100-year recurrence interval.

Costs

No Action Alternative: This impact would be indirect, major, permanent, and adverse. Under this alternative it is estimated that approximately $2,921,600 in flooding damage would continue to occur on an annualized basis in the watershed. This damage estimate includes structural damage to buildings and income losses to businesses. Monetary damage to agricultural lands was not estimated. An indirect effect of the no action alternative would be the continued threat of flood damage to the watershed. Under this alternative it is estimated that during a 100-year flooding event, 104 budlings in Pierce and 67 buildings in Osmond are inundated.

Levee Improvements and Diversion Channels Alternative: This impact would be direct, major, long-term, and beneficial. Construction of this alternative would reduce flooding damages in Pierce, producing approximately $1,429,500 in annualized flood damage reduction benefits.

Road Raise, Berm, and Nonstructural Alternative: This impact would be direct, major, long-term, and beneficial. Construction of this alternative would reduce flooding damages in Osmond, producing $164,100 in annualized flood damage reduction benefits.

Historic Properties and Cultural Resources

No Action Alternative: This alternative would not change current conditions for any historic properties or cultural resources. There would be no Federal Action, and no immediate change to the surrounding lands. Historic properties would continue to be at risk of damage due to flooding. Structures can be inundated or destroyed completely, and archeological sites can be scoured away by floodwaters or buried by sediment deposition. This impact would be indirect, permanent, and neutral.

Levee Improvements and Diversion Channels Alternative: Two historic properties are within the APE for this alternative: Pierce Levee and Gilman Park.

The Pierce Levee is eligible for inclusion in the NRHP under Criterion A due to its role in the growth and development of the City of Pierce. The proposed levee improvements will have no adverse effect on the levee because raising the levee and adding the seepage berm will not alter any characteristics that make the levee eligible for inclusion.

Gilman Park is eligible under Criterion A as a recreational development tied to the importance of the growth of the community of Pierce. The levee improvements will have no adverse effect on Gilman Park. The historic park features are approximately 300-500 meters away from most of the levee. Temporary effects include increased noise and traffic at the park during construction. Permanent effects will be minor and consist of visual effects from the increased height of the levee and possible tree removal. Visual effects from the increased levee height will be minor because the levee will be vegetated and appear similar to existing conditions. Effects from tree removal will also be minimal because only small trees next to the levee will be removed. The trees were not part of the original plantings from the 1950s, and larger trees will obscure any visual effects from the tree removal.

No historic properties are located within the APE for the proposed diversion channels.

Fill for the levee and berm construction will be obtained from three potential borrow areas that have not yet been investigated for historic properties. If historic properties are present within these areas, excavation for fill may have an adverse effect on those properties. Prior to construction NRCS will complete a survey of the borrow areas to identify historic properties. NRCS has executed a Programmatic Agreement with SHPO and consulting parties to allow for phased identification of historic properties (Appendix E). NRCS will make a determination of effect following further investigation and consult with SHPO and consulting parties. Mitigation needs, if any, will be determined during consultation.

Road Raise, Berm, and Nonstructural Alternative: No historic properties would be affected by the road raise or berm proposed in Osmond. The St. Mary of the Seven Dolors Church and Architectural Resource #11 are both outside the APE for this alternative. No historic properties are located within the APE of either improvement.

Twelve houses will be modified by the nonstructural alternative to prevent future flood damages. These houses were not included in the cultural resources inventory and have not been evaluated for the NRHP. Modifications for each building will be determined by the homeowners and sponsor during the design phase of the project. Potential modifications include raising the homes above the base flood elevation; installing flood vents, flood walls, berms, or sewer backflow preventers; installing floodproof building materials; or property acquisition and building demolition. The proposed modifications could be an adverse effect if any of the buildings are eligible for inclusion in the NRHP. These structures will need to be evaluated prior to any modification.

Prior to construction NRCS will complete a survey of the APE for the nonstructural improvements to identify historic properties. NRCS has executed a Programmatic Agreement with SHPO and consulting parties to allow for phased identification of historic properties (Appendix E). 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.

Local and Regional Economy

No Action Alternative: This impact would be indirect, major, permanent, and adverse. Flooding would continue to impact Osmond and Pierce and surrounding agricultural areas, harming the local and regional economy. An economic burden would continue to be placed on property owners required to purchase flood insurance. Additionally, flooded roads would continue to inhibit people from going to work and prevent goods from being transported.

Levee Improvements and Diversion Channels Alternative: This impact would be direct, major, long-term, and beneficial. Flood damage to the City of Pierce would be reduced, thus protecting the local and regional economy, and potentially reducing or removing the need for flood insurance for some property owners. The project would protect the community from future flood events and help promote community growth and prosperity. Reducing roadway flooding would allow residents to travel to work and earn an income, allow for transportation of goods, and allow for agricultural lands to be planted and harvested without interruption. Additionally, construction of the alternative may provide short-term economic benefits if watershed residents are hired to work on the project during the construction phase. Temporary disruption to agricultural or residential access roads during construction may indirectly affect the local economy.

Road Raise, Berm, and Nonstructural Alternative: This impact would be direct, major, long-term, and beneficial. Flood damage to the City of Osmond would be reduced, thus protecting the local and regional economy, and potentially reducing or removing the need for flood insurance for some property owners. The project would protect the community from future flood events and help promote community growth and prosperity. Reducing roadway flooding would allow residents to travel to work and earn an income, allow for transportation of goods, and allow for agricultural lands to be planted and harvested without interruption. Additionally, construction of the alternative may provide short-term economic benefits if watershed residents are hired to work on the project

during the construction phase. Temporary disruption to agricultural or residential access roads during construction may indirectly affect the local economy.

Public Health and Safety

No Action Alternative: This impact would be indirect, major, permanent, and adverse. Flooding would continue to be a threat to public health and safety in the watershed. Floods can not only kill by drowning but can make people more vulnerable to sickness and injury. Floodwater can be contaminated with human and livestock waste and chemicals, as well as debris that can cause serious harm. Additionally, flooding can block access to emergency services.

Levee Improvements and Diversion Channels Alternative: This impact would be direct major, long-term, and beneficial. After the alternative is installed, approximately 80 buildings will be removed from the 100-year flood inundation area in the City of Pierce. The flood damage reduction benefits that would be achieved with this alternative would improve the public health, safety, and welfare of the watershed by reducing the frequency and duration of flooding in and around the City of Pierce. This alternative would reduce the occurrence of overtopped roads, inundated buildings, and damage to community infrastructure and decrease the need for emergency personnel to assist during flood events. Temporary disruption to agricultural or residential access roads during construction may indirectly affect access to emergency services. Reduced exposure to floodwater will prevent potential instances of sickness and injury, as well as flood-related deaths.

Road Raise, Berm, and Nonstructural Alternative: This impact would be direct major, long-term, and beneficial. After the alternative is installed, approximately 15 buildings will be removed from the 100-year flood inundation area in the City of Osmond. The flood damage reduction benefits that would be achieved with this alternative would improve the public health, safety, and welfare of the watershed by reducing the frequency and duration of flooding in and around the City of Osmond. This alternative would reduce the occurrence of overtopped roads, inundated buildings, and threats to community infrastructure and decrease the need for emergency personnel to assist during flood events. Temporary disruption to agricultural or residential access roads during construction may indirectly affect access to emergency services. Reduced exposure to floodwater will prevent potential instances of sickness and injury, as well as flood-related deaths.

Recreation

No Action Alternative: This impact would be indirect, minor, permanent, and adverse. There are no major public recreation sites within the watershed. Flooding may impact people's ability to travel to recreation sites due to road closures.

Levee Improvements and Diversion Channels Alternative: This impact would be indirect, minor, long-term, and beneficial. Instances of road overtopping and/or closures would be

reduced, allowing easier travel to recreation areas for residents of Pierce. Flood damage within Gilman Park in Pierce would be reduced by the interior drainage improvements.

Road Raise, Berm, and Nonstructural Alternative: This impact would be indirect, minor, long-term, and beneficial. Instances of road overtopping and/or closures would be reduced, allowing easier travel to recreation areas for residents of Osmond. Flood damage to Osmond Park would be reduced by the road raise and berm.

ECOSYSTEM SERVICES

Human resources within the watershed provide various ecosystem services. As described in Chapter 3, ecosystem services and flows most relevant to proposed alternatives were selected for analysis. The section below describes impacts to selected ecosystem services for each alternative. Additional analysis of ecosystem service tradeoffs is provided at the end of this chapter.

Regulating Services

No Action Alternative: This impact would be indirect, major, permanent, and adverse. This alternative would not regulate any flooding within the watershed. Continued flooding would lead to ongoing flood damage and concerns for public health and safety. Watershed residents would continue to be displaced during flood events, and they would continue to be stressed about damage to their homes and belongings as well as potential threats to their lives.

Levee Improvements and Diversion Channels Alternative: This impact would be direct, major, long-term, and beneficial. This alternative would provide regulation of flooding and improvements to public health and safety in Pierce, leading to enhanced regulating services within the watershed. As previously discussed, this alternative would reduce flood damage and produce monetary annual flood damage reduction benefits for the watershed. Additionally, stress and the financial hardships caused by displacement from flooding would be alleviated for residents of Pierce with the implementation of the alternative. The alternative is designed to reduce flood damage up to and including the 100-year recurrence interval. Risk of flood damage remains during events greater in magnitude than the 100-year recurrence interval.

Road Raise, Berm, and Nonstructural Alternative: This impact would be direct, major, long-term, and beneficial. This alternative would provide regulation of flooding and improvements to public health and safety in Pierce, leading to enhanced regulating services within the watershed. As previously discussed, this alternative would reduce flood damage and produce monetary annual flood damage reduction benefits for the watershed. Additionally, stress and the financial hardships caused by displacement from flooding would be alleviated for residents of Osmond with the implementation of the alternative. The alternative is designed to reduce flood damage up to and including the 100-year recurrence interval. Risk of flood damage remains during events greater in magnitude than the 100-year recurrence interval.

Provisioning Services

No Action Alternative: Impacts would be indirect, permanent, and neutral. This alternative would not change the current conditions of provisioning services when viewed as food production capacity within the watershed. No agricultural land would be added or removed, and the overall agricultural nature of the watershed would not be affected.

Levee Improvements and Diversion Channels Alternative: This impact would be direct, negligible, permanent, and adverse. This alternative would slightly reduce provisioning services when viewed as food production capacity within the watershed. Construction of this alternative would result in the loss of 16 acres of cultivated cropland. The overall agricultural nature of the watershed would not be affected.

Road Raise, Berm, and Nonstructural Alternative: This impact would be direct, negligible, permanent, and adverse. This alternative would slightly reduce provisioning services when viewed as food production capacity within the watershed. Construction of this alternative would result in the loss of 0.5 acres of cultivated cropland. The overall agricultural nature of the watershed would not be affected.

Cultural Services

No Action Alternative: This impact would be indirect, major, permanent, and adverse. This alternative would not benefit public safety within the watershed and therefore would not improve cultural services. Watershed residents would continue to be displaced during flood events, and they would continue to be stressed about damage to their homes and belongings as well as potential threats to their lives.

Levee Improvements and Diversion Channels Alternative: This impact would be direct, major, long-term, and beneficial. Cultural services within the watershed would be affected by improving public health and safety in Pierce. Stress and the financial hardships caused by displacement from flooding would be alleviated for residents of Pierce with the implementation of the alternative.

Road Raise, Berm, and Nonstructural Alternative: This impact would be direct, major, long-term, and beneficial. Cultural services within the watershed would be affected by improving public health and safety in Osmond. Stress and the financial hardships caused by displacement from flooding would be alleviated for residents of Osmond with the implementation of the alternative.

REASONABLY FORESEEABLE FUTURE EFFECTS

The effects of climate change are expected to be present within the watershed in the foreseeable future, causing higher average temperatures, more extreme weather events, and changes in

precipitation patterns. In response to climate pressures, it is reasonable to anticipate that adoption of conservation practices by agricultural producers will increase in the future. Climate change may lead to variations in normal streamflow conditions due to changes in precipitation patterns. This could also affect threatened and endangered species that rely on normal streamflow. More extreme weather events may increase the frequency of flooding within the watershed. The proposed alternative design considers variation and allows for additional freeboard, increasing the watershed's overall resiliency to climate change induced flooding events.

The watershed's population has remained steady in recent decades and will likely continue to experience slow growth. However, it is unlikely that any major conversion of land use away from agriculture will occur in the watershed in the foreseeable future. Population growth should not affect surface water, but may impact groundwater quantity in the region as residents rely on aquifers for domestic water supply. Population growth is unlikely to take place at such a rate that habitat for threatened and endangered species will be negatively impacted.

There are no known current or reasonably foreseeable projects in the watershed which would interact with this proposed project.

POSSIBLE CONFLICTS WITH PLANS AND POLICIES

A review of available regional water management plans and coordination with the Sponsor and representatives of Osmond and Pierce shows that there are no anticipated conflicts with currently available plans or policies, and that the proposed alternative is consistent with each regional water management plan.

PRECEDENT FOR FUTURE ACTIONS WITH SIGNIFICANT IMPACTS

The actions required to implement the proposed alternative do not set a precedent for future actions in the watershed that would cause significant impacts. Any other projects similar in nature and vision would be evaluated under their own standalone study.

CONTROVERSY

The watershed has experienced flooding damage repeatedly since its settlement. Property owners are aware of the intent to reduce flood risks and there were no significant concerns voiced during public meetings or community meetings held throughout the planning process that were left unaddressed. The proposed alternative is not controversial.

ALTERNATIVE SUMMARY AND COMPARISON

Table 21 provides a summary of the environmental consequences identified and discussed throughout Chapter 5. This summary includes resource concerns identified in Chapter 2 and detailed in Chapter 3.

Table 21: Summary and Comparison of Selected Alternatives Impacts on Resource Concerns

Item or Concern	No Action Alternative	Levee Improvements and Diversion Channels Alternative	Road Raise, Berm, and Nonstructural Alternative
Alternative Description	Most likely future condition if no alternatives are implemented.	Construct two diversion channels in addition to levee improvements including pump stations, seepage berms, and height increase, in Pierce.	Construct a road raise and berm in Osmond and implement nonstructural improvements to homes.
Installation Cost			
NRCS Contribution	$0	$18,678,600	$3,745,100
Sponsor Contribution	$0	$3,979,200	$330,545
Total	$0	$22,657,800	$4,075,645
Soil Resources			
Land Use	No changes to existing land uses.	Would remove approximately 16 acres of cropland from production.	Would remove approximately 0.5 acres of cropland from production.
Prime & Unique Farmland	Continued flooding damage to prime and unique farmland.	Permanent conversion of 20 acres necessary for construction. Negligible effect per consultation.	Exempt from FPPA consideration.
Geology	This alternative would neither disturb nor enhance geological units.	This alternative would neither disturb nor enhance geological units. Geologic/geotechnical conditions that may impact the design of this alternative would be thoroughly explored during the design phase. There are no faults near the project sites.	This alternative would neither disturb nor enhance geological units. Geologic/geotechnical conditions that may impact the design of this alternative would be thoroughly explored during the design phase. There are no faults near the project sites.
Water Resources			
Waters of the United States)	No placement of fill within any streams or waterbodies.	Mitigation would be required due to permanent wetland impacts.	No mitigation would be required due to stream or wetland impacts.
Streams and Water Quantity	No depletion of flows to the Platte River. No alteration of surface water quantity.	No depletion of flows to the Platte River. No alteration of surface water quantity.	No depletion of flows to the Platte River. No alteration of surface water quantity.

Item or Concern	No Action Alternative	Levee Improvements and Diversion Channels Alternative	Road Raise, Berm, and Nonstructural Alternative
Wetlands	Continued flooding damage to wetlands.	Construction would permanently impact 5.615 acres of wetlands. Mitigation would be required.	Construction of this alternative would not impact any wetlands.
Surface Water Quality	Continued degradation of surface water quality.	This alternative is unlikely to affect surface water quality.	This alternative is unlikely to affect surface water quality.
Groundwater Quantity	No depletion or recharge of groundwater.	No depletion or recharge of groundwater.	No depletion or recharge of groundwater.
Groundwater Quality	No effect on groundwater quality.	Small reduction in pollutant loading to groundwater.	Small reduction in pollutant loading to groundwater.
Regional Water Management Plans	Compliant with relevant management plans as there would be no depletion of flows to the Platte River.	Compliant with relevant management plans as there would be no depletion of flows to the Platte River.	Compliant with relevant management plans as there would be no depletion of flows to the Platte River.
Floodplain Management	No effect to current regulatory floodplain.	Beneficial impact would reduce the extents and depth of flooding up to and including the 100-year interval. Regulatory floodplain may be altered through LOMR process.	Beneficial impact would reduce the extents and depth of flooding up to and including the 100-year interval. Regulatory floodplain may be altered through LOMR process.
Federally Authorized Levee System	No effect to the existing Pierce levee.	Alternative would alter the existing Federally Authorized Levee System in Pierce. All levee alterations would follow USACE regulations, requirements, and receive USACE authorization for construction.	No effect to the existing Pierce levee.
Plant & Animal Resources			
Fish and Wildlife (Including Coordination Requirements)	Continued threat of flooding damage to fish and wildlife.	Continued threat of flooding damage to fish and wildlife.	Continued threat of flooding damage to fish and wildlife.
Threatened and Endangered Species	No effect on any T&E species.	Conservation measures would be followed to minimize potential adverse effects to T&E species due to construction.	Conservation measures would be followed to minimize potential adverse effects to T&E species due to construction.
Invasive Species	Continued risk of endangered species spreading via flooding.	Measures would be followed to minimize the potential spread or	Measures would be followed to minimize the potential spread or

Item or Concern	No Action Alternative	Levee Improvements and Diversion Channels Alternative	Road Raise, Berm, and Nonstructural Alternative
		introduction of invasive species due to construction.	introduction of invasive species due to construction.
Migratory Birds / Bald & Golden Eagles	Continued risk of potential flooding damage to habitat.	Alternative would comply with the MBTA and Bald and Golden Eagle Protection Act.	Alternative would comply with the MBTA and Bald and Golden Eagle Protection Act.
Fish & Wildlife Habitat			
Forest Resources	Continued risk of potential flooding damage.	Minor loss of trees due to construction is anticipated.	No loss of trees due to construction.
Riparian Areas	Continued risk of potential flooding damage.	Minor permanent impact to riparian areas due to construction.	No impact due to construction. Continued risk of potential flooding damage.
Human Resources			
Flood Damages	Continued flooding damages.	Reduced flooding damages.	Reduced flooding damages.
Costs	Continued costs associated with flooding.	Reduced costs associated with flooding.	Reduced costs associated with flooding.
Historic Properties & Cultural Resources	Potential damage from flooding.	Effects to historic properties cannot be determined at this time because not all affected areas have been investigated. NRCS has executed a Programmatic Agreement pursuant to 36 CFR 800.14(b) with the Nebraska State Historic Preservation Office and other consulting parties to allow for phased identification and evaluation of historic properties. NRCS will conduct additional cultural resource inventories and consult on the effects of the undertaking during the design phase of the project.	Effects to historic properties cannot be determined at this time because not all affected areas have been investigated. NRCS has executed a Programmatic Agreement pursuant to 36 CFR 800.14(b) with the Nebraska State Historic Preservation Office and other consulting parties to allow for phased identification and evaluation of historic properties. NRCS will conduct additional cultural resource inventories and consult on the effects of the undertaking during the design phase of the project.
Local & Regional Economy	Continued economic burden to residents due to flooding.	Reduced flooding damages would provide economic benefits.	Reduced flooding damages would provide economic benefits.

Item or Concern	No Action Alternative	Levee Improvements and Diversion Channels Alternative	Road Raise, Berm, and Nonstructural Alternative
Public Health & Safety	Continued threats from flooding.	Reduced threats to public health and safety due to reduced likelihood of flooding.	Reduced threats to public health and safety due to reduced likelihood of flooding.
Recreation	Continued minor impacts to recreation access due to flooding.	Improved access to recreation sites due to reduced road closures caused by flooding.	Improved access to recreation sites due to reduced road closures caused by flooding.
Ecosystem Services			
Provisioning	Continued damages to agricultural lands due to flooding.	Small loss of agricultural lands for construction. No change to flooding damage of agricultural lands.	Small loss of agricultural lands for construction. No change to flooding damage of agricultural lands.
Regulating	No regulation of flooding damages would occur.	Regulation of flooding damages would provide an annualized benefit of $1,429,500	Regulation of flooding damages would provide an annualized benefit of $164,100
Cultural	Continued threat to public safety from flood risk.	Improved public safety due to reduced likelihood of flood risk.	Improved public safety due to reduced likelihood of flood risk.

Note: Ecosystem service values are calculated and reported as changes from baseline/No Action conditions.

CHAPTER 6. CONSULTATION, COORDINATION, AND PUBLIC PARTICIPATION

6.01 OVERVIEW

This chapter contains information on the involvement of the public and agencies as stakeholders in the development of this plan. In addition to the meetings detailed here, there was regular coordination between the SLO (LENRD), USACE, and NRCS throughout the planning period.

The USACE is a cooperating agency for this NEPA document and will use the analysis to assist in project review for meeting requirements for Section 404 of the Clean Water Act. Supporting information on impacts to wetlands and other aquatic resources (including avoidance, minimization, and mitigation measures) is provided in Appendix E. As a cooperating agency, USACE was involved in all milestone meetings.

For wetlands that could be converted to a commodity crop, the LENRD, landowners, and producers have been informed and are aware of the potential effect of the wetland conversion provisions and of the actions needed to avoid loss of program benefits according to the Food Security Act (FSA).

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 USFWS and NGPC have been consulted regarding potential impacts to threatened and endangered species.

6.02 PUBLIC SCOPING MEETING – NOVEMBER 6, 2023

A public scoping meeting was held in Osmond, NE with residents of the watershed and members of the project team. The open house meeting format consisted of information stations manned by members of the project team who presented information about the planning process, potential alternative options, answered questions, and took comments.

6.03 PUBLIC SCOPING MEETING – NOVEMBER 8, 2023

A public scoping meeting was held in Pierce, NE with residents of the watershed and members of the project team. The open house meeting format consisted of information stations manned by members of the project team who presented information about the planning process, potential alternative options, answered questions, and took comments.

6.04 AGENCY SCOPING MEETING – NOVEMBER 28, 2023

An agency scoping meeting was held virtually with representatives from the LENRD, NRCS, USACE, US Environmental Protection Agency, NGPC, Nebraska Department of Transportation, Nebraska State Historic Preservation Office, Federal Highway Administration, Nebraska Department of Natural Resources, and other partners. Discussion at this meeting centered on an overview of the study area watershed, purpose and need, anticipated types of alternatives, project schedule, and next steps. The agency mailing list is included in Table 22, and the Tribal mailing list is included in Section 6.09. This meeting gave attendees an overview of the WFPO program, and details about the study area and planning process and schedule. This overview was followed by a roundtable discussion in which each agency was given the opportunity to share their agency's point of interest in the watershed, any pertinent information they may have, and any concerns.

Table 22: Agency Mailing List for First Scoping Meeting

Antelope County	Nebraska Department of Transportation
BSNF Railway	Nebraska Game and Parks Commission
Bureau of Reclamation	Nebraska State Archeologist
Cedar County	Office of the Governor
City of Osmond	Pierce County
City of Pierce	US Army Corps of Engineers
City of Plainview	US Department of Agriculture
Federal Emergency Management Agency	US Environmental Protection Agency
Federal Highway Administration Nebraska Division	US Fish and Wildlife Service
History Nebraska	US Geological Survey
Knox County	Village of Foster
Lower Elkhorn Natural Resources District	Village of Magnet
National Park Service	Village of McLean
Natural Resources Conservation Service	Village of Wausa
Nebraska Department of Environment and Energy	Wayne County
Nebraska Department of Natural Resources	

6.05 PUBLIC OPEN HOUSE MEETING – JUNE 25, 2024

A public open house meeting was held in Pierce with members of the public and representatives from the project team. The open house meeting format consisted of information stations manned by members of the project team who presented information about the planning process, potential alternative options, answered questions, and took comments.

6.06 PUBLIC OPEN HOUSE MEETING – JUNE 26, 2024

A public open house meeting was held in Osmond with members of the public and representatives from the project team. The open house meeting format consisted of information stations manned by members of the project team who presented information about the planning process, potential alternative options, answered questions, and took comments.

6.07 COORDINATION WITH USACE

Regulatory Branch:

NRCS invited the USACE Regulatory Branch to be a Cooperating Agency on this Watershed Plan-EA in October 2023. USACE accepted the invitation in a letter received October 25, 2023 (see Appendix A) and assigned Identification Number 2023-01589-WEH to the Plan-EA.

A Clean Water Act review meeting was held with representatives from the project team, LENRD, NRCS, and USACE on October 30, 2024. The purpose of the meeting was to review the preliminary impacts to streams and wetlands which fall under USACE jurisdiction. Options for mitigation of those impacts were discussed, along with potential 404 permitting strategies.

Planning Branch:

NRCS and the project sponsor met with the USACE Planning Brach Section 408 review team for a pre-application meeting on February 7, 2025. NRCS described the project components and impacts to USACE Civil Works Projects in Pierce, Nebraska. USACE requested additional hydraulic and hydrological models that show the existing Pierce levee in place to aid in their evaluation of the project and its impacts. Additional models were provided to USACE on March 18, 2025.

6.08 CONSULTATION WITH USFWS AND NGPC

USFWS was invited to be a cooperating agency for this Plan-EA but chose not to accept.

USFWS and NGPC were invited to participate in the NEPA scoping meetings held in 2023.

P.L.83-566 Section 12 consultation with USFWS was initiated on December 5, 2024. No response was received.

Informal ESA Section 7 and NESCA consultation was initiated on July 17, 2025.

6.09 TRIBAL AND NHPA SECTION 106 CONSULTATION

The NRCS consulted on a government-to-government basis with Federally Recognized Tribes who have ancestral land claims in the area and will continue to consult through implementation if cultural resources are identified after NHPA Section 106 consultation is complete. The Federally Recognized Tribes consulted from the inception of the project include:

- Apache Tribe of Oklahoma
- Cheyenne and Arapaho Tribes of Oklahoma
- Northern Arapaho Tribe
- Northern Cheyenne Tribe
- Omaha Tribe of Nebraska
- Pawnee Nation of Oklahoma
- Ponca Tribe of Indians of Oklahoma
- Ponca Tribe of Nebraska
- Santee Sioux Nation of Nebraska
- Yankton Sioux Tribe

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 18, 2023, 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. NeSHPO responded that they would like to participate in the agency scoping meeting and noted that archeological resources would be a concern in the watershed. NeSHPO also noted that the Ponca Tribe had vested interest in the area.

After the cultural resources inventory was complete, NRCS sent NHPA Section 106 consultation request letters to NeSHPO and the Tribes listed above on January 29, 2025. The consultation letter presented the proposed alternatives, the historic property identification efforts, determinations of eligibility, and the determination of effect. Copies of the cultural resources inventory report, draft programmatic agreement, and maps of the APE were submitted with the consultation letter to support the determination of effect. NRCS consulted with the USACE under NHPA Section 106 in a letter dated March 17, 2025. NRCS also sent follow up emails to the Tribes listed above on March 17, 2025, correcting some information in the original consultation letter and requesting a response regarding the project. Copies of all correspondence are provided in Appendix A.

NeSHPO agreed to be a signatory on the programmatic agreement in an email received February 28, 2025, but requested additional time to evaluate the Pierce Levee. NeSHPO asked additional questions about the Pierce Levee in a letter dated April 22, 2025. NRCS provided answers to the questions on July 17, 2025. NeSHPO concurred that the undertaking will have no adverse effect on the Pierce Levee in an email received July 18, 2025. The Northern Arapaho concurred with

the determination of effect in a letter dated March 12, 2025. The Pawnee Nation responded that the project should not adversely affect the cultural landscape of the Pawnee Nation in an email received May 1, 2025. NRCS invited ACHP to participate in the Programmatic Agreement in August 2025.

Representatives from the Tribes listed above were also invited to participate in the agency review meeting and to review a copy of the draft Plan-EA prior to the public review period.

6.10 INTERAGENCY AND PUBLIC REVIEW

Note: A summary of interagency and public review of the draft will be added here once that step in the planning process is complete, including a summary of the comments received and actions taken.

Agency Review Meeting – DATE TBD

Public Review Meeting – DATE TBD

CHAPTER 7. PREFERRED ALTERNATIVE

7.01 RATIONALE FOR THE PREFERRED ALTERNATIVE

Of the alternatives considered, the Levee Improvements and Diversion Channels Alternative and Road Raise and Berm Alternative 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. Economic tables are provided at the end of this chapter, and additional information concerning alternatives analysis is available in Chapter 4 and Appendix D.

POSSIBLE CONFLICTS WITH PLANS AND POLICIES

A review of available regional water management plans, coordination with the Sponsor, and Cities of Osmond and Pierce shows that there are no anticipated conflicts with currently available plans or policies.

PRECEDENT FOR FUTURE ACTIONS WITH SIGNIFICANT IMPACTS

The actions required to implement the preferred alternative do not set a precedent for future actions in the watershed that would cause significant impacts. Any other projects similar in nature and vision would be evaluated under their own standalone study.

7.02 MEASURES TO BE INSTALLED

In Pierce, levee improvements consisting of seepage berms and a height increase would be constructed in conjunction with interior drainage improvements consisting of two diversion channels, and two stormwater pumping stations. All these elements are interdependent to provide a complete alternative. Interior drainage issues would not exist had the levee not been built, and therefore the additional measures to mitigate interior flooding are interdependent with the levee improvements which will provide protection from exterior flooding sources.

In Osmond, a road raise and berm would be constructed, and nonstructural improvements would be made to homes south of Highway 20. The road raise and berm elements are interdependent. The 4th Street road raise prevents floodwater from entering the central portion of Osmond, but also results in increases to floodwater depth to the northeast. The berm element of the alternative was therefore included to provide protection to the northeastern portion of Osmond. Nonstructural improvements would be made to up to a dozen homes identified south of Highway 20 that are prone to frequent flooding damage.

Each of these alternatives would successfully provide flood damage reduction to their respective communities. Summaries of the design details are provided in Structural Tables at the end of this chapter. Additional details, including NRCS Engineering Job Classifications, are provided in

Appendix D, with maps and drawings provided in Appendix C. A preliminary level geologic investigation and seismic analysis was performed in support of the planning phase of the preferred alternative, and a summary of this work is provided in Appendix D. During final design, additional geologic investigation will be performed.

Note that technical and financial assistance for the implementation of the preferred alternative is limited and would be provided only when it contributes to achieving the project's objectives. Participation in the WFPO program is voluntary and the Sponsor would make the final decision on what measures would be implemented.

Each of the works of improvement would abide by the design requirements of at least one NRCS Conservation Practice Standard (CPS), as detailed below. For the purposes of planning and environmental review the following Nebraska CPS codes were identified as applicable to each measure; however, final determination would be made during the design phase.

- CPS 342: Critical area planting
- CPS 356: Dike and levee (Class 1)
- CPS 410: Grade stabilization structure
- CPS 472: Access Control
- CPS 500: Obstruction Removal
- CPS 533: Pumping Plant
- CPS 560: Access road
- CPS 572: Spoil disposal
- CPS 580: Streambank and shoreline protection
- CPS 582: Open channel
- CPS 620: Underground Outlet

PIERCE LEVEE IMPROVEMENTS L1-20

The existing Pierce levee is situated between the city and the North Fork Elkhorn River. The improvements would support the original purpose of the levee of reducing the risk of riverine flooding stemming from the North Fork Elkhorn River. Levee improvements were based on the 100-year water surface elevation plus 3.5 feet of freeboard. The improvements consist of adding earth fill to the landward side of the existing levee and raising the top of levee elevation by approximately 2 feet. Seepage berms and toe trench drains would also be implemented. The seepage berms would consist of 4-foot tall, 150-foot wide fill where space permits. Two trench drains would be used where space is not available for seepage berm construction. Levee design would follow FEMA and USACE standards as well as NRCS CPS codes.

Note that improvements made to the levee upstream of the confluence of the North Fork Elkhorn River and Yankton Slough are eligible for PL 83-566 funding. Improvements made downstream of the confluence are not eligible for PL 83-566 funding. This division of funding is included in the estimated costs used throughout this plan.

PIERCE SOUTHWEST DRAINAGE IMPROVEMENTS C1-30

C1-30 works interdependently with C1-10 and the stormwater pumping stations to help mitigate flooding caused by internal sources on the landward side of the Pierce levee. C1-30 consists of a diversion channel running between 853 Rd and 549 Ave. The channel would run for approximately 2,400 ft and have a bottom width of 14 ft. This channel would capture flows entering Pierce from the west and reroute them south around the city to Willow Creek. Additional improvements would include road crossing improvements, a pedestrian bridge to reduce backwater effects at an existing hike/bike trail, and stream stabilization improvements at the downstream end of the channel.

PIERCE NORTHWEST DRAINAGE IMPROVEMENTS C1-10

C1-10 works interdependently with C1-30 and the stormwater pumping stations to help mitigate flooding caused by internal sources on the landward side of the Pierce levee. C1-10 consists of a diversion channel running between 548 Ave and State Highway 13. The channel would run for approximately 1.5 miles parallel to 854 Rd and 549 Ave with a bottom width of 10-12 ft. This channel would capture flows entering Pierce from the northwest and funnel them to the north. Floodwater would exit the channel on the east side of State Highway 13 and be prevented from re-entering Pierce by the improved levee.

PIERCE STORMWATER PUMPING STATIONS

The stormwater pumping stations work interdependently with C1-30 and C1-10 to help mitigate flooding caused by internal sources on the landward side of the Pierce levee. Two locations for pumping stations were identified, consisting of low spots (sumps) along the landward side of the existing levee. The pumping stations would pull floodwater building up within Pierce and reroute it to the river side of the levee, thereby reducing flood risks within the city.

OSMOND 4TH STREET FLOOD REDUCTION F1-1

F1-1 consists of a road raise running for approximately 1,100 ft along 4th Street in Osmond, east of N Hill St. The road elevation will be raised an average of 3 ft, with a maximum raise of 6.25 ft. Additionally, this includes grading of a portion of the surrounding baseball field area to restore high ground and prevent floodwater from backing up into Osmond. To minimize grading impacts to existing infrastructure, a retaining wall running north-south with a maximum height of 6 feet was utilized on the eastern perimeter of the grading area. Baseball field concessions and restroom buildings will also be raised to the new proposed grade, above flood elevations. F1-1 and F1-2 work interdependently to provide flood reduction to Osmond. F1-1 prevents floodwater from entering the center of the city but causes an increase in flooding depth to the northeastern portion of Osmond. F1-2 provides flood protection to the northeastern portion of the city.

OSMOND NORTHEAST FLOOD REDUCTION F1-2

F1-2 consists of an earthen berm running for approximately 650 ft with a top width of 10 ft and maximum height of 7.6 ft. The berm is located east of the homes built along N Park St, running north-south. This berm ties into existing higher ground at each end. F1-1 and F1-2 work interdependently to provide flood reduction to Osmond. F1-1 prevents floodwater from entering the center of the city but causes an increase in flooding depth to the northeastern portion of Osmond. F1-2 provides flood protection to the northeastern portion of the city.

OSMOND NONSTRUCTURAL

Twelve homes located south of Highway 20 in Osmond were identified for potential implementation of nonstructural floodproofing improvements. While the final nonstructural measures for each structure will ultimately be decided by the homeowner and Sponsor during the design phase, it was assumed that each of these structures would be elevated above the base flood elevation for cost estimating purposes.

BORROW AND SPOIL MATERIAL

Potential borrow sites have been identified, and fieldwork for those sites will be completed during the design phase. If the fieldwork reveals unfavorable conditions, additional borrow sites will need to be investigated at greater cost to the Sponsor. This will include wetland delineations, cultural resources investigations, and geological / geotechnical investigations. A map of the potential sites is included in Appendix C. Spoil materials will be located within the ARA.

7.03 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

Irreversible effects result primarily from the use or destruction of a specific resource that cannot be replaced within a reasonable time frame. For the preferred alternative, this includes the conversion of land uses required to construct the alternative, as well as the construction materials (lumber, metal, aggregate, and fuels).

Irretrievable resource commitments involve the loss in value of an affected resource as a result of the action that cannot be restored. For the preferred alternative, this includes the loss of streams and wetlands. However, those losses will be mitigated. Additionally, this includes costs to design, construct, and continue long-term OM&R activities.

7.04 AREAS OF CONTROVERSY

The watershed has experienced flooding damage repeatedly since its settlement. Property owners are aware of the intent to reduce flood risks and there were no significant concerns voiced during public meetings or community meetings held throughout the planning process that were left unaddressed. The proposed alternative is not controversial.

7.05 PERMITS AND COMPLIANCE

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

- USACE
  - Clean Water Act, Section 404 (regulatory program)
  - Section 408 Program (civil works program)
- NeDNR
  - Dam Safety Review (if applicable)
  - Water Storage Permit (if applicable)
- NDEE
  - 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
- Fish and Wildlife Coordination Act PL 116-188
  - USFWS notified of planning project per PL 83-566, Section 12
- Migratory Bird Treaty Act
- Bald and Golden Eagle Protection Act
- Endangered Species Act
  - The only concurrence being provided for the Plan-EA by both agencies is for NEPA, as it relates to identifying significant impacts.
  - Further consultation with USFWS and NGPC will be initiated after the design is complete. A Biological Assessment may be required at that time.
- Fish and Wildlife Coordination Act
- Nebraska Nongame and Endangered Species Conservation Act
- Floodplain Management
  - Local floodplain development permits
  - CLOMR and LOMR
    - It is anticipated implementation of this alternative will result in a future revision to the regulatory floodplain based on the additional flood risk analysis detail for the watershed developed for this plan. To assure a successful map change and to support floodplain permitting for the project, based on the conceptual alternative presented in this plan it is anticipated a Conditional Letter of Map Revision (CLOMR) would be submitted prior to project construction, if the project is funded and implemented. Once the project is completed, a Letter of Map Revision (LOMR) would be requested from FEMA to ensure updated regulatory floodplain maps are developed.
  - EO 11988 and 7 CFR 650.25

- National Historic Preservation Act
    - In accordance with 36 CFR 800.4(b)(2), NRCS will defer identification and evaluation of historic properties 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) (see Appendix E). If historic properties will be adversely affected, mitigation will follow the procedures outlined in the Programmatic Agreement.
- National Environmental Policy Act
- Operation, Maintenance, and Replacement (OM&R) plans for each structure

7.06 MITIGATION OF POTENTIAL EFFECTS

Impacts to existing natural resources and cultural resources/historic properties due to the installation of this project were identified in Chapter 5. Any wetlands interrupted due to excavation would be plugged to prevent further drainage of the wetland. All adverse impacts were avoided and minimized to the greatest extent practicable. The remaining impacts would require mitigation. In-field surveys, paired with other existing data were utilized to determine mitigation needs. Mitigation quantities for each resource were based on input from NRCS resource specialists and USACE Regulatory requirements. Locations of mitigation actions would be identified during the design phase. Land required for mitigation would be acquired by the Sponsor for the duration of the project life. All necessary mitigation plans would be developed as part of the design phase, prior to construction.

The project would be reviewed by USACE under CWA Section 404. It is anticipated that the alternatives would be permitted under an Individual Permit and a Nationwide Permit. All impacts are necessary to build these sites to meet current NRCS design standards. This project complies with the Food Security Act by not making the wetland areas easier to farm than they currently are, nor does it convert any wetlands to farmland. This project complies with Executive Order 11990 by adequately replacing impacted wetlands with new wetlands. Additional information is included in Appendix E.

WETLAND MITIGATION

Implementation of the preferred alternative would cause permanent wetland impacts. The bulk of wetland impacts were avoided and minimized by limiting grading extents and selecting alignments to avoid known wetland areas. Construction of the Levee Improvements and Diversion Channels alternative would result in 5.615 acres of permanent wetland impacts due to excavation, fill placement, and lateral drainage. The Road Raise, Berm, and Nonstructural alternative would not impact any wetlands. All impacts would be necessary for the new structures to meet current NRCS design standards.

These impacts would be mitigated by creating new additional wetlands of the appropriate subclass onsite. Mitigation ratios are anticipated to be 4:1 for all impacted wetlands based on information provided by USACE during the planning process. Mitigation ratios would be subject to change during the final design and permitting of this project. Additional information is provided in Appendix E.

STREAM MITIGATION

Construction of the levee improvements and diversion channels alternative would require altering a total of 0.094 acres of streams due to fill placement for levee improvements and riprap placement for channel stabilization. Stream beds and banks would be stabilized within the project area resulting in decreased erosion and downstream sedimentation. All impacts are necessary to build these sites to meet current NRCS design standards. Additional information is included in Appendix E.

The project would be reviewed by USACE under CWA Section 404. It is anticipated that this alternative would be permitted under an Individual Permit. A jurisdictional determination alongside the Nebraska Stream Condition Assessment Procedure (NeSCAP) would be completed during the design phase. Mitigation requirements are determined by USACE based on the comparison of stream conditions before and after implementation of the project. Existing and proposed stream conditions would be analyzed using NeSCAP to determine if the overall function of the stream system would be improved following project implementation. If the function of the stream is uplifted, no additional mitigation actions would be required. If the function of the stream is not improved, mitigation actions will take place on stream channels within the ARA to improve their function.

HISTORIC PROPERTY MITIGATION

Approximately 198 acres of the Area of Potential Effect have not been investigated for the presence of historic properties. Prior to construction, NRCS will need to complete field investigations and determine whether any historic properties will be adversely affected by the proposed action. NRCS has executed a Programmatic Agreement with SHPO and consulting parties to allow for phased identification of historic properties (Appendix E). 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 following the procedures outlined in the Programmatic Agreement.

CONSERVATION MEASURES

Conservation measures would be implemented to prevent, avoid, and minimize potential adverse impacts to certain threatened and endangered species, migratory birds, and invasive species. For threatened and endangered species, conservation measures include construction timing, biological surveys, and approved seeding plans. For migratory birds, conservation measures

include surveys and construction timing. For invasive species, conservation measures include approved seeding plans and proper cleaning / decontamination of transported equipment.

7.07 COSTS AND COST SHARING

Cost descriptions are summarized in Economic Table 1 and Economic Table 2. Additional details are available in Appendix D.

CONSTRUCTION

Construction costs are the total of all costs required to build the proposed project. This includes all components of the project from initial contractor mobilization through final seeding, fencing, and mitigation activities. NRCS will provide 100% funding for construction costs.

It should be noted that some construction items may fall under the definition of “real property rights”, as defined in Title 390-National Watershed Program Manual, Part 506, subpart E, Section 506.50(K)(12). The Sponsor is responsible for 100% of these costs, which, for example, may include changes to public or private roads, bridges, culverts, and utilities.

ENGINEERING

Engineering costs include all elements of the preferred alternative design, such as permitting (including mitigation and conservation measures), construction oversight, geological and geotechnical investigation and analysis, and topographic survey. All permitting costs are the responsibility of the project Sponsor. Engineering costs related to real property rights, such as surveying, land appraisal, and legal fees, are the responsibility of the project Sponsor. NRCS would provide funding for the remaining engineering-related costs.

REAL PROPERTY ACQUISITION AND EASEMENTS

Approximately 53.6 acres of real property acquisition would be required for implementation of the preferred alternative. Easement costs are estimated to be 100% of land value for areas permanently altered. Based on property sales in the region and to ensure a conservative cost estimate, a value of $15,000 per acre was used for permanent acquisition and easements. Costs of legal fees and land appraisals are estimated at 10% of the total land rights costs. Real property also includes all costs associated with items such as roads, bridges, culverts, utility lines, etc. The Sponsor is responsible for 100% of these costs.

OPERATION, MAINTENANCE, AND REPLACEMENT

Operation, maintenance, and replacement (OM&R) cost estimates are based on previous experience. OM&R costs are estimated to be 0.75% of the total construction cost per year. OM&R is the responsibility of the Sponsor for the design life of the structure. Costs are included for replacement of the pump stations at the end of their 50-year useful life. One replacement was

included to extend that lifespan to 100 years to match the remaining components of the proposed alternative. Replacement costs are not necessary for any of the other components of the proposed alternative as the design life for those measures is equal to the project life (100 years).

PROJECT ADMINISTRATION

Project administration costs are based on experience with other projects. Initial estimates were based on 5% of the construction costs and were then updated based on input from the Sponsor. The Sponsor is responsible for 100% of its own project administration costs, which include items like contract administration, review of materials, progress meetings during design and construction, landowner coordination, etc. The NRCS provided an estimate for its own project administration costs, which they are also 100% responsible for.

7.08 ECOSYSTEM SERVICE BENEFITS

The Preferred Alternative would enhance the watershed's ability to regulate flood damages. The damage reductions would benefit existing structures, including residential, commercial, industrial, and public buildings as well as their contents. The Preferred Alternative would reduce damage to public infrastructure and reduce losses of business and wage income. Construction of the alternative would remove a very small amount of land from agricultural production. The alternative would not reduce flooding damages to agricultural lands. The alternative would improve public safety through reduced flooding damages.

7.09 INSTALLATION AND FINANCING

INSTALLATION

Table 23 below provides the approximate timeline for completion of the project. Note that the full level of flood protection described in this plan would not be achieved until all components are completed and operational.

Table 23: Project Timeline

Project Step	Timeline
Final design plans and specifications complete	2027
Secure land rights/easements	2027
Obtain USACE Section 404 permit(s)	2028
Bidding/contracting	2028
Begin Construction, F1-1	2028
Begin Construction, F1-2	2028
Begin Construction, C1-10	2028
Begin Construction, C1-30	2028
Begin Construction, L1-20 and Pump Stations	2029
Completed Construction, All Sites	2032

RESPONSIBILITIES

The project Sponsor is responsible for land rights and easements, permits and compliance, and the costs outlined in the previous sections of this chapter. The Sponsor has analyzed the financial needs of this project and would be able to make funds available, as necessary. The NRCS would provide federal funds for construction of the preferred alternative through the WFPO program. The availability of those federal funds is contingent on appropriations being made available for this purpose. The Sponsor would have a financial management plan in place before receiving federal funds.

CONTRACTING

Implementation of the preferred alternative would be accomplished using binding contract agreements between the NRCS and the Sponsor.

REAL PROPERTY AND RELOCATIONS

The Sponsor will comply with all of the policies and procedures of the Uniform Relocation Assistance and Real Property Acquisition Policies Act (42 U.S.C. Section 4601 et seq. as further implemented through regulations in 49 CFR Part 24 and 7 CFR Part 21).

The Sponsor will need to acquire the following to construct the preferred alternative:

- Approximately 53.6 acres of real property rights or easements to construct the preferred alternative.
- The cost estimate assumes several buildings may need to be relocated.
- The cost estimate assumes twelve buildings will have nonstructural measures applied to them.

FINANCING

Costs outlined in the previous sections of this chapter are the responsibility of the Sponsor and/or NRCS, as summarized in Economic Table 1 and Economic Table 2. The Sponsor has the ability to levy taxes and issue bonds for the purposes of financing projects. The Sponsor also has the option of using eminent domain, but this option should be avoided if possible. No other federal agencies are required or anticipated to provide assistance with the implementation of this plan. Note that Federal financial assistance is dependent on appropriations for the purposes of this project.

7.10 OPERATION, MAINTENANCE, AND REPLACEMENT

OM&R includes all activities related to ensuring the structures of the preferred alternative remain in functioning condition. All OM&R activities and costs for the lifetime of the project are the

responsibility of the project Sponsor. The estimated average annual OM&R costs are provided in Economic Table 4.

Activities may include, but are not limited to, vegetation removal, seeding, rodent management, access maintenance (roads, etc.), and repair of any damages regardless of cause (natural disaster, vandalism, etc.). An OM&R plan would be prepared for each structure, and the structures would be inspected annually. Special inspections should be conducted following major events such as floods. Replacement costs are included in the cost estimate for the stormwater pumping stations as they have an anticipated lifespan of 50 years. One replacement was included to extend that lifespan to 100 years in order to match the remaining components of the proposed alternative. Replacement costs are not necessary for any of the other components of the proposed alternative as the design life for those measures is equal to the project life.

Additional coordination with USFWS and NGPC will take place during the completion of a Biological Assessment, to ensure the activities in the OM&R plan follow conservation conditions and other best practices.

7.11 EMERGENCY ACTION PLAN

An Emergency Action Plan (EAP) identifies potential emergency conditions at a levee and provides actions to be taken in order to avoid or minimize damages should an emergency occur. An EAP would be required during the construction of the Pierce levee improvements. The EAP would be developed by the Sponsor with technical assistance from NRCS or a Professional Engineer prior to construction beginning. Once construction is completed, the Operations and Maintenance manual would be updated, and the EAP would no longer be active.

7.12 ECONOMIC AND STRUCTURAL TABLES

The results of the cost-benefit analysis for the Preferred Alternative are compared against the damages under the FWOFI and serve as the best estimate of the additional economic value that would be created under the Preferred Alternative. Results are presented using the Economic and Structural Tables (NWPM Part 506, NRCS 2014b) shown below. These tables summarize installation costs, distribution of costs, and total annual average costs for the Preferred Alternative.

ECONOMIC TABLE 1: ESTIMATED INSTALLATION COST OF THE PREFERRED ALTERNATIVE (2024$)

Works of Improvement	Federal Land (ac)	Non-Federal Land (ac)	Total (ac)	Public Law 83-566 Funds (Non-Federal land)	Other Funds (Non-Federal land)	Total
Osmond Alternative	0	1.6	1.6	$3,745,100	$330,545	$4,075,645
Pierce Alternative	0	52	52	$13,823,400	$8,834,400	$22,657,800
Total	**0**	**53.6**	**53.6**	$17,568,500	$9,164,945	$26,733,445

Notes: Totals may not sum due to rounding. *Prepared: November 2024.* *Price base: 2024 dollars.*

ECONOMIC TABLE 2: ESTIMATED PREFERRED ALTERNATIVE COST DISTRIBUTION (2024$)

Works of Improvement	Engineering[1]	Administration[1]	Construction[1]	Total PL 83-566[1]	Property Rights[2]	Administration[2]	Construction[2]	Permitting[2]	Total Other[2]	Total
Osmond Alternative	$517,700	$81,100	$3,146,300	$3,745,100	$31,245	$81,100	$88,700	$129,500	$330,545	$4,075,645
Pierce Alternative	$2,770,500	$433,000	$10,619,900	$13,823,400	$1,014,000	$433,000	$6,694,700	$692,700	$8,834,400	$22,657,800
Total	$3,288,200	$514,100	$13,766,200	$17,568,500	$1,045,245	$514,100	$6,783,400	$822,200	$9,164,945	$26,733,445

1) PL 83-566 Funds
2) Sponsor Funds

Notes: Totals may not sum due to rounding. *Prepared: November 2024.* *Price base: 2024 dollars.*

STRUCTURAL TABLE 3A: DIKES / LEVEES

Levee	Station	Top Width (ft)	Average Side Slope (h:v)	Average Height (ft)	100-yr Frequency Velocity (ft/s)	Levee Protection	Volume of Earth Fill (yd^3)
L1-20	101+00 to 244+00	10	4:1	7.8	8.6	Seepage Berm and Toe Trench Drain	188,570
F1-1	10+75 to 14+25	10	N/A	5	1	N/A	6,130
F1-2	10+25 to 17+00	10	4:1	6	2.6	None	2,856

STRUCTURAL TABLE 3B: CHANNEL WORK

Channel Name (reach)	Station	Drainage Area (mi^2)	(100) Year Freq Design Discharge (ft^3/s)	Water Surface Elev (feet msl)	Hydraulic Gradient (ft/ft)	Gradient (ft/ft)	Bottom Width (ft)	Elev. (feet msl)	Side Slopes (h:v)	n Value	Velocities (ft/s) Aged	Velocities (ft/s) As-Built	Excavation Volume (yd^3)	Type of Work[1]	Existing Channel Type [2]	Present Flow Cond. [3]
C1-10	10+00 to 90+00	2.1	172	1623.8 - 1583.8	0.001 - 0.0175	0.001 - 0.0175	10 - 12	1623 - 1582	4:1 roadside, 3:1 elsewhere	0.03	1.5 - 7.0	4.5 - 7.0	27,210	II	M	E
C1-30	10+00 to 38+50	1.2	290	1600.9 - 1592.2	0.004	0.004	14	1599 - 1586	4:1 roadside, 3:1 elsewhere	0.03	2.0 - 4.5	2.0 - 4.5	7,110	II	M	E

Prepared: October 2024

1 I Establishment of new channel including necessary stabilization measures.
II Enlargement or realignment of existing channel or stream
III Cleaning out natural or manmade channel (including bar removal and major clearing and snagging operations).
IV Clearing and removal of loose debris within channel section.
V Stabilization as primary purpose (by continuous treatment or localized problem areas - present capacity adequate).

2 N An unmodified, well-defined natural channel or stream.
M Manmade ditch or previously modified channel or stream (show approximate date of original construction in parenthesis).
O None or practically no defined channel."

3 Pr Perennial-Flows at all times except during extreme drought.
I Intermittent-Continuous flow through some seasons of the year.
E Ephemeral-Flows only during periods of surface runoff, otherwise dry.
S Ponded water with no noticeable flow-Caused by lack of outlet or high groundwater table.

As Economic Table 4 shows, the total annualized cost of the Osmond alternative is approximately $137,800, compared to $752,600 for the Pierce alternative. In total, the two action alternatives have a combined annualized cost of $890,400.

ECONOMIC TABLE 4: ESTIMATED AVERAGE ANNUAL COSTS (2024$)

Alternative	Amortization of Installation Cost	Other Direct Costs[1]	Total
Osmond	$120,000	$17,800	$137,800
Pierce	$667,400	$85,200	$752,600
Total	**$787,400**	**$103,000**	**$890,400**

Notes: Totals may not sum due to rounding. Prepared: November 2024
Price base: 2024 dollars amortized over 100 years at a discount rate of 2.75 percent.
1: Other direct costs include annual operations and maintenance associated with installation, operation, and replacement of project structures.

The impact of the action alternatives on ecosystem flows and values is shown in Economic Table 5a, below. The action alternatives would positively impact regulating services in the watershed by reducing flood damages to buildings, businesses, and employees in the cities of Osmond and Pierce. In total, the action alternatives would create average annualized gross benefits of approximately $1,593,700, with the majority of benefits coming from reducing flood damages to buildings.

These are “conservative” estimates because they focus solely on reduced building damages and decreased business and wage income losses and therefore exclude several other significant benefits of reducing flooding. For example, the benefits do not account for long-term infrastructure damages to roads, bridges, and critical infrastructure. They also do not account for environmental degradation. Furthermore, the benefits do not include social and emotional costs, such as the displacement of communities and mental health effects. If these other benefits could be easily and defensibly quantified and monetized, the benefits of the action alternatives would likely be much larger than the estimates reported here.

ECONOMIC TABLE 5A: ESTIMATED AVERAGE ANNUAL FLOOD DAMAGE REDUCTION BENEFITS (2024$)

Benefit/Reduced Damage	Agricultural-Related	Non-Agricultural-Related
Reduced building damages	$981,800	-
Reduced wage and business income loss	$611,900	-
Total Quantified Benefits	**$1,593,700**	**-**

Notes: Totals may not sum due to rounding. Prepared: November 2024.
Price base: 2024 dollars amortized over 100 years at a discount rate of 2.75 percent.

Using the resulting benefits and costs from the previous two tables, Economic Table 6 presents a comparison of the average annualized benefits and average annualized costs for the action alternatives. In total, the action alternatives will generate average annual benefits of $1,593,700 compared to average annual costs of $890,400, for a benefit-cost ratio of 1.8. Each alternative generates benefits in excess of its costs, as shown in Economic Table 6.

ECONOMIC TABLE 6: COMPARISON OF BENEFITS AND COSTS (2024$)

Works of Improvement	Reduced Building-Related Damages[1]	Reduced Business Income & Wage Losses[1]	Total Annualized Benefits	Average Annual Cost	Benefit Cost Ratio
Osmond Alternative	$81,600	$82,500	$164,100	$137,800	1.2
Pierce Alternative	$900,200	$529,300	$1,429,500	$752,600	1.9
Total	**$981,800**	**$611,800**	**$1,593,700**	**$890,400**	**1.8**

Notes: Totals may not sum due to rounding. Prepared: November 2024.
Price base: 2024 dollars amortized over 100 years at a discount rate of 2.75 percent.
1) Agriculture-related benefits

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8.01 ABBREVIATIONS AND ACRONYMS

ASPE	Office of the Assistant Secretary for Planning and Evaluation
BCC	Birds of Conservation Concern
CEQ	Council on Environmental Quality
CERT	Conservation and Environmental Review Tool
CWA	Clean Water Act
FEMA	Federal Emergency Management Agency
FPPA	Farmland Protection Policy Act
FWOFI	Future Without Federal Investment
HSG	Hydrologic Soil Groups
HUC	Hydrologic Unit Code
IPaC	Information for Planning and Consultation
LENRD	Lower Elkhorn Natural Resources District
LPRBC	Lower Platte River Basic Coalition
NCEI	National Centers for Environmental Information
NDEE	Nebraska Department of Environment and Energy
NDEQ	Nebraska Department of Environmental Quality
NEPA	National Environmental Policy Act
NESCA	Nongame and Endangered Species Conservation Act
NeSCAP	Nebraska Stream Condition Assessment Procedure
NFHL	National Flood Hazard Layer
NFIP	National Flood Insurance Program
NGPC	Nebraska Game and Parks Commission
NHD	National Hydrography Dataset
NHL	National Historic Landmarks
NHPA	National Historic Preservation Act
NISC	Nebraska Invasive Species Council
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NWSR	National Wild and Scenic Rivers
Plan-EA	Watershed Plan and Environmental Assessment
PR&G	Principles, Requirements, and Guidance for Water and Land Related Resources Implementation Studies

SCORP	Statewide Comprehensive Outdoor Recreation Plan
SLO	Sponsoring Local Organization
SWIF	System-Wide Improvement Framework
T&E	Threatened and Endangered
UNL-CSD	University of Nebraska-Lincoln Conservation and Survey Division
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WFPO	Watershed and Flood Prevention Operations

CHAPTER 9. LIST OF PREPARERS

The North Fork Elkhorn River Watershed Plan-EA was prepared by an interdisciplinary team. Those individuals who made significant input to the Plan-EA are included in Table 24. Reviewers who guided development of the Plan-EA are included in Table 25. The draft Plan-EA was reviewed and concurred with by State staff specialists having responsibility for engineering, soils agronomy, range conservation, biology, cultural resources, forestry, and geology. This review was followed by a review of the document by the NRCS National Watershed management Center (NWMC). A similar review was also provided by USACE personnel.

Table 24: List of Preparers

Name	Current Title & Experience (Years)	Education	Other Pertinent Qualifications, Publications, and Professional Licenses
JEO Consulting Group, Inc. Staff			
Adam Rupe	Natural Resources Specialist / Project Manager (15 years)	B.S. Fisheries & Wildlife; B.S. Environmental Studies; M.A.S. Environmental Studies	Certified Ecological Restoration Practitioner (CERP)
Andrea Gebhart	Planning and Engagement Department Leader (10 years)	Masters in Community and Regional Planning; Graduate Certificate in Public Management; B.S. Dietetics	AICP
Ann Nissen	Project Engineer (10 years)	B.S. Civil Engineering; B.S. Business Administration	PE registration (NE)
Brianna Lock	Community Engagement Specialist (1 year)	B.A. Journalist B.A. Spanish	
Charlie Fankhauser	Water Resources Engineer (1 year)	B.S. Civil Engineering	EI
Dillon Vogt	Natural Resources Specialist (9 years)	B.S. Water Science; Minor - Mathematics	PH (Professional Hydrologist)
Eric Marrow	Environmental Scientist (9 years)	B.S. Fisheries & Wildlife; Minor - Geography	
John Callen	Senior Project Engineer (19 years)	B.S. Biological Systems Engineering	PE Registration (NE, IA), Certified Floodplain Manager (CFM)
Justine Cherovsky	Environmental Scientist (3 years)	B.S. Environmental Studies;	

Name	Current Title & Experience (Years)	Education	Other Pertinent Qualifications, Publications, and Professional Licenses
		Minor Fisheries & Wildlife	
Katie Boden	Environmental Scientist (4 years)	B.S. Fisheries &Wildlife; B.S. Environmental Restoration Science	AWB
Ross Lawrence	Project Engineer (13 years)	B.S. Agricultural Engineering	PE registration (NE, IA, ID)
Ruvarashe Tsoka	Associate Planner (1 year)	Masters in Community and Regional Planning Graduate Certificate in Urban Design B.A. Global Studies	
Seth Anderson	Environmental Junior Scientist (2 years)	B.S. Environmental Studies	
BBC Research and Consulting Staff			
Michael Verdone	Economist (14 years)	Ph.D. Natural Resource Economics	
Thiele Geotech, Inc.			
Brian Gappa	Drilling Manager (25 years)	B.S. Environmental Studies/Earth Science	Certified Well Driller (NE, IA)
Broc Burmeister	Project Geologist (11 years)	B.S. Geology	PG Registration
Collin Steimer	Staff Engineer (3.5 years)	B.S. Civil Engineering	EIT (Engineer In Training)
Reanna Thiele	Vice President /Senior Engineer (11 years)	B.S. & M.S. Civil Engineering	PE Registration (NE, IA)
Buried Past Consulting LLC			
Tod Bevitt	Principal Investigator / Archeologist (28 years)	M.A. Anthropology	
Wendi Bevitt	Historian (24 years)	B.A. History	

Table 25: List of Government Reviewers

Name	Current Title	Agency
Allen Gehring	State Conservation Engineer	USDA NRCS
Melissa Baier	Archeologist	USDA NRCS
Ritch Nelson	Wildlife Biologist	USDA NRCS
Alessandra Sealander	Geologist	USDA-NRCS
Doug Christensen	Economist	USDA NRCS
Jordan Rodriguez	Economist	USDA-NRCS
Robert Sullivan	Dam Safety Engineer	USDA NRCS
Kristen Gordon	Natural Resources Specialist	USDA NRCS
Merceidez June Fabok	Natural Resource Specialist	USDA NRCS
Nicole Zimmerman	Hydrology and Hydraulics Engineer	USDA NRCS
Tom Mountford	Watershed Project Specialist	USDA-NRCS
Kristina Amato	Nebraska Regulatory Office	USACE
Katrina Stanek	Nebraska Regulatory Office	USACE

CHAPTER 10. DISTRIBUTION LIST

The Draft Plan-EA was submitted to the NWMC for review. Following this review, and after comments were addressed, the Draft Plan-EA was distributed to the agencies, organizations, and persons listed below (mailing lists are provided in Chapter 6). The names of private stakeholders and members of the public are not listed for privacy. A public notice was issued stating that the Draft Plan-EA was available for public comment during a 30-day comment period. Agency comments were then evaluated, and a letter of response was sent to each agency. Copies of all correspondence that received, and responses, are available in Appendix A.

Antelope County	Nebraska Department of Transportation
BSNF Railway	Nebraska Game and Parks Commission
Bureau of Reclamation	Nebraska State Archeologist
Cedar County	Office of the Governor
City of Osmond	Pierce County
City of Pierce	US Army Corps of Engineers
City of Plainview	US Department of Agriculture
Federal Emergency Management Agency	US Environmental Protection Agency
Federal Highway Administration Nebraska Division	US Fish and Wildlife Service
History Nebraska	US Geological Survey
Knox County	Village of Foster
Lower Elkhorn Natural Resources District	Village of Magnet
National Park Service	Village of McLean
Natural Resources Conservation Service	Village of Wausa
Nebraska Department of Environment and Energy	Wayne County
Nebraska Department of Natural Resources	
Apache Tribe of Oklahoma	Pawnee Nation of Oklahoma
Cheyenne and Arapaho Tribes of Oklahoma	Ponca Tribe of Indians of Oklahoma
Northern Arapaho Tribe	Ponca Tribe of Nebraska
Northern Cheyenne Tribe	Santee Sioux Nation of Nebraska
Omaha Tribe of Nebraska	Yankton Sioux Tribe