Tentative Agenda for the WAVERLY CITY COUNCIL MEETING to be held on October 28, 2025 at 6:00 PM. This meeting will be held at the Waverly City Office Building, 14130 Lancashire, Waverly, NE 68462. A current Agenda shall be readily available for public inspection at the office of the City Clerk during normal business hours.

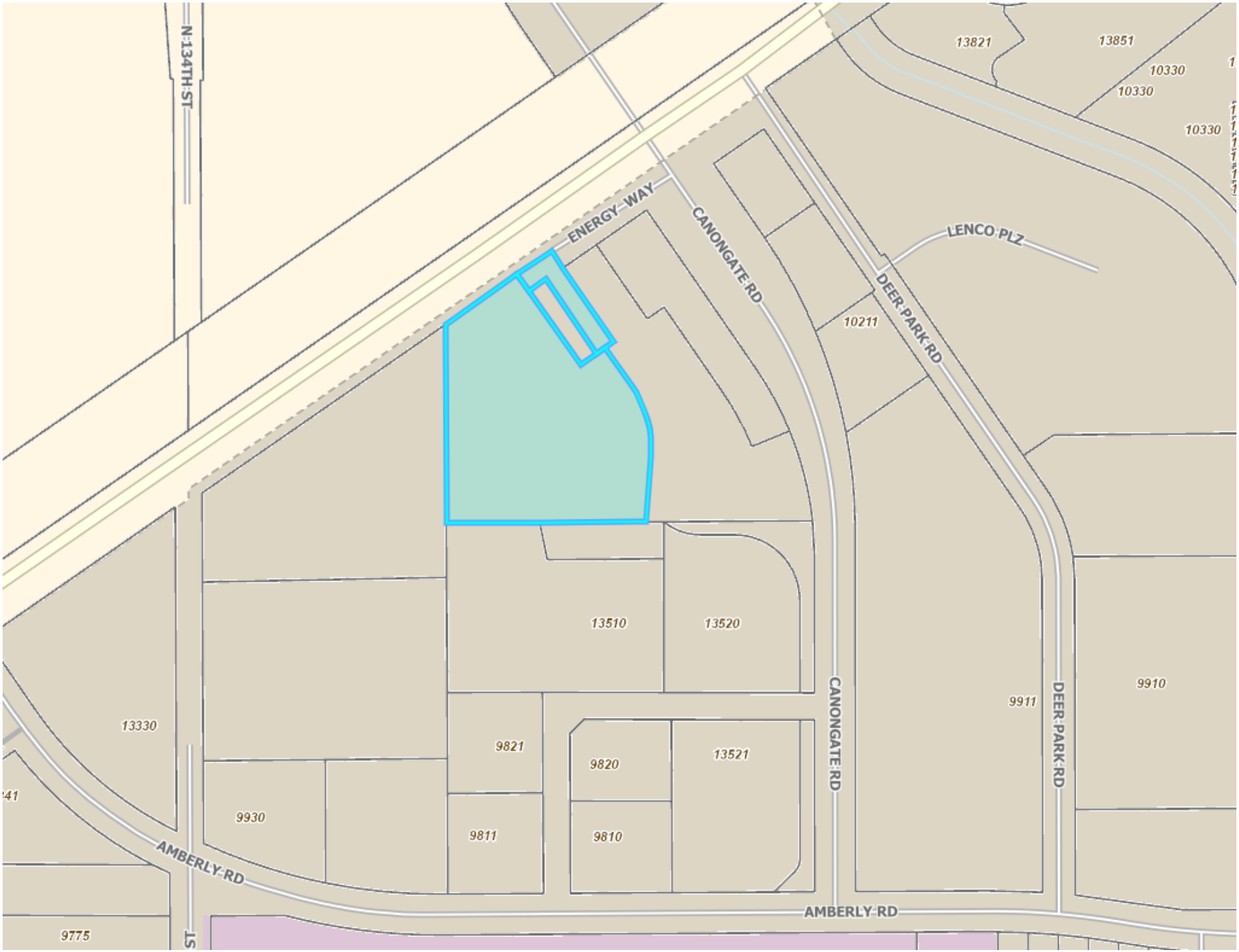
1. **Call to Order**
   - 1.a) Roll Call
   - 1.b) Pledge of Allegiance
   - 1.c) Acknowledgement of the "Open Meetings Act" poster that is posted by the south entrance.
   - 1.d) Adoption of Agenda
   - 1.e) Approval of the Consent Agenda Items*
     All items listed with an asterisk (*) are considered to be routine by the City Council and will be approved by one motion. There will be no separate discussion of these items unless a Council Member or a Citizen so requests, in which event the item will be removed from the Consent Agenda status and considered in its normal sequence on the Agenda.
   - 1.f) Proclamations and Presentations
2. **Purchase of Real Estate**
   - 2.a) Public Hearing: Proposed Purchase of Real Estate at Lot 2 and Outlot A, Oscar Fiene Addition
   - 2.b) Consideration of Resolution 25-26, a Resolution Declaring Intent to Incur Indebtedness to Acquire Land for Municipal Building Improvements and to Reimburse Certain Original Expenditures of the City with the Proceeds of Such Indebtedness.
   - 2.c) Consideration of Real Estate Purchase Agreement by and between Property Investors, LLC and City of Waverly, Nebraska, a Nebraska Municipal Corporation.
3. **Sheriff's Report**
4. **Public Comments**
5. **Approval of Minutes**
   - 5.a) *Minutes of the October 14, 2025 City Council Meeting
6. **Consideration of Claims and Financial Reports**
   - 6.a) Claims for Payment
   - 6.b) Keno & Sales Tax Reports
7. **Introduction of Resolutions**
   - 7.a) Consideration of Resolution 25-27 a Resolution Accepting the Lower Platte South NRD Hazard Mitigation Plan
8. **Introduction of Ordinances**
9. **Introduction of Business and Communications**
   - 9.a) Consideration of Interlocal Agreement with Lincoln Fire and Rescue for Emergency Medical Services from September 1, 2025 through August 31, 2026 in an amount not to exceed $6,731.60 and authorizing the Mayor to sign the agreement.
   - 9.b) Consideration of an interlocal agreement with Lancaster County for construction services on Oldfield Street.
   - 9.c) Consideration of a bid from Gregg Electric Co for Electrical Work at the Wastewater Treatment Facility in an amount not to exceed $28,840.00.

10. **Committee Reports**
    - 10.a) Human Services (Park & Recreation): Council Member Stark
    - 10.b) Public Works (Utilities & Street): Council Member Delahoyde
    - 10.c) Public Health (Fire & Safety): Council Member Jespersen
    - 10.d) Fiscal & Economic Development: Council Member Nielson
    - 10.e) City Administrator Fisher
11. **Adjournment**

The Governing Body reserves the right to go into Executive Session at any time for the reasons outlined in State Statute 84-1410.

The following rules are established for audience members and participants at a Council meeting:

(1) Any person wishing to address the Council shall first state their name and address.
(2) Public comments may be for agenda or non-agenda items.
(3) Remarks shall be limited to five (5) minutes.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RESOLUTION NO. 25-26

A RESOLUTION DECLARING INTENT TO INCUR INDEBTEDNESS TO ACQUIRE LAND FOR MUNICIPAL BUILDING IMPROVEMENTS AND TO REIMBURSE CERTAIN ORIGINAL EXPENDITURES OF THE CITY WITH THE PROCEEDS OF SUCH INDEBTEDNESS.

BE IT RESOLVED BY THE MAYOR AND CITY COUNCIL OF THE CITY OF WAVERLY, NEBRASKA:

Section 1. The Mayor and Council hereby find and determine that it is necessary and appropriate to declare an official intent to issue tax-exempt bond anticipation notes, municipal improvement bonds, or other tax-exempt bonds or bond anticipation notes of the City of Waverly, Nebraska (the "City") and, in addition, to declare the City's reasonable expectations to reimburse certain expenditures with the proceeds of such bond anticipation notes or bonds as proposed to be issued by the City in connection with the acquisition of land for a city hall/recreational center facility, together with engineering, legal, financing, and other related costs.

Section 2. This resolution shall stand as a statement of the official intent of the City under Regulation Section 1.150-2 and for such purpose the following information is hereby given:

(a) The project for which expenditures may be made is the acquisition of land for a city hall/recreational center facility, together with engineering, legal, financing, and other related costs.

(b) The principal amount of the bonds or notes expected to be issued by the City for the project as authorized by Nebraska statutes is estimated to be $1,250,000. The City anticipates that up to the entire amount of project costs incurred by the City prior to the issuance of such notes or bonds may be reimbursed to the City from the proceeds of the bonds.

PASSED AND APPROVED this 28th day of October, 2025.

_____
Abbey L. Pascoe, Mayor

ATTEST:

_____
Megan K. Frye, City Clerk

[SEAL]

REAL ESTATE PURCHASE AGREEMENT

This Real Estate Purchase Agreement ("Agreement") is entered into effective as of the date of the last party to sign ("Effective Date") and is made by Property Investors LLC, a Nebraska limited liability company ("Seller") and the City of Waverly, a Nebraska municipal corporation ("Buyer"). Seller and Buyer are at times collectively referred to herein as the "Parties".

WHEREAS, Seller owns real property in Lancaster County, Nebraska legally described as **Lot 2 and Outlot A, Oscar Fiene Addition, City of Waverly, Lancaster County, Nebraska**, all improvements, fixtures, structures, attachments, and all rights, privileges, easements, and appurtenances existing thereupon or under or appurtenant thereto (the "Property");

WHEREAS, Buyer has held a public hearing regarding Buyer's potential acquisition of the Property and the City Council of Waverly, Nebraska subsequently approved the terms of this Agreement in accordance with Nebraska Revised Statute § 18-1755; and

WHEREAS, Seller desires to sell the Property, and Buyer desires to purchase the Property from Seller, in accordance with the terms and conditions set forth herein:

1. **Agreement to Purchase**. Seller shall sell to Buyer, and Buyer shall purchase from Seller, upon the terms and subject to the conditions set forth herein, the Property.

2. **Purchase Price and Earnest Deposit**. The purchase price for the Property shall be One Million Two Hundred Six Thousand One Hundred Dollars and No/100 Dollars ($1,206,100.00) (the "Purchase Price"). The Purchase Price, subject to allocations and credits as provided for herein, shall be payable in certified funds at Closing. Within three (3) business days after the Effective Date, Buyer shall deposit with the Closing Agent the sum of Twenty-Five Thousand Dollars ($25,000.00) (the "Earnest Money Deposit") to be held in escrow and applied toward the Purchase Price at Closing. The Earnest Money Deposit shall be fully refundable to Buyer at any time prior to December 23, 2025, if this Agreement is terminated for any reason permitted under this Agreement, including during or after the Due Diligence Period or if the Agreement terminates due to Seller's breach or failure of a condition to Buyer's obligations. On and after December 23, 2025, the Earnest Money Deposit shall become nonrefundable, except in the event of Seller's breach or failure of a condition to Buyer's obligations. If Buyer breaches this Agreement or fails to close for reasons other than Seller's breach or failure of a condition to Buyer's obligations, the Earnest Money Deposit shall be paid to Seller as liquidated damages.

3. **Personal Property**. No personal property is included in this transaction.

4. **Conveyance of Title**. At Closing, Seller shall deliver a special warranty deed ("Warranty Deed") granting and conveying good and marketable title to the Property in fee simple absolute to Buyer, free and clear of all liens and encumbrances and subject only to the Permitted Exceptions (as defined below).

5. **Title Insurance.**

a. **Title Commitment**. Buyer shall obtain a preliminary title commitment ("Commitment") for an ALTA Owner's Policy of Title Insurance issued through a title company acceptable to Buyer (the "Title Company" or sometimes referred to herein as the "Closing Agent"), committing the Title Company to issue an ALTA insurance policy or such other policy as determined by Buyer (the "Title Insurance Policy") insuring Buyer's fee title interest in the Property in an amount equal to the Purchase Price, and subject only to the Permitted Exceptions. Seller agrees to execute and deliver to the Title Company such affidavits, indemnity agreements, and other documents as may be reasonably required by the Title Company to delete the standard exceptions on Schedule B, Section II of the Commitment.

b. **Exceptions to Title.** Any easement, covenant, restriction of record, or other exception listed on the Commitment and any encroachment or exception which is not objected to by Buyer as provided herein (or which is objected to by Buyer as provided herein but is subsequently waived by Buyer), shall constitute a permitted exception (each a "Permitted Exception" and collectively, the "Permitted Exceptions"). Written notice of any easement, covenant, restriction of record, or other exception listed on the Commitment which Buyer objects to shall be delivered to Seller at least three (3) calendar days prior to Closing. Buyer shall be deemed to object to any and all mortgages, deeds of trust and other liens against the Property which appear in the Commitment, and Buyer shall not be required to provide Seller with written notice of any such objection. Seller shall have ten (10) calendar days to remove or otherwise cure any objection at Seller's expense. The date of the Closing shall be adjusted, if necessary, to allow Seller to utilize the full ten (10) day period to cure the objection(s). If Seller refuses or otherwise fails to remove or cure any title objection within the time prescribed, then Buyer may (i) terminate this Agreement; or (ii) waive the objection and take title to the Property subject to the easement, covenant, restriction of record, or other exception listed on the Commitment that Seller has refused or been unable to remove or otherwise cure.

c. **Title Insurance Policy**. Buyer shall pay the cost of the premium for the Title Insurance Policy.

6. **Real Estate Taxes.** Seller shall pay the real estate taxes levied and assessed against the Property for all calendar years preceding the calendar year in which Closing occurs. Real estate taxes for the calendar year in which Closing occurs (and which are due and delinquent in the following year) shall be prorated to the date of Closing, with Seller being responsible for the real estate taxes for the prorated period prior to the date of Closing. The taxes shall be prorated on the basis of the most recent assessed valuation and the most recent tax rate available from the appropriate government body at the time of the Closing, net of any applicable tax credits.

7. **Due Diligence**. From and after the Effective Date hereof and ending at 5:00 PM Central Time on the date that is forty-five (45) days after the Effective Date (the "Due Diligence Period"), Buyer and its agents shall have the right and option to conduct and to enter onto the Property for the purpose of conducting such inspections and tests of the Property, and to perform such other analyses, inquiries, and investigations, as Buyer, in its sole and absolute discretion, shall deem necessary or appropriate for Buyer's intended use and purposes for acquiring the Property. If Buyer has not yet received one or more of the following due diligence items by the end of the initial forty-five (45) day period: (i) title commitment, (ii) the survey, or (iii) the Phase I environmental report, then the Due Diligence Period shall be automatically extended until the date that is five (5) business days after Buyer's receipt of the last outstanding item, but in no event shall the Due Diligence Period extend beyond December 23, 2025. In the event that Buyer determines, in Buyer's sole and absolute discretion, that Buyer does not desire, for any reason or no reason whatsoever, to acquire the Property, Buyer shall provide written termination notice to Seller before the end of the Due Diligence Period (as may be extended under this Section 7). Upon such termination, this Agreement shall terminate as of the date such termination notice is delivered by Buyer, and thereupon, neither party shall have any further rights or obligations to the other party hereunder. After the Due Diligence Deadline, Buyer's right to terminate under this Section 8 shall expire, and Buyer shall be obligated to proceed to Closing subject only to the other express conditions set forth in this Agreement and refund provisions of Section 2. Such extension shall occur automatically and shall not require notice or further agreement of the Parties.

8. **Closing.**

a. **Date and Place of Closing.** The date of closing of this sale shall be on or before December 23rd, 2025 (the "Closing"). The Closing shall occur on such date unless the Parties mutually agree otherwise in writing

b. **Closing Costs and Adjustments**. Seller shall pay at Closing: (1) Seller's share of the prorated real estate taxes; (2) one-half of the cost of the Closing Agent's closing fees. Buyer shall pay at Closing: (1) one-half of the cost of the Closing Agent's closing fees; (2) the cost of recording the warranty deed; and (3) the cost of the Title Insurance premium. Seller shall pay all documentary stamp taxes or other transfer taxes associated with the conveyance of the Property.

9. **Condition of Property.** Seller represents to the best of Seller's knowledge, information and belief, there are no latent defects in the Property nor any conditions present or existing with respect to the Property which may give rise to or create environmental hazards or liabilities and there are no enforcement actions pending or threatened with respect thereof. Seller agrees to maintain the Property in its current condition until Closing and delivery of possession to Buyer. Seller represents and warrants that it has full right, power, and authority to enter into this Agreement and convey the Property; that there are no pending or threatened actions, suits, or proceedings that would affect Seller's ability to perform under this Agreement or adversely affect the Property; and that no condemnation or other governmental proceedings are pending or threatened with respect to the Property. Seller represents that Seller has not received any notice of any environmental, zoning, building code, or other regulatory violation affecting the Property and that no such violations exist to Seller's knowledge.

10. **Possession, Maintenance, and Risk of Loss.**

a. **Possession**. Seller will deliver possession of the Property to Buyer effective as of the time of Closing. Seller shall insure the Property until possession of the Property has been delivered to Buyer.

b. **Maintenance of Property**. Prior to Closing, Seller shall commit no waste upon the Property and shall maintain the Property in its present condition. Seller will allow Buyer access to the Property upon request and within twenty-four (24) hours prior to Closing to confirm compliance with this provision.

c. **Risk of Loss**. Seller shall maintain the risk of loss to the Property until possession of the Property has been transferred to Buyer at the Closing. If, prior to Closing, the Property is materially damaged, then Buyer shall have the right to terminate this Agreement. From and after the time in which Buyer receives possession of the Property at the Closing, Buyer shall have the risk of loss to the Property.

11. **Breach.**

a. **Seller's Breach**. If Seller breaches this Agreement or fails to close for reasons other than Buyer's breach or failure of a condition to Seller's obligations, Buyer may, as its sole and exclusive remedy, either: (i) terminate this Agreement and receive return of any amounts paid to Seller, if any; or (ii) seek specific performance of this Agreement. IN NO EVENT SHALL SELLER BE LIABLE FOR CONSEQUENTIAL, SPECIAL, INDIRECT, OR PUNITIVE DAMAGES.

b. **Buyer's Breach**. If Buyer breaches this Agreement or fails to close for reasons other than Seller's breach, failure of a condition to Buyer's obligations, or Buyer's permitted termination under this Agreement, Seller shall retain the Earnest Money Deposit as liquidated damages, which shall constitute Seller's sole and exclusive remedy. The Parties acknowledge and agree that Seller's actual damages resulting from Buyer's breach would be difficult or impossible to determine with certainty, and that the Earnest Money Deposit represents a reasonable estimate of such damages and is not a penalty. Upon Seller's retention of the Earnest Money Deposit, this

Agreement shall terminate and neither Party shall have any further obligations to the other except those that expressly survive termination. For avoidance of doubt, Buyer's termination of this Agreement after the expiration of the Due Diligence Period but prior to Closing, in accordance with Section 2, shall not constitute a breach, and the Earnest Money Deposit shall be distributed as provided therein.

12. **Assignment**. Buyer may assign this Agreement without Seller's consent to: (a) another governmental entity, department, or instrumentality of the City of Waverly or the Community Redevelopment Authority; or (b) a non-profit organization formed to facilitate the redevelopment contemplated by this Agreement. Buyer shall provide written notice to Seller at least ten (10) business days prior to Closing identifying any assignee. Any other assignment shall require Seller's prior written consent, not to be unreasonably withheld, conditioned, or delayed.

13. **Integration and Modification**. This Agreement contains all the agreements and conditions made between the parties, and no statement, promise, representation, or inducement relating hereto which is not contained herein shall be valid or binding. This Agreement may be modified or amended only by a writing signed by all parties hereto.

14. **Waiver**. No waiver of any of the provisions of this Agreement shall be deemed, or shall constitute, a waiver of any other provision, whether or not similar, nor shall any waiver constitute a continuing waiver. No waiver shall be binding unless executed in writing by the party making the waiver.

15. **Notice**. All notices and demands herein required shall be in writing and shall be hand-delivered or sent by certified mail or electronic mail to the persons at the address designated by each party.

16. **Binding Effect**. This Agreement shall be binding upon the parties hereto and their respective heirs, administrators, devisees, representatives, affiliates, successors, and assigns.

17. **Time is of the Essence**. Time shall be of the essence with respect to all the terms and provisions of this Agreement.

18. **Nebraska Law**. This Agreement shall be construed and enforced in accordance with the laws of the State of Nebraska.

19. **Knowing and Voluntary**. Each party hereto represents that each had the opportunity to thoroughly discuss all aspects of this Agreement and the entire transaction contemplated by this Agreement with their attorney(s) or other advisors before signing and that they have thoroughly discussed, or, in the alternative, have freely elected to waive any further opportunities to thoroughly discuss this Agreement and the entire transaction contemplated by this Agreement with their attorneys or advisors. The parties further acknowledge that Rembolt Ludtke LLP, is acting as legal counsel to Buyer, and is not acting as legal counsel to any other party.

20. **Signatures**. Emailed copies of signed documents in pdf, or faxed copies of signed documents, are valid the same as originals; this Agreement may be signed in counterparts.

21. **Survival.** The representations and warranties of Seller set forth in Section 11 shall survive Closing for a period of twelve (12) months. All other terms and conditions shall survive Closing only to the extent necessary to enforce rights accruing prior to Closing.

22. **Sovereign Immunity.** Nothing in this Agreement shall be construed as a waiver of Buyer's governmental or sovereign immunity or any statutory limitation of liability under Nebraska law.

23. **Public Records.** Buyer is a public entity subject to the Nebraska Public Records Act, Neb. Rev. Stat. §84-712 et seq. The Parties acknowledge that this Agreement and related documents may be subject to public disclosure under applicable law.

24. **Brokers.** Each Party represents and warrants that no real estate broker, agent, or finder has been involved in this transaction and that no brokerage commissions or fees are owed or will be paid by either Party in connection with this transaction. Each Party agrees to indemnify, defend, and hold harmless the other Party from any claim for brokerage commissions or fees arising out of its actions. Monte L. Froehlich, an individual, is a licensed real estate broker in the State of Nebraska, acting on his own behalf with the intent to make a profit.

[SIGNATURE PAGE FOLLOWS]

THIS AGREEMENT is made effective as of the Effective Date:

SELLER:

Property Investors LLC

By: _____ Date: 10-28-25
Monte Froehlich, Managing Member

STATE OF NEBRASKA)
) ss.
COUNTY OF LANCASTER)

The foregoing instrument was acknowledged before me on this 28 day of October, 2025, by MONTE FROEHLICH, Managing Member of Property Investors LLC.

General Notary - State of Nebraska
JESSICA LINDERSMITH
My Comm. Expires Apr. 22, 2027

_____
Notary Public

BUYER:

City of Waverly, Nebraska

By: _____ Date: _____
Abbey Pascoe, Mayor

Attest:

_____ (Seal)
Megan Frye, City Clerk

4930-6663-8197, v. 1

MINUTES OF A WAVERLY CITY COUNCIL MEETING HELD ON OCTOBER 14, 2025

CALL TO ORDER
Mayor Abbey Pascoe called the meeting to order at 6:00 p.m. and led those in attendance in reciting the Pledge of Allegiance. Pascoe acknowledged the Open Meetings Act Poster located on the south wall of the Council Chambers. Mayor Abbey Pascoe and Council Members David Jespersen, Dave Nielson, Aaron Delahoyde, and Allison Stark were in attendance. Other City Officials present were City Administrator Stephanie Fisher and City Clerk Megan Frye. Others present were Fire Chief/Emergency Services Coordinator Robin Hoffman, Disaster Preparedness Manager Terry Spoor, and Lancaster County Sheriff Deputy Jason Brownell. Notice of the Meeting and Agenda were given to the Mayor and all Members of the City Council prior to the Meeting. Notice of the Meeting was posted at Russ's Market Express, the US Post Office, the City Office, and the City website (citywaverly.com).

ADOPTION OF AGENDA
Council Member Jespersen moved to adopt the Agenda as presented. Council Member Nielson seconded the motion.
The following Council Members voted "YEA": Jespersen, Nielson, Delahoyde, and Stark. The following Council Members voted "NAY": None. Motion Carried. 4-0.

APPROVAL OF CONSENT AGENDA
Minutes of the September 23, 2025 City Council Meeting
Minutes of the September 23, 2025 Budget Hearing
Consideration of Resolution 25-24 authorizing temporary street closures for Waverly Fire/Rescue parade on Sunday, December 7, 2025.

Council Member Jespersen moved to approve the Consent Agenda. Council Member Nielson seconded the motion.
The following Council Members voted "YEA": Nielson, Delahoyde, Stark, and Jespersen. The following Council Members voted "NAY": None. Motion Carried. 4-0.

PROCLAMATIONS AND PRESENTATIONS
None.

PUBLIC HEARINGS
None.

SHERIFF'S REPORT
Deputy Brownell shared the recent LSO shift bid is seniority-based: continuing Jones on days and Brownell on nights, and adding Lavene on nights. Brownell shared it is my 25th anniversary with Lancaster County Sheriff Department.

PUBLIC COMMENTS
None.

APPROVAL OF MINUTES
Minutes of the September 23, 2025 City Council Meeting
Consent Agenda.

Minutes of the September 23, 2025 Budget Hearing
Consent Agenda.

CONSIDERATION OF CLAIMS AND FINANCIAL REPORTS

Claims for Payment

Claims for Payment: September 24th - October 14th, 2025		
Group A		
Vendor	**Description**	**Amount**
Joy Maag	Utility Deposit Refund	$ 100.00
Zach & Mary Mendoza	Utility Deposit Refund	$ 100.00
Lance & Brittany Schmohr	Utility Deposit Refund	$ 100.00
Jacoby & Natalie Sommer	Utility Deposit Refund	$ 100.00
The Mix, LLC	Utility Deposit Refund	$ 100.00
Sandra Verstraete	Utility Deposit Refund	$ 100.00
Teran & Anne Walford	Utility Deposit Refund	$ 100.00
Todd Williams	Utility Deposit Refund	$ 100.00
Aden Brummer	Flag football referee	$ 240.00
ADP Fees	Payroll Fees	$ 216.35
ADP Fees	Payroll Fees	$ 136.47
ADP Payroll	Payroll	$ 39,816.97
ADP Payroll	Payroll	$ 43,066.23
Aerzen USA Corp.	Drive shaft sealing kit	$ 557.97
Allo Communications	Phone/Internet Services	$ 973.68
Ball Insurance Services	Fire Department Insurance	$ 5,618.20
Barco Municipal Products Inc.	Street signs	$ 775.68
Black Hills Energy	Natural gas	$ 172.97
Caden Cerny	Flag football referee	$ 680.00
Capitol City Electric	Sensor setup	$ 500.00
Carquest Auto Parts	Gloves, oil & filters	$ 72.55
Colonial Life	Insurance	$ 65.88
Commonwealth Electric Company	Unhook temp generator to ATS	$ 460.00
Core & Main	Hydrant lubricant	$ 44.58
Cubby's, Inc.	Fuel	$ 1,873.07
DataVizion, LLC	Microsoft 365 Business, Support	$ 1,900.26
Consolidated Elect.Distributor	SQD Drive	$ 184.15
Filament Essential Services	SOCS Web Hosting Services	$ 3,050.00
Hawkins, Inc.	Supplies	$ 12,844.83
Hayden Demuth	Flag football referee	$ 480.00
HBE LLP	Preparation 2025-2026 Budget	$ 3,315.00
Heritage Landscape Supply	Sprinkler repair	$ 2,088.00
Horizon Bank	Monthly ACH Fees	$ 10.00
Huber Technology, Inc.	WWTP sludge press brush kit	$ 8,682.78
IWORQ	Software Management & Support	$ 5,083.33
Jaydon Pribyl	Flag football referee	$ 600.00
JEO Consulting Group, Inc.	Comp. Safety Action Plan	$ 38,415.50
John Hancock USA	Retirement	$ 3,319.96
John Hancock USA	Retirement	$ 3,648.03
Jones Group	Fire department property insurance	$ 23,707.00
Kevin LaPage	Degritter pump repair	$ 360.00
Lancaster Co.Sheriff Office	October 2025	$ 38,759.00
LARM	2025-2026 Insurance	$ 159,218.50
Life-Assist, Inc.	Medical Supplies	$ 3,210.44

Lincoln Electric System	Electricity	$	5,846.53
MacQueen Emergency	Helmet fronts	$	169.00
Matheson Tri-Gas, Inc.	Oxygen bottle rental	$	56.35
Megan Frye	Parking reimbursement	$	21.00
Midwest Laboratories, Inc.	Lab fees	$	977.66
NCE Empowering Safety	Lifepak mounting system	$	2,758.00
Nebraska Dept Revenue Waste	Recycling Fee	$	25.13
Nebraska Dept Revenue Waste	Utility Sales Tax	$	10,725.62
Odey's Inc.	Linestripe paint	$	769.45
One Billing Solutions	September 2025 Billing-EMS	$	1,546.98
One Call Concepts, Inc.	One-Call Service	$	70.75
Pavers Inc.	Cold mix asphalt & road gravel	$	547.47
Pinnacle Bank	Santa Express printable tickets	$	23.99
Pinnacle Bank	Conference, spreader, junior firefighter badges, park supplies, flags	$	2,332.00
Production Creek Specialty Adv	Employee clothing	$	244.50
Quik Dump Refuse	Garbage Service	$	689.33
Railroad Management Co. III, LLC	10" Water Pipeline Crossing, 12" & 12.75" Sewer Pipeline Crossing	$	1,376.28
Reimers Kaufman Concrete Prod	Concrete bunker blocks	$	2,802.50
Rembolt Ludtke LLP	Legal Fees	$	3,000.00
SENAHC	Middle Income Workforce Housing	$	10,000.00
Shaffer Communications	Radio battery	$	139.35
Small Engine Specialists	Spreader & brushcutter	$	1,079.47
Sunbelt Rentals,Inc.	Forklift rental	$	525.80
Text My Gov, Inc.	Text My Gov Annual Software	$	6,000.00
The Fort	Clothing Allowance	$	413.92
The Voice News	Advertising & Printing	$	1,022.01
Traffic and Parking Control Co	Street signs socket/anchors	$	1,232.00
Travelers - RMD	FD Workers Compensation Plan	$	1,181.00
U.S. Bank Equipment Finance	Ricoh Copier	$	143.95
ULINE	Shelf bins and dividers	$	240.47
Uribe Refuse Services	Restroom Rental	$	96.00
USA Blue Book	Hydrant flushing parts, reagent, green paint, marking flags	$	3,091.66
Verizon Wireless	Phone Service	$	488.74
Visual Edge IT	Copies	$	136.31
Walker Process Equipment	Clarifier repair parts	$	4,403.10
RecDesk	Monthly Deposit Charge	$	25.00
RecDesk	Monthly Deposit Charge	$	25.00
Sam's Club	Halloween candy - fire dept.	$	134.20
Point C	Health Reimbursement Account	$	383.00
	Claims Group A Total	**$**	**469,690.90**

Council Member Jespersen moved to approve claims in the amount of $469,690.90. Council Member Nielson seconded the motion.
The following Council Members voted “YEA”: Delahoyde, Stark, Jespersen, and Nielson. The following Council Members voted “NAY”: None. Motion Carried. 4-0.

Treasurer's Report and Budget & Expense Report
Council Member Jespersen moved to approve Treasurer's Report and Budget & Expense Report. Council Member Nielson seconded the motion.
The following Council Members voted "YEA": Stark, Jespersen, Nielson, and Delahoyde. The following Council Members voted "NAY": None. Motion Carried. 4-0.

INTRODUCTION OF RESOLUTIONS
Consideration of Resolution 25-24 authorizing temporary street closures for Waverly Fire/Rescue parade on Sunday, December 7, 2025.
Consent Agenda.

RESOLUTION 25-24

RESOLUTION AUTHORIZING THE TEMPORARY CLOSING OF OLDFIELD STREET FROM N 141ST TO CANONGATE ROAD; CANONGATE ROAD FROM OLDFIELD STREET TO KENILWORTH STREET; KENILWORTH STREET FROM CANONGATE ROAD TO N 142ND STREET; N 142ND STREET FROM KENILWORTH STREET TO LANCASHIRE STREET; LANCASHIRE STREET FROM N 142ND STREET TO WOODSTOCK STREET; AND WOODSTOCK STREET FROM LANCASHIRE TO N 148TH STREET FROM 4:30 P.M. TO 7:00 P.M. ON SUNDAY, DECEMBER 7, 2025

WHEREAS, Waverly Fire and Rescue has requested approval to hold a parade for the 2024 Santa Express and Tree Lighting event on December 7, 2025; and

WHEREAS, they have requested the temporary closing of Oldfield Street from N 141st Street to Canongate Road; Canongate Road from Oldfield Street to Kenilworth Street; Kenilworth Street from Canongate Road to N 142nd Street; N 142nd Street from Kenilworth Street to Lancashire Street; Lancashire Street from N 142nd Street to Woodstock Street; and Woodstock Street from Lancashire Street to N 148th Street from 4:30 p.m. to 7:00 p.m. on Sunday, December 7, 2025; and

WHEREAS, the City of Waverly has agreed to provide the necessary signage barricades to prohibit vehicular traffic from 4:30 p.m. to 7:00 p.m. at the outlined locations with the understanding that the volunteers of the Waverly Fire and Rescue Department will install the barricades by 4:30 p.m. and remove the barricades by 7:00 p.m. on Sunday, December 7, 2025.

NOW THEREFORE, BE IT RESOLVED BY THE MAYOR AND CITY COUNCIL OF WAVERLY, NEBRASKA that barricades be provided and placed by 4:30 p.m. on December 7, 2025 to prohibit vehicular traffic except emergency vehicles on Oldfield Street from N 141st Street to Canongate Road; Canongate Road from Oldfield Street to Kenilworth Street; Kenilworth Street from Canongate Road to N 142nd Street; N 142nd Street from Kenilworth Street to Lancashire Street; Lancashire Street from N 142nd Street to Woodstock Street; and Woodstock Street from Lancashire Street to N 148th Street after 4:30 p.m. on December 7, 2025 until 7:00 p.m. on December 7, 2025.

PASSED AND APPROVED THIS 14TH DAY OF OCTOBER, 2025.

Consideration of Resolution 25-25 adopting and revising the Employee Handbook
Council Member Jespersen moved to approve Resolution 25-25 adopting and revising the Employee Handbook. Council Member Nielson seconded the motion.

City Administrator Fisher explained the amendments include a adding a job description of Fire Department Administrative Assistant and adding paid time off and retirement to the Municipal Code Inspector job description.

The following Council Members voted "YEA": Jespersen, Nielson, Delahoyde, and Stark. The following Council Members voted "NAY": None. Motion Carried. 4-0.

RESOLUTION 25-25

RESOLUTION ADOPTING AND REVISING THE EMPLOYEE HANDBOOK

WHEREAS, the establishment of rules and regulations for the hiring and continued employment of City personnel is of benefit to the City, and
WHEREAS, it is advantageous for City personnel to know their rights and terms of employment.

NOW, THEREFORE, BE IT RESOLVED BY THE MAYOR AND CITY COUNCIL OF THE CITY OF WAVERLY, NEBRASKA that the Employee Handbook as revised on November 27, 2018, incorporates revisions to the following sections:

PAY PLAN
JOB DESCRIPTIONS

The additions and changes in the above stated sections shall be in full force and effect and is hereby adopted as policy.

PASSED AND APPROVED THIS 14TH DAY OF OCTOBER, 2025.

INTRODUCTION OF ORDINANCES
Consideration of the First Reading of Ordinance 25-23, amending Chapter 90 of the Waverly Municipal Code, relating to Leisure and Recreation: Parks; Hours.
Council Member Jespersen moved to approve the First Reading of Ordinance 25-23, amending Chapter 90 of the Waverly Municipal Code, relating to Leisure and Recreation: Parks; Hours. Council Member Nielson seconded the motion.

City Administrator Fisher read the ordinance by title:
ORDINANCE NO. 25-23, AN ORDINANCE OF THE CITY OF WAVERLY, NEBRASKA, AMENDING CHAPTER 90 OF THE WAVERLY MUNICIPAL CODE RELATING TO LEISURE AND RECREATION; PARKS; HOURS.

Fisher stated the Parks Committee is committed to working with LSO to ensure safety in our parks, they have recommended we adjust hours taking into consideration the pool closing time to allow adequate time to exit the park. Council Members discussed the proposed opening time of 6:00 a.m., taking into consideration early morning park walkers. Brownell advised the evening hours are the focus for safety.

Council Member Stark moved to amend the hours closed from 10:30 p.m. to 5:00 a.m. Council Member Nielson seconded the motion.
The following Council Members voted "YEA": Nielson, Delahoyde, Stark, and Jespersen. The following Council Members voted "NAY": None. Motion Carried. 4-0.

Council Member Nielson moved to suspend the rules and waive the requirement of three readings and move to Third and Final Reading of Ordinance 25-23. Council Member Delahoyde seconded the motion. The following Council Members voted "YEA": Delahoyde, Stark, Jespersen, and Nielson. The following Council Members voted "NAY": None. Motion Carried. 4-0.

Vote to Pass Ordinance 25-23 on Third and Final Reading, as amended, the following Council Members voted "YEA": Stark, Jespersen, Nielson, and Delahoyde. The following Council Members voted "NAY": None. Motion Carried. 4-0.

ORDINANCE NO. 25-23

AN ORDINANCE OF THE CITY OF WAVERLY, NEBRASKA, AMENDING CHAPTER 90 OF THE WAVERLY MUNICIPAL CODE RELATING TO LEISURE AND RECREATION; PARKS; HOURS.

BE IT ORDAINED BY THE MAYOR AND CITY COUNCIL OF THE CITY OF WAVERLY, LANCASTER COUNTY, NEBRASKA:

Section 1. That Section 90.03 contained within Chapter 90 of the Waverly Municipal Code be amended to read as follows:

§ 90.03 HOURS.

Municipal Parks shall be closed to all activity, except law enforcement vehicles, from the hours of ten thirty (10:30) p.m. to five o'clock (5:00) a.m. year-round. *(Amended by Ord. No. 08-17, 10/6/08; 12-23, 10/16/12)*

Section 2. That any ordinance in conflict with this ordinance is hereby repealed.

Section 4. This ordinance shall be in full force and take effect from and after its passage, approval and publication according to the law.

PASSED AND APPROVED THIS 14TH DAY OF OCTOBER, 2025.

Consideration of the First Reading of Ordinance 25-24, amending Chapter 131 of the Waverly Municipal Code, relating to Miscellaneous Misdemeanors: Park Hours.
Council Member Jespersen moved to approve the First Reading of Ordinance 25-24, amending Chapter 131 of the Waverly Municipal Code, relating to Miscellaneous Misdemeanors: Park Hours. Council Member Nielson seconded the motion.

City Administrator Fisher read the ordinance by title:
ORDINANCE NO. 25-24, AN ORDINANCE OF THE CITY OF WAVERLY, NEBRASKA, AMENDING CHAPTER 131 OF THE WAVERLY MUNICIPAL CODE RELATING TO MISCELLANEOUS MISDEMEANORS; PARK HOURS.

Council Member Stark moved to amend the hours closed from 10:30 p.m. to 5:00 a.m. Council Member Nielson seconded the motion.
The following Council Members voted "YEA": Jespersen, Nielson, Delahoyde, and Stark. The following Council Members voted "NAY": None. Motion Carried. 4-0.

Council Member Nielson moved suspend the rules and waive the requirement of three readings and move to Third and Final Reading of Ordinance 25-24. Council Member Delahoyde seconded the motion.
The following Council Members voted "YEA": Delahoyde, Stark, and Jespersen. The following Council Members voted "NAY": Nielson. Motion Carried. 3-1.

Terry Spoor asked the council to consider the regular procedure of three readings when adopting an ordinance to allow ample time for citizens to review the changes and called for transparency. Fisher advised we will update the park hours displayed on park signs. Brownell discussed citation procedures. Council Members discussed.

Vote to Pass Ordinance 25-24 on Third and Final Reading, as amended. The following Council Members voted "YEA": Stark, Jespersen, Nielson, and Delahoyde. The following Council Members voted "NAY": None. Motion Carried. 4-0.

ORDINANCE NO. 25-24

AN ORDINANCE OF THE CITY OF WAVERLY, NEBRASKA, AMENDING CHAPTER 131 OF THE WAVERLY MUNICIPAL CODE RELATING TO MISCELLANEOUS MISDEMEANORS; PARK HOURS.

BE IT ORDAINED BY THE MAYOR AND CITY COUNCIL OF THE CITY OF WAVERLY, LANCASTER COUNTY, NEBRASKA:

Section 1. That Section 131.17 contained within Chapter 131 of the Waverly Municipal Code be amended to read as follows:

§ 131.17 PARK HOURS.

It shall be unlawful for any person to loiter, wander, stroll, loaf, or play in or upon any of the City parks between the hours of ten thirty (10:30) p.m. on any day and five (5:00) o'clock a.m. of the following day. Any person who violates this section shall be guilty of a Class I Misdemeanor as defined by §131.22 of this Code. *(Amended by Ord.01-07, 6/4/01, 07-05, 5/7/07)*

Section 2. That any ordinance in conflict with this ordinance is hereby repealed.

Section 4. This ordinance shall be in full force and take effect from and after its passage, approval and publication according to the law.

PASSED AND APPROVED THIS 14TH DAY OF OCTOBER, 2025.

INTRODUCTION OF BUSINESS AND COMMUNICATIONS

Consideration of the purchase of safety stairs for the Wastewater Treatment Facility in an amount not to exceed $12,313.00.

Council Member Jespersen moved to approve the purchase of safety stairs for the Wastewater Treatment Facility in an amount not to exceed $12,313.00. Council Member Nielson seconded the motion.

The following Council Members voted "YEA": Jespersen, Nielson, Delahoyde, and Stark. The following Council Members voted "NAY": None. Motion Carried. 4-0.

Consideration of the purchase of a ladder for Well #7 in an amount not to exceed $6,564.00.

Council Member Jespersen moved to approve the purchase of a ladder for Well #7 in an amount not to exceed $6,564.00. Council Member Nielson seconded the motion.

The following Council Members voted "YEA": Nielson, Delahoyde, Stark, and Jespersen. The following Council Members voted "NAY": None. Motion Carried. 4-0.

Consideration of Interlocal Agreement with Lincoln Fire and Rescue for Emergency Medical Services from September 1, 2025 through August 31, 2026 in an amount not to exceed $6,731.60 and authorizing the Mayor to sign the agreement.
Council Member Jespersen moved to approve Interlocal Agreement with Lincoln Fire and Rescue for Emergency Medical Services from September 1, 2025 through August 31, 2026 in an amount not to exceed $6,731.60 and authorizing the Mayor to sign the agreement. Council Member Nielson seconded the motion.

Fire Chief Hoffman, who is also the Secretary/Treasurer for Lancaster County Mutual Aid, shared differences of this contract: it is now a 10-year agreement with 5% annual increase; LFR is not willing to negotiate; at least two other departments that won't be signing this agreement. Discussion of services in the meantime of contract acceptance; services will continue until voted down. Hoffman stated the next meeting is Monday, October 20; Council Members requested further discussion and negotiation at the meeting. Mayor Pascoe shared I suggest we postpone until next meeting as long as it does not hurt our citizens; by signing we are no longer negotiating. Hoffman shared daily call procedures and charges.

Council Member Jespersen moved to postpone to the next meeting on October 28, 2025. Council Member Nielson seconded the motion.
The following Council Members voted "YEA": Delahoyde, Stark, Jespersen, and Nielson. The following Council Members voted "NAY": None. Motion Carried. 4-0.

Consideration of the purchase of a snow plow and hitch from Midwest Service & Sales Co in an amount not to exceed $27,330.76.
Council Member Jespersen moved to approve the purchase of a snow plow and hitch from Midwest Service & Sales Co in an amount not to exceed $27,330.76. Council Member Nielson seconded the motion.
City Administrator Fisher stated this is a budgeted item for the Hino dump truck.
The following Council Members voted "YEA": Stark, Jespersen, Nielson, and Delahoyde. The following Council Members voted "NAY": None. Motion Carried. 4-0.

Consideration of a bid from Veolia for Aquaray 40 HO Generation 2 Vertical Lamp System for the Wastewater Treatment Facility in an amount not to exceed $208,000.00.
Council Member Jespersen moved to approve bid from Veolia for Aquaray 40 HO Generation 2 Vertical Lamp System for the Wastewater Treatment Facility in an amount not to exceed $208,000.00. Council Member Nielson seconded the motion.
City Administrator Fisher provided explanation. Mayor Pascoe advised we are under budget; $300,000 was budgeted.
The following Council Members voted "YEA": Jespersen, Nielson, Delahoyde, and Stark. The following Council Members voted "NAY": None. Motion Carried. 4-0.

COMMITTEE REPORTS
Human Services (Park & Recreation): Council Member Stark
Council Member Stark reported the last day of NFL Flag Football is Saturday, October 18 when they will have the Super Bowl. Soccer will be finishing up on October 23. Seven teams are signed up for adult women's volleyball; the league is starting October 15, playing Wednesday nights. Registration for Waverly Rec baseball and softball registration opened on October 1. They planted 15 trees in Wayne Park to replace the Green Ash that were removed. Treatment on Field 1 & 2 has been applied for the weeds there. There is a leak in under the concrete leading to guard house and bath house at the Aquatic Center

and was repaired yesterday. We are transitioning the Pool Manager position from seasonal to full-time and adding a marketing and rec sports supervisor portion in addition to pool season. Wayne and Lawson Parks were mowed.

Council Member Delahoyde reported the parks committee had a really good discussion around fees and charges; no resolution reached yet, but we appreciate the Riptide representative taking time to come to the meeting and share information. City Administrator Fisher shared there was a form approved for standardized park benches.

Public Works (Utilities & Street): Council Member Delahoyde
Council Member Delahoyde reported public works continues to mow due to getting more rain this year. They unhooked the sludge press to have its internal parts repaired. Had a meeting about the intersection approach of N 149th Street and Kenilworth that was poured in the rain and is delaminating in the Waverly Ridge development. They located the entire Waverly Ridge subdivision for the natural gas installation. They started to flush hydrants and they have 100 left. Swept streets for the marching band parade—I heard went really well from both the band and the spectators. Had a meeting at MBA poultry about water flow problem, they are using one 4-inch line to feed two 4-inch lines and are having flow problems. Put the sander and plow on the HV dump truck, sewer jetted looking for root intrusion into older mains, and poured a new concrete base on an old headstone over 75 years old at the cemetery, at the request of the family. Awaiting to hear back from Windstream - Kinetic about a phone line that was bored through the sewer main at N 145th and Heywood. Started to assemble the salt storage cover and picked up a dead deer along Hwy 6.

Public Health (Fire & Safety): Council Member Jespersen
Council Member Jespersen reported during Fire Prevention Week, the crew made 7 visits to daycares and to Villa Marie School. Took part in Eek at the Creek at Camp Creek Threshers; there was a good turnout. Did some apparatus checks last week. Did some training with the new EMTs this week on doing some demonstrations on efficiencies. Fire Chief Hoffman reported there was a workshop today on threat hazards identification risk assessment (THIRA); about 100 people in attendance including LFR, Emergency Management, the university, and Bryan Hospital. They give us three different scenarios: tornado, ice storm, and hazardous materials leak. They provide these scenarios, and you have to tell them what resources you are going to need, how you are going to mitigate it, and things like that. They provide a final report will be shared with everyone in attendance.

Fiscal and Economic Development: Council Member Nielson
Council Member Nielson reported Spots Spirits new owners Callie and Scott Jungers began on September 8. HotKote, a powder coating facility has been added to the Empire campus, located north of Waverly Road and just south of the city's tree dump. The next CRA meeting is Monday, October 20 in the Council Chambers.

City Administrator Fisher
City Administrator Fisher reported I have been working with the fire chief on some of the municipal code changes that we need to implement for the different levels within the fire department. We will have something to present to council, at one of the next few meetings. All the department heads are working on new projects for the new budget year and is going well. The UV system has a lead time of 6-7 months, so that's why we are jumping in to get a lot of these projects going, and we will have some planning come before you in the next few meetings.
Council Members discussed moving the November 11 meeting, which falls on Veterans Day to Monday, November 10.

EXECUTIVE SESSION
Council Member Nielson moved to enter Executive Session to protect the public interest to discuss negotiation strategy relating to possible real estate acquisitions. Council Member Jespersen seconded the motion.
The following Council Members voted "YEA": Nielson, Delahoyde, Stark, and Jespersen. The following Council Members voted "NAY": None. Motion Carried. 4-0.

City Administrator Fisher declared Closed Session at 6:47 p.m. Those present in Executive Session were Mayor Pascoe and Council Members Nielson, Jespersen, Stark, and Delahoyde, City Administrator Fisher, and City Clerk Frye. No action was taken during Executive Session. Council Member Jespersen left the meeting at 6:51 p.m.

Mayor Pascoe declared Open Session 7:07 p.m.

Nielson moved to leave Executive Session at 7:07 p.m. Stark seconded the motion.
The following Council Members voted "YEA": Delahoyde, Stark, and Nielson. The following Council Members voted "NAY": None. Motion Carried. 3-0.

ADJOURNMENT
Council Member Stark moved to adjourn the meeting at 7:08 p.m. Council Member Nielson seconded the motion.
The following Council Members voted "YEA": Stark, Nielson, and Delahoyde. The following Council Members voted "NAY": None. Motion Carried. 3-0.

_____	_____
Abbey L. Pascoe	Megan K. Frye
Mayor	City Clerk/Human Resources Assistant

Claims for Payment: October 15th - 28th , 2025

Group A			
Vendor	**Description**	**Amount**	**Date Paid**
ADP Fees	Payroll Fees	$ 70.75	10/31/2025
ADP Fees	Payroll Fees	$ 136.47	10/24/2025
ADP Payroll	Payroll	$ 42,942.73	10/31/2025
Blue Cross Blue Shield NE	Health Insurance	$ 16,990.59	11/1/2025
Caden Cerny	Flag football ref	$ 120.00	
ClearSpan Fabric Structures	Storage shed	$ 8,610.41	
Core & Main	Meter & Readout Purchase, hydrant lubricant	$ 1,419.52	
DataVizion, LLC	Docking stations	$ 512.98	
Frontier	Clamps for pump on sprayer	$ 9.50	
Guardian	Life & Vision Insurance	$ 500.01	
Heermann Economic Development	Economic development consulting services	$ 2,900.00	
Hippo Equipment	Edger, battery, truck tires	$ 2,427.37	
Hometown Leasing	FD Copier	$ 71.48	
Huber Technology, Inc.	Sludge press labor	$ 15,459.00	
JEO Consulting Group, Inc.	Oak Lane & Danvers Water Main, ANP 10th Addition, Industrial Park, New Well Siting	$ 16,162.50	
John Hancock USA	Retirement	$ 3,682.19	10/31/2025
Lee Sapp Ford	Ford F250 repair	$ 510.33	
Life-Assist, Inc.	Stretcher	$ 1,899.00	
Life-Assist, Inc.	Medical supplies	$ 547.95	
Lincoln Electric System	Electricity	$ 16,144.56	
MacQueen Emergency	Helmet front, fire hose adapters	$ 454.43	
Mammoth Station	Fuel & battery cleaner	$ 301.01	
Nadezhda Koval	Cleaning Service	$ 452.41	
Nebraska Dept Of Revenue	Lottery Tax	$ 11,596.00	
NE Public Health Environ.Lab	Lab Fees	$ 767.00	
Nebraska Title Company	Parcel ID 2421112002000	$ 25,000.00	
Nebraska Title Company	Parcel ID 2421114002000 & 2421114004000	$ 25,000.00	
Olsson Inc.	Waverly Ridge Construction	$ 5,640.15	
Patriot Crane & Rigging LLC	Remove/reinstall sludge press	$ 5,610.00	
Pavers Inc.	Crushed asphalt millings	$ 82.98	
Point C	Health Reimbursement Account	$ 85.25	
Production Creek Specialty Adv	Employee clothing	$ 56.00	
Quik Dump Refuse	Garbage Service	$ 575.93	
Sarpy County Planning Dept.	Code officials training	$ 150.00	
Small Engine Specialists	Trimmer harness	$ 97.98	
S.E.Rural Fire Protection Dist	EMS Calls	$ 2,750.00	
Stephanie Fisher	Title & license new ambulance reimbursement	$ 23.00	
Tasha Osten	Pool Emergency Action Plan	$ 200.00	
U.S. Postmaster	Stamps/Postage	$ 323.39	
Union Bank & Trust Co.	HSA Accounts	$ 2,750.00	11/1/2025
Storage Ninjas - Waverly	Storage for Engine 34 - F.D. debit card purchase	$ 148.00	
Point C	Health Reimbursement Account	$ 3,888.18	
Point C	Health Reimbursement Account	$ 142.09	
	Claims Group A Total	**$ 217,211.14**	

Abbey Pascoe, Mayor

Cheris Cadwell, City Treasurer/Deputy Clerk

Sales Tax Collections: ***sales tax earned two months prior-- shown as month paid to City***

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025		
January		$32,992.14	$29,189.49	$29,531.36	$32,688.55	$32,284.36	$33,172.54	$46,014.14	$41,917.94	$46,648.43	$90,625.85	$103,786.45	$105,194.37	$104,708.89	$125,496.52		
February		$29,537.64	$30,246.77	$64,480.25	$36,940.26	$41,698.05	$41,692.99	$60,599.43	$46,095.47	$54,122.85	$109,289.36	$116,586.73	$131,852.76	$114,253.11	$133,595.25		
March		$26,920.56	$26,887.71	$30,457.12	$35,161.97	$35,290.80	$40,821.47	$40,219.57	$42,933.14	$42,610.56	$75,928.93	$99,352.41	$95,771.88	$82,176.63	$123,786.47		
April		$28,796.53	$28,137.26	$29,420.11	$29,176.72	$30,227.87	$34,683.45	$41,461.95	$34,740.53	$47,940.60	$77,700.69	$111,903.31	$97,168.62	$111,029.70	$101,190.07		
May	$8.24	$35,288.09	$34,362.26	$34,621.55	$31,802.05	$39,108.51	$43,465.17	$52,003.47	$47,233.51	$44,064.34	$93,473.57	$97,854.57	$101,491.84	$105,729.62	$109,905.53		
June	$21,243.02	$32,198.24	$28,426.22	$38,672.07	$31,794.65	$33,427.73	$40,781.58	$45,768.13	$41,378.54	$52,572.46	$99,944.43	$95,376.36	$111,660.31	$96,112.09	$112,449.89		
July	$25,244.63	$30,457.75	$31,952.30	$39,768.61	$43,691.63	$5,327.24	$45,632.90	$50,294.37	$52,805.83	$45,600.18	$98,328.54	$100,142.61	$106,592.60	$107,047.20	$109,031.89		
August	$29,839.16	$36,192.83	$33,585.11	$32,131.22	$31,226.35	$44,897.74	$48,886.02	$51,641.21	$50,411.52	$59,379.70	$107,707.62	$121,477.70	$130,326.31	$99,092.02	$124,102.79		
September	$30,988.54	$37,130.93	$34,002.03	$41,645.33	$49,711.78	$36,561.46	$41,391.36	$42,353.80	$50,953.89	$67,428.76	$99,848.37	$104,395.19	$103,737.29	$91,604.71	$124,882.31		
October	$29,229.16	$36,993.71	$38,297.05	$35,077.10	$36,328.32	$39,165.85	$45,678.64	$52,076.81	$57,694.98	$55,385.72	$99,986.54	$119,671.73	$114,754.32	$95,256.32	$117,354.64		
November	$29,346.34	$32,505.44	$41,745.15	$37,159.48	$36,419.27	$47,264.28	$50,944.62	$42,158.82	$58,477.36	$56,647.46	$118,010.17	$109,006.57	$102,350.94	$104,667.52			
December	$27,622.05	$29,632.44	$17,238.71	$32,581.21	$22,368.15	$35,162.51	$48,520.21	$45,481.83	$45,307.48	$90,445.57	$87,009.84	$14,777.74	$102,439.75	$83,758.65			
																City	Aquatic Ctr
Total Year	$193,521.14	$388,646.30	$374,070.06	$445,545.41	$417,309.70	$420,416.40	$515,670.95	$570,073.53	$569,950.19	$662,846.63	$1,157,853.91	$1,194,331.37	$1,303,340.99	$1,195,436.46	$1,181,795.36	$787,863.97	$393,931.39
Monthly Ave	$24,190.14	$32,387.19	$31,172.51	$37,128.78	$34,775.81	$35,034.70	$42,972.58	$47,506.13	$47,495.85	$55,237.22	$96,487.83	$99,527.61	$108,611.75	$99,619.71	$118,179.54		

Tax Year	Tax Month	Sales and Use Tax***	Consumers Use Tax	Current Month's Refunds	Administration Fee	Paid to City	Motor Vehicle Sales Tax
2011	MARCH	8.5	0	0	-0.26	8.24	0
2011	APRIL	15,415.21	6,484.81	0	-657	21,243.02	1,823.27
2011	MAY	21,667.75	4,357.64	0	-780.76	25,244.63	5,788.37
2011	JUNE	23,301.52	7,460.50	0	-922.86	29,839.16	4,130.36
2011	JULY	27,421.51	4,525.44	0	-958.41	30,988.54	7,386.23
2011	AUGUST	24,815.25	5,317.90	0	-903.99	29,229.16	6,051.95
2011	SEPTEMBER	25,308.28	4,945.68	0	-907.62	29,346.34	7,157.20
2011	OCTOBER	22,134.06	6,342.28	0	-854.29	27,622.05	4,587.09
2011	NOVEMBER	27,617.00	6,421.31	-25.79	-1,020.38	32,992.14	4,160.86
2011	DECEMBER	23,244.46	7,206.72	0	-913.54	29,537.64	4,359.71
2012	JANUARY	23,359.89	4,393.26	0	-832.59	26,920.56	6,780.83
2012	FEBRUARY	25,526.98	4,160.16	0	-890.61	28,796.53	8,674.90
2012	MARCH	28,559.75	7,902.92	-83.2	-1,091.38	35,288.09	8,671.84
2012	APRIL	23,623.05	9,574.34	-3.33	-995.82	32,198.24	6,178.25
2012	MAY	24,541.36	6,858.38	0	-941.99	30,457.75	5,172.52
2012	JUNE	27,549.48	10,143.28	-380.56	-1,119.37	36,192.83	9,538.15
2012	JULY	27,301.79	10,978.30	-0.78	-1,148.38	37,130.93	5,693.49
2012	AUGUST	30,506.45	7,633.26	-1.86	-1,144.14	36,993.71	9,079.62
2012	SEPTEMBER	24,745.01	8,767.26	-1.51	-1,005.32	32,505.44	4,169.41
2012	OCTOBER	24,429.85	6,119.06	0	-916.47	29,632.44	6,285.49
2012	NOVEMBER	26,792.27	3,318.20	-18.21	-902.77	29,189.49	6,440.89
2012	DECEMBER	27,459.37	3,722.87	0	-935.47	30,246.77	7,076.74
2013	JANUARY	24,879.70	2,889.59	-50	-831.58	26,887.71	5,370.87
2013	FEBRUARY	26,724.12	2,283.36	0	-870.22	28,137.26	3,988.43
2013	MARCH	33,193.18	2,231.83	0	-1,062.75	34,362.26	5,453.53
2013	APRIL	27,197.57	2,107.81	0	-879.16	28,426.22	5,843.58
2013	MAY	30,628.60	2,317.08	-5.16	-988.22	31,952.30	6,412.37
2013	JUNE	29,122.78	7,593.00	-2,091.96	-1,038.71	33,585.11	9,349.84
2013	JULY	32,833.59	2,223.69	-3.64	-1,051.61	34,002.03	7,990.33
2013	AUGUST	36,291.13	3,233.44	-43.08	-1,184.44	38,297.05	15,073.10
2013	SEPTEMBER	34,347.27	8,688.97	0	-1,291.09	41,745.15	11,463.13
2013	OCTOBER	30,797.91	3,943.10	-16,969.14	-533.16	17,238.71	4,370.31
2013	NOVEMBER	29,408.36	1,036.34	0	-913.34	29,531.36	8,019.80
2013	DECEMBER	61,359.57	5,114.91	0	-1,994.23	64,480.25	9,177.12
2014	JANUARY	30,017.85	1,385.43	-4.19	-941.97	30,457.12	4,790.19
2014	FEBRUARY	31,594.51	2,426.46	-3,690.96	-909.9	29,420.11	7,156.77
2014	MARCH	32,421.02	3,271.30	0	-1,070.77	34,621.55	6,011.56

2014	APRIL	33,181.11	6,687.00	0	-1,196.04	38,672.07	8,966.34
2014	MAY	36,039.59	4,958.98	0	-1,229.96	39,768.61	6,281.78
2014	JUNE	30,408.84	3,528.21	-812.08	-993.75	32,131.22	6,908.98
2014	JULY	38,778.88	4,319.77	-165.32	-1,288.00	41,645.33	10,423.14
2014	AUGUST	37,204.63	-1,042.67	0	-1,084.86	35,077.10	12,752.23
2014	SEPTEMBER	35,673.34	2,635.40	0	-1,149.26	37,159.48	6,890.30
2014	OCTOBER	32,755.32	1,097.64	-264.08	-1,007.67	32,581.21	6,242.33
2014	NOVEMBER	29,758.71	4,197.54	-256.71	-1,010.99	32,688.55	7,173.36
2014	DECEMBER	36,212.81	2,697.68	-827.75	-1,142.48	36,940.26	9,673.81
2015	JANUARY	31,430.17	4,819.28	0	-1,087.48	35,161.97	7,641.40
2015	FEBRUARY	28,073.66	2,005.43	0	-902.37	29,176.72	7,068.34
2015	MARCH	30,523.36	3,514.71	-1,252.45	-983.57	31,802.05	7,207.36
2015	APRIL	30,654.89	2,529.75	-406.65	-983.34	31,794.65	7,116.77
2015	MAY	39,248.01	5,794.91	0	-1,351.29	43,691.63	9,533.30
2015	JUNE	31,312.06	4,469.40	-3,589.35	-965.76	31,226.35	6,797.96
2015	JULY	37,820.92	13,511.27	-82.93	-1,537.48	49,711.78	10,182.40
2015	AUGUST	32,702.13	4,749.75	0	-1,123.56	36,328.32	8,532.32
2015	SEPTEMBER	34,772.93	2,776.84	-4.13	-1,126.37	36,419.27	7,182.17
2015	OCTOBER	32,438.30	3,694.75	-13,073.10	-691.8	22,368.15	8,275.22
2015	NOVEMBER	26,484.79	6,798.06	0	-998.49	32,284.36	5,183.27
2015	DECEMBER	35,027.68	8,361.67	-401.67	-1,289.63	41,698.05	5,382.21
2016	JANUARY	34,494.33	1,887.94	0	-1,091.47	35,290.80	7,568.79
2016	FEBRUARY	30,867.40	1,608.14	-1,312.79	-934.88	30,227.87	5,103.29
2016	MARCH	34,681.29	5,691.40	-54.64	-1,209.54	39,108.51	8,511.11
2016	APRIL	32,367.40	2,094.18	0	-1,033.85	33,427.73	6,657.25
2016	MAY	32,517.30	7,487.50	-34,512.80	-164.76	5,327.24	6,533.37
2016	JUNE	38,735.52	7,550.81	0	-1,388.59	44,897.74	9,915.06
2016	JULY	34,322.24	3,484.90	-114.91	-1,130.77	36,561.46	7,592.47
2016	AUGUST	36,751.30	3,824.29	-198.42	-1,211.32	39,165.85	7,313.30
2016	SEPTEMBER	42,023.77	6,704.04	-1.75	-1,461.78	47,264.28	8,791.01
2016	OCTOBER	34,633.96	1,616.05	0	-1,087.50	35,162.51	6,679.20
2016	NOVEMBER	32,423.73	1,774.77	0	-1,025.96	33,172.54	6,436.16
2016	DECEMBER	37,251.12	6,031.09	-299.75	-1,289.47	41,692.99	4,876.80
2017	JANUARY	33,469.65	8,614.34	0	-1,262.52	40,821.47	6,863.48
2017	FEBRUARY	33,713.45	2,042.68	0	-1,072.68	34,683.45	6,736.48
2017	MARCH	42,760.85	3,282.76	-1,234.16	-1,344.28	43,465.17	9,149.62
2017	APRIL	41,358.64	1,773.97	-1,089.74	-1,261.29	40,781.58	7,983.03
2017	MAY	43,807.66	3,357.01	-120.44	-1,411.33	45,632.90	11,624.63
2017	JUNE	43,258.55	7,245.94	-106.53	-1,511.94	48,886.02	9,277.24

2017	JULY	40,577.27	3,157.72	-1,063.48	-1,280.15	41,391.36	6,598.62
2017	AUGUST	41,702.65	5,463.01	-74.28	-1,412.74	45,678.64	10,427.95
2017	SEPTEMBER	50,678.98	2,160.87	-319.62	-1,575.61	50,944.62	13,695.11
2017	OCTOBER	41,192.29	8,828.54	0	-1,500.62	48,520.21	7,569.74
2017	NOVEMBER	43,767.24	5,067.77	-1,397.75	-1,423.12	46,014.14	7,294.89
2017	DECEMBER	53,503.31	8,970.33	0	-1,874.21	60,599.43	8,982.34
2018	JANUARY	40,067.17	1,396.30	0	-1,243.90	40,219.57	8,010.64
2018	FEBRUARY	38,328.66	4,632.29	-216.67	-1,282.33	41,461.95	4,361.85
2018	MARCH	44,653.78	8,958.04	0	-1,608.35	52,003.47	7,890.18
2018	APRIL	43,637.34	3,546.30	0	-1,415.51	45,768.13	7,859.35
2018	MAY	49,767.39	3,104.94	-1,022.46	-1,555.50	50,294.37	9,463.96
2018	JUNE	43,510.52	10,623.77	-895.93	-1,597.15	51,641.21	6,832.18
2018	JULY	42,122.29	1,937.52	-396.1	-1,309.91	42,353.80	5,827.99
2018	AUGUST	50,970.75	2,716.68	0	-1,610.62	52,076.81	13,293.29
2018	SEPTEMBER	39,643.73	3,818.97	0	-1,303.88	42,158.82	6,262.15
2018	OCTOBER	43,991.20	2,897.28	0	-1,406.65	45,481.83	7,533.17
2018	NOVEMBER	44,139.20	4,058.28	-4,983.11	-1,296.43	41,917.94	7,449.37
2018	DECEMBER	43,301.31	4,219.79	0	-1,425.63	46,095.47	8,658.42
2019	JANUARY	41,778.46	2,831.79	-349.28	-1,327.83	42,933.14	8,634.39
2019	FEBRUARY	37,753.03	2,595.61	-4,533.66	-1,074.45	34,740.53	4,058.98
2019	MARCH	45,207.29	3,487.95	-0.9	-1,460.83	47,233.51	8,965.99
2019	APRIL	41,931.04	1,671.25	-944	-1,279.75	41,378.54	7,105.21
2019	MAY	50,371.66	4,608.31	-540.97	-1,633.17	52,805.83	15,575.91
2019	JUNE	47,239.73	4,730.91	0	-1,559.12	50,411.52	6,902.70
2019	JULY	52,092.06	3,821.66	-3,383.94	-1,575.89	50,953.89	9,424.54
2019	AUGUST	47,578.92	11,900.44	0	-1,784.38	57,694.98	7,477.22
2019	SEPTEMBER	53,124.03	7,130.98	0	-1,807.65	58,447.36	11,382.61
2019	OCTOBER	43,090.84	4,687.33	-1,069.43	-1,401.26	45,307.48	8,105.56
2019	NOVEMBER	44,966.28	3,124.88	0	-1,442.73	46,648.43	8,702.34
2019	DECEMBER	51,145.06	4,651.69	0	-1,673.90	54,122.85	7,878.82
2020	JANUARY	42,943.97	1,004.86	-20.42	-1,317.85	42,610.56	8,420.51
2020	FEBRUARY	43,897.77	5,525.53	0	-1,482.70	47,940.60	6,559.23
2020	MARCH	42,056.98	3,509.49	-139.32	-1,362.81	44,064.34	7,372.41
2020	APRIL	41,704.64	12,631.43	-137.66	-1,625.95	52,572.46	2,409.46
2020	MAY	43,803.00	3,207.49	0	-1,410.31	45,600.18	4,510.43
2020	JUNE	55,131.98	6,084.21	0	-1,836.49	59,379.70	12,180.94
2020	JULY	66,198.05	3,798.16	-482.02	-2,085.43	67,428.76	18,066.18
2020	AUGUST	54,937.26	2,161.42	0	-1,712.96	55,385.72	11,556.38
2020	SEPTEMBER	56,125.69	2,273.75	0	-1,751.98	56,647.46	9,608.01

2020	OCTOBER	89,776.04	3,466.82	0	-2,797.29	90,445.57	18,153.45
2020	NOVEMBER	86,949.10	6,479.61	0	-2,802.86	90,625.85	21,547.71
2020	DECEMBER	108,576.77	4,092.67	0	-3,380.08	109,289.36	23,446.26
2021	JANUARY	74,598.19	4,558.11	-879.05	-2,348.32	75,928.93	13,386.75
2021	FEBRUARY	72,896.15	7,312.07	-104.42	-2,403.11	77,700.69	12,505.52
2021	MARCH	93,083.13	3,284.28	-2.9	-2,890.94	93,473.57	14,828.07
2021	APRIL	98,712.24	5,293.21	-969.96	-3,091.06	99,944.43	23,661.01
2021	MAY	97,187.83	4,222.15	-40.35	-3,041.09	98,328.54	25,823.99
2021	JUNE	108,982.91	2,055.87	0	-3,331.16	107,707.62	29,613.97
2021	JULY	95,408.95	7,528.82	-1.31	-3,088.09	99,848.37	18,159.99
2021	AUGUST	99,081.53	3,997.38	0	-3,092.37	99,986.54	19,045.36
2021	SEPTEMBER	95,169.14	26,490.83	0	-3,649.80	118,010.17	14,982.49
2021	OCTOBER	84,890.49	4,810.38	0	-2,691.03	87,009.84	9,257.17
2021	NOVEMBER	99,432.30	7,571.35	-7.31	-3,209.89	103,786.45	13,258.56
2021	DECEMBER	117,320.03	2,872.48	0	-3,605.78	116,586.73	20,511.17
2022	JANUARY	94,993.99	7,431.17	0	-3,072.75	99,352.41	16,055.01
2022	FEBRUARY	100,863.32	14,500.92	0	-3,460.93	111,903.31	31,073.57
2022	MARCH	95,600.01	5,280.99	0	-3,026.43	97,854.57	16,791.29
2022	APRIL	98,630.99	5,313.40	-5,618.25	-2,949.78	95,376.36	18,250.98
2022	MAY	96,913.50	6,326.30	0	-3,097.19	100,142.61	22,080.80
2022	JUNE	119,936.26	5,303.56	-5.08	-3,757.04	121,477.70	35,999.23
2022	JULY	110,599.83	6,739.12	-9,715.04	-3,228.72	104,395.19	25,964.36
2022	AUGUST	115,315.14	8,057.78	0	-3,701.19	119,671.73	24,717.82
2022	SEPTEMBER	107,091.76	5,286.15	0	-3,371.34	109,006.57	20,853.84
2022	OCTOBER	97,831.00	6,146.73	-88,742.95	-457.04	14,777.74	17,684.55
2022	NOVEMBER	103,147.49	5,303.92	-3.61	-3,253.43	105,194.37	14,413.06
2022	DECEMBER	126,213.66	9,717.02	0.00	-4,077.92	131,852.76	19,582.54
2023	JANUARY	99,931.16	4,540.54	-5,737.80	-2,926.02	95,771.88	16,309.36
2023	FEBRUARY	92,450.77	7,723.06	0.00	-3,005.21	97,168.62	17,766.17
2023	MARCH	104,088.00	5,851.20	-5,308.44	-3,138.92	101,491.84	19,821.37
2023	APRIL	107,671.13	7,442.59	0.00	3,453.41	111,660.31	22,676.53
2023	MAY	99,774.64	10,985.95	-871.31	-3,296.68	106,592.60	15,819.03
2023	JUNE	116,964.50	17,405.68	-13.16	-4,030.71	130,326.31	34,107.82
2023	JULY	90,489.34	16,652.84	-196.52	-3,208.37	103,737.29	20,060.61
2023	AUGUST	106,653.66	11,652.42	-2.66	-3,549.10	114,754.32	20,898.64
2023	SEPTEMBER	94,484.67	11,064.11	-32.35	-3,165.49	102,350.94	17,374.97
2023	OCTOBER	89,704.24	15,907.81	-4.06	-3,168.24	102,439.75	19,912.75
2024	NOVEMBER	97,589.16	14,908.49	-4,550.34	-3,238.42	104,708.89	21,411.40
2024	DECCEMBER	95,134.75	22,651.96	0.00	-3,533.60	114,253.11	12,711.15

2024	JANUARY	76,394.12	9,310.60	-986.54	-2,541.55	82,176.63	12,082.66
2024	FEBRUARY	103,146.31	11,657.40	-340.10	-3,433.91	111,029.70	31,303.95
2024	MARCH	101,023.80	7,990.16	-14.35	-3,269.99	105,729.62	18,011.46
2024	APRIL	89,290.02	9,800.04	-5.43	-2,972.54	96,112.09	16,984.55
2024	MAY	101,290.86	9,067.08	0.00	-3,310.74	107,047.20	25,940.79
2024	JUNE	95,653.49	6,662.89	-159.66	-3,064.70	99,092.02	25,619.52
2024	JULY	87,998.16	6,439.69	0.00	-2,833.14	91,604.71	14,076.87
2024	AUGUST	90,958.63	7,243.76	0.00	-2,946.07	95,256.32	15,569.72
2024	SEPTEMBER	105,512.30	13,132.88	-10,740.52	-3,237.14	104,667.52	21,204.49
2024	OCTOBER	84,153.55	8,735.27	-6,539.70	-2,590.47	83,758.65	16,601.42
2024	NOVEMBER	120,780.83	8,597.03	0.00	3,881.34	125,496.52	22,739.09
2024	DECEMBER	131,604.25	6,273.10	-150.29	-4,131.81	133,595.25	10,951.52
2025	JANUARY	118,540.78	9,103.41	-29.27	-3,828.45	123,786.47	28,771.09
2025	FEBRUARY	91,096.33	13,343.99	-120.66	-3,129.59	101,190.07	17,224.28
2025	MARCH	107,113.04	6,276.11	-84.48	-3,399.14	109,905.53	25,630.17
2025	APRIL	111,272.09	4,690.72	-35.09	-3,477.83	112,449.89	22,174.66
2025	MAY	108,480.84	6,417.81	-2,494.64	-3,372.12	109,031.89	21,232.57
2025	JUNE	119,302.16	8,638.86	0.00	-3,838.23	124,102.79	21,591.29
2025	JULY	117,119.04	13,505.71	-1,880.10	-3,862.34	124,882.31	30,178.66
2025	AUGUST	108,870.25	18,229.43	-6,115.52	-3,629.52	117,354.64	26,196.34
2025							
	TOTALS			**-$258,029.74**		**$10,590,778.40**	

*** The Sales and Use Tax Column includes Motor Vehicle Sales Tax. The amount of Motor Vehicle Sales Tax is separately stated in the last column of this spreadsheet.

City of Waverly
9/1/20025

Gross Sales

Waverly		$ 163,818.68
Gross Sales	100.00%	**$ 163,818.68**

Prizes (Payouts)

Waverly		
Prizes (Payouts)	83.2395%	**$136,361.89**
Operator Commission	12.0000%	$19,658.24
City Share	4.4561%	$7,299.97
Uncollected Winnings	0.3043%	$498.58
Interest		$6.47
Total to city		**$7,805.02**

YTD SALES	$ 2,642,522.84
City 7%min earned YTD	$184,976.60
Paid YTD	$165,936.82
Due City	**$19,039.78**

RESOLUTION NUMBER 25-27

WHEREAS, the Federal Disaster Mitigation Act of 2000 was signed into law on October 30, 2000, placing new emphasis on state and local mitigation planning for natural hazards and requiring communities to adopt a hazard mitigation action plan to be eligible for pre-disaster and post-disaster federal funding for mitigation purposes; and

WHEREAS, a Hazard Mitigation Plan was prepared by the Lower Platte South Natural Resources District, with assistance from JEO Consulting Group, Inc. of Lincoln, NE.

WHEREAS, the purpose of the mitigation plan was to lessen the effects of disasters by increasing the disaster resistance of the region and participating jurisdictions located within the planning boundary by identifying the hazards that affect **City of Waverly** and prioritize mitigation strategies to reduce potential loss of life and property damage from those hazards, and

WHEREAS, FEMA regulations require documentation that the plan has been formally adopted by the governing body of **City of Waverly** in the form of a resolution and further requesting approval of the plan at the Federal Level; and

NOW, THEREFORE, the governing body of **City of Waverly** does herewith adopt the most recent and FEMA-approved version of the Lower Platte South NRD Hazard Mitigation Plan Update in its entirety; and

PASSED AND APPROVED THIS 28TH DAY OF OCTOBER, 2025.

_____
Abbey L. Pascoe
Mayor

ATTEST:

_____
Megan K. Frye
City Clerk/Human Resources Assistant

(Seal)

Lower Platte South NRD Multi-Jurisdictional Hazard Mitigation Plan

2025

LOWER PLATTE SOUTH
natural resources district

Plan developed for
Lower Platte South NRD
by JEO Consulting Group

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS

ACS – American Community Survey
BCA – Benefit Cost Analysis
CFR – Code of Federal Regulations
CIKR – Critical Infrastructure and Key Resources
CRS – Community Rating System
DHS – Department of Homeland Security
DMA 2000 – Disaster Mitigation Act of 2000
EAB – Emerald Ash Borer
EAP – Emergency Action Plan
ELAP – Emergency Assistance for Livestock, Honeybees, and Farm-Raised Fish Program
EPA – Environmental Protection Agency
EPZ – Emergency Planning Zone
ESL – English as Second Language
F&W – Fish and Wildlife
FBI – Federal Bureau of Investigations
FEMA – Federal Emergency Management Agency
FIRM – Flood Insurance Rate Map
FMA – Flood Mitigation Assistance Program
FR – FEMA's Final Rule
GIS – Geographic Information Systems
HMA – Hazard Mitigation Assistance
HMGP – Hazard Mitigation Grant Program
HMP – Hazard Mitigation Plan
HPRCC – High Plains Regional Climate Center
HSAS – Homeland Security Advisory System
IP – Office of Infrastructure Protection
JEO – JEO Consulting Group, Inc.
LEOP – Local Emergency Operations Plan
LFD – Livestock Forage Disaster Assistance Program
LGA – Liquid Gallon
LIP – Livestock Indemnity Program
LPSNRD – Lower Platte South Natural Resources District
MHSW – Mobile Home Single Wide
MPH – miles per hour
NCEI – National Centers for Environmental Information
NDA – Nebraska Department of Agriculture
NDEE – Nebraska Department of Environment and Energy
NDMC – National Drought Mitigation Center
NDOT – Nebraska Department of Transportation
NeDNR – Nebraska Department of Natural Resources
NEMA – Nebraska Emergency Management Agency
NFIP – National Flood Insurance Program
NFS – Nebraska Forest Service
NIPP – National Infrastructure Protection Plan
NOAA – National Oceanic and Atmospheric Administration
NPDP – National Performance of Dam Program
NPS – National Park Service
NRC – National Response Center
NRD – Natural Resources District
NTAS – National Terrorism Advisory System
NWS – National Weather Service
PDM – Pre-Disaster Mitigation Program
PDSI – Palmer Drought Severity Index
PHMSA – U.S. Pipeline and Hazardous Material Safety Administration
P.L. – Public Law
PSHA – Probabilistic Seismic Hazard Analysis
RMA – Risk Management Agency
SBA – Small Business Administration
SFHA – Special Flood Hazard Area
SPIA – Sperry-Piltz Ice Accumulation Index
SSA – Sector-Specific Agency
START – National Consortium for the Study of Terrorism and Responses to Terrorism
SURE – Supplemental Revenue Assistance Payments
TAP – Tree Assistance Program
TORRO – Tornado and Storm Research Organization
USACE – United States Army Corps of Engineering
USDA – United States Department of Agriculture
USGS – United States Geological Survey
WUI – Wildland Urban Interface

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SECTION ONE
INTRODUCTION

HAZARD MITIGATION PLANNING

Hazard mitigation planning is a process in which hazards are identified and profiled; people and facilities at-risk are identified and assessed for threats and potential vulnerabilities; and strategies and mitigation measures are identified. Hazard mitigation planning increases the ability of communities and other governmental entities to effectively function in the face of natural disasters. The goal of the process is to reduce risk and vulnerability, in order to lessen impacts on life, the economy, and infrastructure.

Severe weather and hazardous events are occurring more frequently in our daily lives. Pursuing mitigation strategies reduces risk and is socially and economically responsible to prevent long-term risks from natural and human-caused hazard events.

FEMA Definition of Hazard Mitigation: "Any sustained action taken to reduce or eliminate the long-term risk to human life and property from [natural] hazards."

Natural hazards, such as severe winter weather, avalanche, severe wind, landslides, floods, lightning, and wildfires are part of the world around us. These hazard events can occur as a part of normal operation or because of human error. All jurisdictions participating in this planning process are vulnerable to a wide range of natural hazards that threaten the safety of residents and have the potential to damage or destroy both public and private property, cause environmental degradation, or disrupt the local economy and overall quality of life.

The Lower Platte South NRD (LPSNRD) prepared this multi-jurisdictional hazard mitigation plan in an effort to reduce impacts from natural and human-caused hazards and to better protect the people and property of the region from the effects of these hazards. This plan demonstrates a regional commitment to reducing risks from hazards and serves as a tool to help decision makers establish mitigation activities and resources. Further, this plan was developed to make LPSNRD and participating jurisdictions eligible for federal pre-disaster funding programs and to accomplish the following objectives:

- Minimize the disruption to each jurisdiction following a disaster.
- Establish actions to reduce or eliminate future damages in order to efficiently recover from disasters.
- Investigate, review, and implement activities or actions to ensure disaster related hazards are addressed by the most efficient and appropriate solution.
- Educate citizens about potential hazards.
- Facilitate development and implementation of hazard mitigation management activities to ensure a sustainable community.

Mitigation is the cornerstone of emergency management. Mitigation focuses on breaking the cycle of disaster damage, reconstruction, and repeated damage. Mitigation lessens the impact disasters have on people's lives and property through damage prevention, appropriate development standards, and affordable flood insurance. Through measures such as avoiding building in damage-prone areas, stringent building codes, and floodplain management regulations, the impact on lives and communities is lessened.

- FEMA Mitigation Directorate

This plan is an update to the Lower Platte South Natural Resources District (LPSNRD) Multi-Hazard Mitigation Plan (HMP) approved in 2015. The plan update was developed in compliance with the requirements of the Disaster Mitigation Act of 2000 (DMA 2000).

HAZARD MITIGATION ASSISTANCE

On June 1, 2009, FEMA initiated the Hazard Mitigation Assistance (HMA) program integration, which aligned certain policies and timelines of the various mitigation programs. These HMA programs present a critical opportunity to minimize the risk to individuals and property from hazards while simultaneously reducing the reliance on federal disaster funds.[1] Each HMA program was authorized by separate legislative actions, and as such, each program differs slightly in scope and intent.

- HMGP: To qualify for post-disaster mitigation funds, local jurisdictions must adopt a mitigation plan that is approved by FEMA. HMGP provides funds to states, territories, Indian tribal governments, local governments, and eligible private non-profits following a presidential disaster declaration. The DMA 2000 authorizes up to seven percent of HMGP funds available to a state after a disaster to be used for the development or update of state, tribal, and local mitigation plans.

- FMA: This program provides grant funds to implement projects such as acquisition or elevation of flood-prone homes. Jurisdictions must be participating communities in the National Flood Insurance Program (NFIP) to qualify for this grant. The goal of FMA is to reduce or eliminate claims under the NFIP.

- BRIC: This program replaced the Pre-Disaster Mitigation Program beginning in 2020 and provides funds on an annual allocation basis to local jurisdictions for implementing programs and projects to improve resiliency and local capacity before disaster events.

- PDM: The PDM grant program makes federal funds available to state, local, tribal, and territorial governments to implement measures designed to reduce the risk to individuals and property from future natural hazards. The Consolidated Appropriations Act of 2023 authorizes funding for 100 projects with total funds of $233.043,782 in 2023.

- FMAG: Section 404 of the Stafford Act allows FEMA to provide HMGP grants to any area that received a Fire Management Assistance Grant declaration even if no major Presidential declaration was made. FMAG aids communities in implementing long-term mitigation measures after a wildfire event.

For more information about these grant programs and other funding opportunities to help implement identified mitigation actions see the appendix *Hazard Mitigation Project Funding Guidebook*.

PLAN FINANCING AND PREPARATION

Regarding plan financing and preparation, in general, the LPSNRD is the “sub-applicant” that is the eligible entity that submits a sub-application for FEMA assistance to the “Applicant.” The “Applicant,” in this case is the State of Nebraska. If HMA funding is awarded, the sub-applicant becomes the “sub-grantee” and is responsible for managing the sub-grant and complying with program requirements and other applicable federal, state, territorial, tribal, and local laws and regulation. The LPSNRD received a BRIC grant in 2023 to finance the update of this HMP.

PARTICIPATING JURISDICTIONS

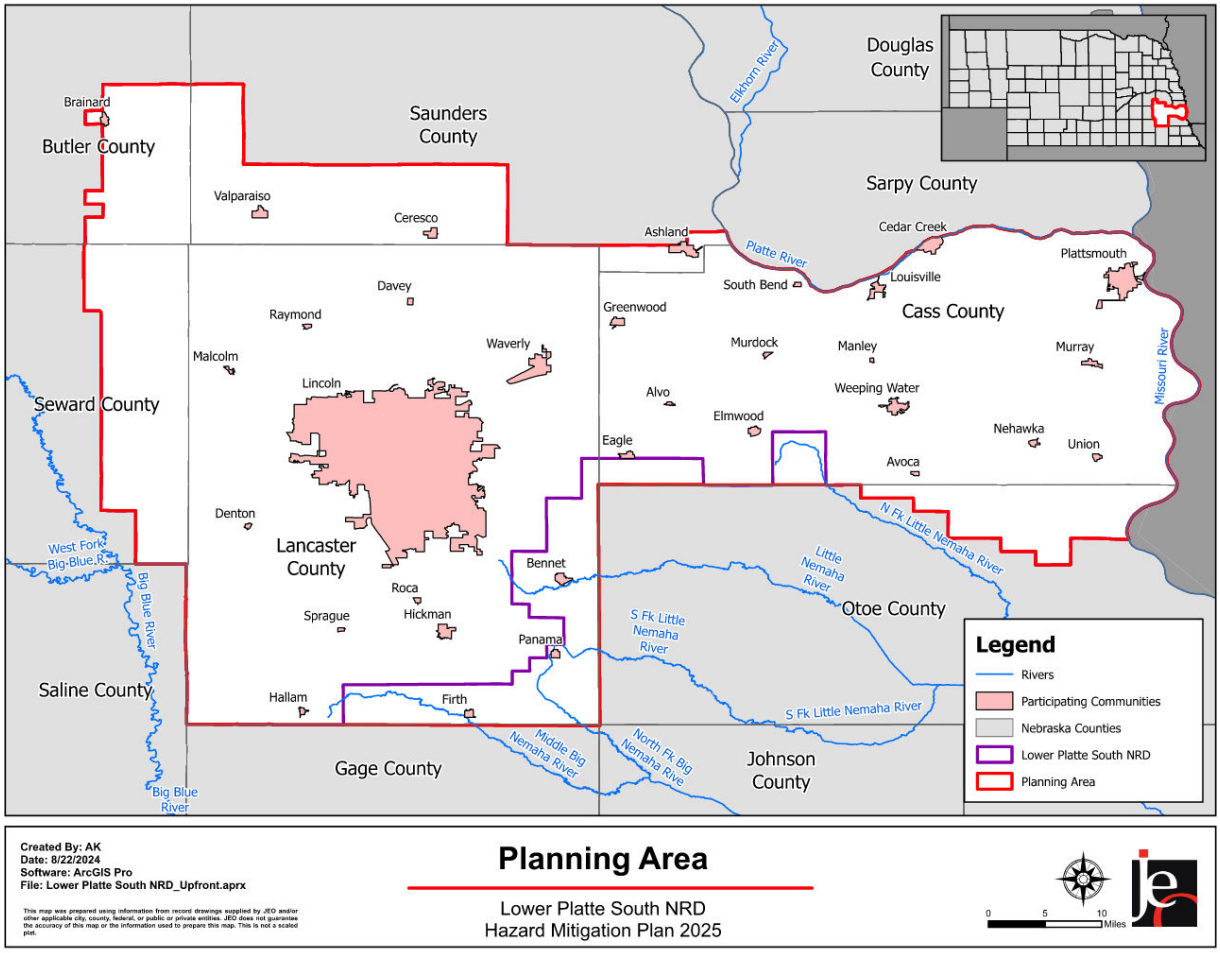
The following table lists counties, communities, and special districts who participated in the 2025 LPSNRD Hazard Mitigation Plan.

Table 1: Plan Participants

Participating Jurisdictions	
Lower Platte South Natural Resources District	
Lancaster County	**Cass County**
Village of Bennet	Village of Alvo
Village of Davey	Village of Avoca
Village of Denton	Village of Cedar Creek
Village of Firth	Village of Eagle
Village of Hallam	Village of Elmwood
City of Hickman	Village of Greenwood
City of Lincoln	City of Louisville
Village of Malcolm	Village of Manley
Village of Panama	Village of Murdock
Village of Raymond	Village of Murray
Village of Roca	Village of Nehawka
Village of Sprague	City of Plattsmouth
City of Waverly	Village of South Bend
Saunders County*	Village of Union
City of Ashland	City of Weeping Water
Village of Ceresco	**Butler County***
Village of Valparaiso	Village of Brainard
Special Districts	
Cass County Rural Water District #1	Norris Public School District
Conestoga Public School District	Raymond Central Public School District
Lincoln Public School District	Weeping Water Public School District

**Saunders and Butler Counties do not participate in the Lower Platte South NRD HMP but are represented in the Lower Platte North NRD sponsored plan.*

Figure 1: Map of Planning Area



GOALS AND OBJECTIVES

The potential for disaster losses and the probability of occurrence of natural and human-caused hazards present a significant concern for the communities participating in this plan update. The driving motivation behind the update of this hazard mitigation plan is to reduce vulnerability and the likelihood of impacts to the health, safety, and welfare of all citizens in the planning area. To this end, the Planning Team reviewed and approved goals which helped guide the process of identifying both broad-based and community-specific mitigation strategies and projects that will, if implemented, reduce their vulnerability and help build stronger, more resilient communities.

Goals from the 2020 HMP were reviewed, and the Planning Team made several revisions at the Kick-off Meeting to ensure the goals and objectives best suited the planning area and current priorities. The goals for this plan update are as follows:

GOAL 1: PROTECT HEALTH AND SAFETY OF THE GENERAL PUBLIC

Objective 1.1: Reduce or prevent damage to property or prevent loss of life or serious injury (overall intent of the plan).

GOAL 2: REDUCE FUTURE LOSSES FROM HAZARD EVENTS

Objective 2.1: Provide protection for existing structures, future development, community lifelines, services, utilities, and the natural environment to the greatest extent possible.

Objective 2.2: Develop hazard specific plans and conduct studies or assessments to identify opportunities for mitigation from hazards to minimize their impacts.

Objective 2.3: Minimize and control the impact of hazard events through enacting or updating ordinances, permits, laws, or regulations.

GOAL 3: INCREASE PUBLIC AWARENESS AND EDUCATION REGARDING VULNERABILITY TO HAZARDS

Objective 3.1 Develop and provide information to the general public about their risk and vulnerability to hazard types and impacts, what they can do to be better prepared, and what their communities are doing to protect against these risks.

Objective 3.2: Identify and foster relationships with local organizations and stakeholders to leverage capabilities, resources, and build awareness to hazards.

GOAL 4: IMPROVE EMERGENCY MANAGEMENT CAPABILITIES

Objective 4.1: Develop or improve Emergency Response Plan, procedures, and personnel abilities.

Objective 4.2: Develop or improve Evacuation Plan and procedures.

Objective 4.3: Improve warning systems and ability to communicate with the public before, during, and after a significant hazard event.

GOAL 5: ENHANCE OVERALL RESILIENCE AND PROMOTE SUSTAINABILITY

Objective 5.1: Incorporate hazard mitigation and adaptation into updating other existing planning endeavors (e.g., comprehensive plans, zoning ordinance, subdivision regulation, etc.)

Objective 5.2: Expand and incorporate hazard mitigation planning process across other preparedness, response, and recovery planning efforts.

SUMMARY OF CHANGES

The hazard mitigation planning process should be revised and updated for each plan update process in order to best accommodate the planning area's priorities and specific conditions. Such priorities for the LPSNRD's HMP update included an increased emphasis on public engagement and participant engagement.

Other changes from the 2020 Hazard Mitigation Plan and planning process in this update included:

- An updated plan layout – changes to Section Three information included. Changes to Community/Jurisdictional profiles to streamline included demographic information and key sections.
- Funding guidebook – Section Eight included with additional funding guides and options for project implementation.
- FEMA Regulatory Requirement Updates – specific inclusions to meet new FEMA requirements including public notification and engagement strategies; information regarding NFIP participation and flood risk hazards; updated hazards of top concern and identified mitigation actions to closely correlate with identified hazards; and identification of community lifelines (formerly critical facilities).
- Goals and Objectives
    - Language changes to goals and objectives included emphasis on the general public, use of community lifelines rather than critical facilities, and the natural environment.
    - Added new objectives under Goals 3 and 5 (objective 3.2 and objective 5.2).
    - Removed prior Goal 5: Pursue Multi-objective Opportunities whenever possible. Goal removed as it is against current guidance and best management practice to have projects that serve only one goal. Rather, Objective 5.2 developed to ensure mitigation processes are carried across other planning efforts.

- Stakeholders and Vulnerable Populations – expanded outreach to vulnerable population groups or agencies for survey outreach and access to plan development process. Feedback from responses will be provided to local planning teams for decision making purposes or included in the plan as supplemental discussion regarding local concerns.
- Hazards of Concern
    - Changes to hazards to be evaluated as part of overall plan risk assessment. Earthquakes removed as a hazard of concern, High Winds and Tornadoes and Chemical Transportation and Chemical Fixed Sites combined as singular hazards. Extreme cold and extreme heat combined into Extreme Temperatures. Hail was included as part of Severe Thunderstorms.

2020 Hazards List	2025 Hazards List
Agricultural Plant and Animal Disease	Agricultural Plant and Animal Disease
Chemical Fixed Sites Chemical Transportation	***Combined to Hazardous Materials***
Dam Failure	Dam Failure
Drought	Drought
Earthquake	***Removed***
Extreme Heat	***Extreme Temperatures (Heat and Cold)***
Flooding	Flooding
Grass/Wildfire	Grass/Wildfire
Hail	***Combine as part of Severe Thunderstorms***
High Winds	***High Winds & Tornadoes***
Levee Failure	Levee Failure
Severe Thunderstorms	***Severe Thunderstorms*** - ***Include Hail as part of STS***
Severe Winter Storms	***Severe Winter Storms*** - ***Remove Extreme Cold and put with Extreme Temperatures***
Terrorism	Terrorism
Tornadoes	***Combine as part of High Winds and Tornadoes***

SECTION TWO
PLANNING PROCESS

The process utilized to develop a hazard mitigation plan is often as important as the final planning document. For this planning process, the LPSNRD adapted the traditional four-step hazard mitigation planning process outlined by FEMA to fit the needs of the participating jurisdictions. The following section outlines the planning process for the 2025 Lower Platte South NRD HMP including the meeting schedule, outreach methods, and agencies involved.

Requirement §201.6(b): Planning process. An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

Requirement §201.6(c)(1): The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

MULTI-JURISDICTIONAL APPROACH

According to FEMA, "A multi-jurisdictional hazard mitigation plan is a plan jointly prepared by more than one jurisdiction." The term 'jurisdiction' means 'local government.' Title 44 Part 201, Mitigation Planning in the CFR, defines a 'local government' as "any county, municipality, city, town, township, public authority, school district, special district, intrastate district, council of governments, regional or interstate government entity, or agency or instrumentality of a local government; any Indian tribe or authorized tribal organization, any rural community, unincorporated town or village, or other public entity." For the purposes of this plan, a 'taxing authority' was utilized as the qualifier for jurisdictional participation. FEMA recommends the multi- jurisdictional approach under the DMA 2000 for the following reasons:

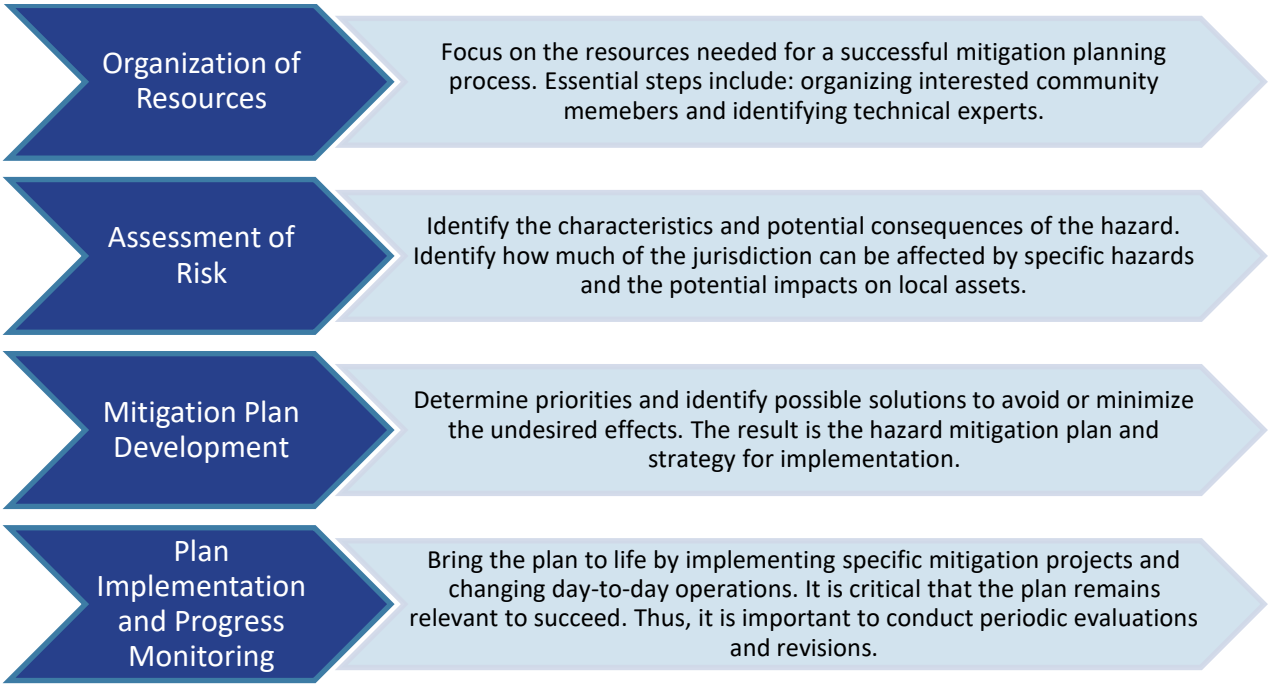
- It provides a comprehensive approach to the mitigation of hazards that affect multiple jurisdictions;
- It allows economies of scale by leveraging individual capabilities and sharing cost and resources;
- It avoids duplication of efforts; and
- It imposes an external discipline on the process.

Both FEMA and NEMA recommend this multi-jurisdictional approach through the cooperation of counties, regional emergency management, and natural resource districts. The LPSNRD utilized the multi-jurisdictional planning process recommended by FEMA resources (Local Mitigation Plan Review Guide[2], Local Mitigation Planning Handbook[3], and Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards[4]) to develop this plan.

[2] Federal Emergency Management Agency. 2011. "Local Mitigation Plan Review Guide." https://www.fema.gov/media-library-data/20130726-1809-25045-7498/plan_review_guide_final_9_30_11.pdf.
[3] Federal Emergency Management Agency. 2013. "Local Mitigation Planning Handbook." https://www.fema.gov/media-library-data/20130726-1910-25045-9160/fema_local_mitigation_handbook.pdf.
[4] Federal Emergency Management Agency. 2013. "Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards." https://www.fema.gov/media-librarydata/20130726-1904-25045-0186/fema_mitigation_ideas_final508.pdf.

Hazard Mitigation Planning Process

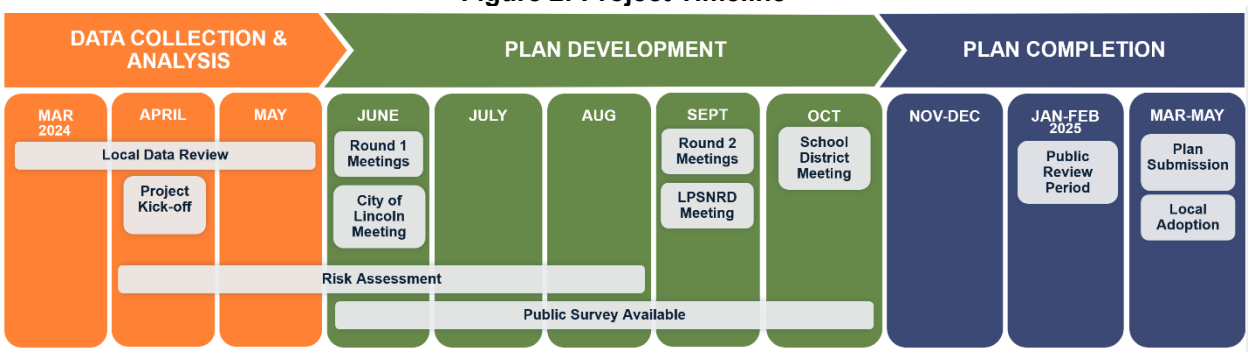
The hazard mitigation planning process as outlined by FEMA has four general steps which are detailed in the figure below. The mitigation planning process is rarely a linear process. It's common that ideas developed during the initial assessment of risks may need revision later in the process, or that additional information may be identified while developing the mitigation plan or during the implementation of the plan that results in new goals or additional risk assessments. The four-step approach is described in the figure below.



Plan Update Schedule

The LPSNRD secured funding for their multi-jurisdictional hazard mitigation plan (HMP) in 2023. JEO Consulting Group, INC. (JEO) was hired to guide and facilitate the planning process and assemble the multi-jurisdictional hazard mitigation plan. For the planning area, David Potter (Assistant General Manager with LPSNRD) led the development of the plan and served as the primary point-of-contact throughout the project. A clear timeline of this plan update process is provided in Figure 2.

Figure 2: Project Timeline



PROJECT KICK-OFF MEETING

A kick-off meeting was held on April 25, 2024 at the Lower Platte South NRD Office to discuss an overview of the planning process between JEO staff and the Regional Planning Team. Discussion at this meeting included participation requirements for communities, required changes to the HMP process from the previous planning effort, planning team establishment, identifying all potential plan participants or key stakeholders, goals and objectives, and a general schedule for the plan update. This meeting also assisted in clarifying the role and responsibilities of the Planning Team and strategies for public engagement throughout the planning process. Table 2 shows Kick-off Meeting attendees. Meeting minutes are available in *Appendix A.*

Table 2: Kick-off Meeting Attendees

Name	Jurisdiction
Amanda Burki	Lincoln-Lancaster County
Angelina Allen	NEMA
David Potter	LPSNRD
Emma Martin	City of Lincoln
Kelly Oelke	City of Hickman
Jessica Quady	City of Ashland
Jim Davidsaver	Lincoln-Lancaster County
Marisa Alvares	NEMA
Mark Hosking	LES
Mark Lindemann	LPSNRD
Michael Jensen	Cass County
Mike Sousek	LPSNRD
Ryan Vulgamott	City of Plattsmouth
Stephanie Rouse	Lincoln-Lancaster County
Terry Kathe	City of Lincoln
Tim Zach	City of Lincoln
Brooke Seachord	JEO
Becky Appleford	JEO
Lalit Jha	JEO

Key topics of discussion at the Kick-off Meeting and decisions made include:

- A review of regulatory updates and changes for the 2025 HMP
- Discussion and revision of goals and objectives to guide the planning process
- Hazard identification and evaluation for inclusion in 2025 HMP
- Identify public engagement strategies and specific agencies or vulnerable population pockets
- Overview of project schedule

PARTICIPANT INVOLVEMENT

Participants play a key role in developing individual profiles with specific, meaningful, and measurable information pertaining to their community or jurisidiction. Participants were asked to review goals and objectives identifying hazards, provide a record of historical disaster occurrences and localized impacts, identify and prioritize potential mitigation projects and strategies, and the review or develop the annual review procedures. To be a participant in the development of this HMP update, jurisdictions were required to attend a Hazard Mitigation Planning meeting with JEO staff with a minimum of one representative and provide relevant information throughout the plan update process. Following plan completion and per FEMA requirements, jurisdictions who participated in the HMP process were required to adopt the plan via resolution within one year of plan approval. The City of Plattsmouth adopted the plan prior to plan submission and approval with NEMA and FEMA; whereas all other jurisdictions elected to approve the plan pending state and federal approval.

Outreach to eligible jurisdictions included notification prior to all public meetings, phone calls and email reminders of upcoming meetings, and invitations to complete surveys and worksheets required for the planning process. Some jurisdictions sent multiple representatives to meetings. For jurisdictions who had only one representative, they were encouraged to bring meeting materials back to their governing bodies, to include a diverse input on the meeting documents. Of note, specific entities or positions invited to each of the meetings included: clerk or administrative personnel, public works or utility superintendents, planning and zoning administrators, county emergency managers, local governing bodies (county commissioners or village boards), fire departments, county sheriffs, and/or other special entities such as local engineers, the NRD, dam owners, and local health care facilities. Due to the diverse nature of this planning area from large metropolitan areas to small limited capacity villages, some jurisdictions did not have many of these positions filled or these representatives were not able to attend scheduleds meetings. When that was the case, copies of the plan were emailed or mailed for review or comment as appropriate. Sign-in sheets from all public meetings can be found in *Appendix A*. Table 3 provides a summary of outreach activities utilized in this process.

Table 3: Outreach Activity Summary

Action	Intent
Project Website	Informed the public and local/planning team members of past, current, and future activities (https://jeo.com/lpsnrdhmp)
Round 1 Meeting Letters, Emails, or Phone Calls	Sent to participants, stakeholders, and neighboring jurisdictions to discuss the agenda/dates/times/ locations of the first round of public meetings
Round 2 Meeting Letters, Emails, or Phone Calls	Sent to participants to discuss the agenda/dates/times/locations of the second round of public meetings
Press Release	Shared with jurisdictions and media to announce the plan and describe the purpose of the plan
Notification Emails	Emailed all participants to remind them about upcoming meetings, material due dates, and/or other pertinent information
Follow-up Emails and Phone Calls	Correspondence was provided to remind and assist participating jurisdictions with the collection and submission of required local data
Project Flyer	Flyers were posted about the LPSNRD HMP and how to get involved. Flyers were distributed at meetings to post in communities and online.
Word-of-Mouth	Staff discussed the plan with jurisdictions throughout the planning process
Social Media and Survey	Online information shared via sponsor website and local community social media to distribute notification of planning process, invite public to meetings, and gather relevant information.

ROUND 1 MEETINGS

The intent of these meetings was to familiarize the jurisdictional representatives with an overview of the work to be completed over the next several months, discuss the responsibilities of being a participant, and to collect preliminary information to update the HMP. At Round 1 meetings, jurisdictional representatives (i.e. the local planning teams) were briefed on updates to the Hazard Mitigation Planning guidance, refamiliarized with existing profiles from the 2020 LPSNRD HMP, and began the process to evaluate changes in the community and impacts to hazards previously identified.

Data collected at these meetings included: discuss changes in capability or development in the community, identify the top concerns from each jurisdiction; review and update community lifelines (formerly critical facilities); and reviewing community profile demographics. These meetings also served as an opportunity to gather input on the identification of hazards, such as records of historical occurrences and the community's capability to mitigate and respond to those events.

The following tables show the attendees for each jurisdiction who attended Round 1 meetings.

Table 4: Round 1 Meeting Information

Name	Title	Jurisdiction
Lancaster County – Thursday, June 13th, 2024 @ 6:30pm LPSNRD Office, Lincoln NE *General overview of the HMP planning process, discuss participation requirements, update critical facilities, capabilities assessment, and begin the process of risk assessment and impact reporting.*		
Aly Timmerman	Intern	JEO Consulting
Becky Appleford	Project Manager	JEO Consulting
Brooke Seachord	Lead Planner	JEO Consulting
David Potter	Assistant General Manager	Lower Platte South NRD
Jill Hoefler	Clerk	Village of Firth
Jim Davidsaver	EMA Director	Lancaster County
Jody Anderson	Office Assistant	Village of Ceresco
Mary Baker	Client Development	JEO Consulting
Terry Spoor	Disaster Preparedness Manager	City of Waverly
Chuck Paukaert	Floodplain Manager	Village of Cedar Creek
John Vik	Captain	Lancaster County Sheriff's Office
Jake Rodick	Regional Supervisor Parks	Nebraska Game and Parks Commission
Dan Homes	Chairman	Village of Valparaiso
Stephanie Fisher	City Administrator	City of Waverly
Gary Hellerich	Director	LPSNRD
David Landis	Director	LPSNRD
Cass County – Thursday, June 6th, 2024 @ 6:30pm Cass County Extension Office, Weeping Water NE *General overview of the HMP planning process, discuss participation requirements, update critical facilities, capabilities assessment, and begin the process of risk assessment and impact reporting.*		
Alan Miller		Village of Murray
Becky Appleford	Project Manager	JEO Consulting
Brooke Seachord	Lead Planner	JEO Consulting
David Nuss	Board Chair	Village of Murdock
David Potter	Assistant General Manager	Lower Platte South NRD
Heidi Hoglund	Director of Permits, Codes, and Regulations	City of Hickman
James Dobbins	Board Member	Village of Eagle

Name	Title	Jurisdiction
Jenn Caylor	Board Member	Village of Eagle
Mike Sousek	General Manager	Lower Platte South NRD
Tim Maloney	Deputy Emergency Manager	Cass County EMA
Wanda Prescott	Board Chair	Village of Cedar Creek
Emily Bausch	City Administrator	City of Plattsmouth
Gary Hellwig	General Manager	Cass County Rural Water District
Steve Van Gorp	Assistant Chief	Murray Fire and Rescue
Jeff Clymer	District Representative	Cass County RWD #2

ROUND 2 MEETINGS

The identification and prioritization of mitigation measures is an essential component in developing effective hazard mitigation plans. The intent of Round 2 meetings was to review updates made to the profiles from information gathered at Round 1 meetings, update mitigation actions carried over from the 2020 HMP, and identify new mitigation actions to address changes in priorities or capacity.

Local planning teams were asked to ensure all information included was up-to-date and accurate. Information/data reviewed include but was not limited to: local hazard prioritization results; identified critical facilities and map review; concentrations of populations identified as 'highly vulnerable'; future mitigation projects. There was also a brief discussion about the planning process, when the plan would be available for public review and comment, annual review of the plan, and the approval and grant opportunities available once the plan was approved.

The following tables show the attendees for each jurisdiction who attended Round 2 meetings.

Table 5: Round 2 Meeting Information

Name	Title	Jurisdiction
Lancaster County – Thursday, September 26th, 2024 @ 10:00am LPSNRD Office, Lincoln NE *Review past and identify new mitigation actions, review of local data and community profile, discuss review process, complete NFIP summary information.*		
April Faubion	Village Clerk	City of Malcolm
Brooke Seachord	Lead Planner	JEO Consulting
David Potter	Assist. Gen. Manager	LPSNRD
James Davidsaver	Emergency Manager	Lancaster County
Jena Vogt	Civil Engineer	Lancaster County
Jill Hoefler	Clerk	Village of Firth
Joan Lindgren	Clerk	Village of Ceresco
Jody Anderson	Office Assistant	Village of Ceresco
John Vik	Captain	Lancaster Co Sherif
Karen Wilson	OD – Optometry	Nebraska Medicine
Lalit Jha	Engineer	JEO Consulting
Leshan Taruru	Admin Specialist	Lancaster County
Michele Lincoln	Building and Zoning Administrator	City of Bennet
Nadine Leik	Village Clerk	City of Malcolm
Sam Otte	Intern	JEO Consulting
Lancaster County – Thursday, September 26th, 2024 @ 6:30pm LPSNRD Office, Lincoln NE *Review past and identify new mitigation actions, review of local data and community profile, discuss review process, complete NFIP summary information.*		

Brooke Seachord	Lead Planner	JEO Consulting
Dan Homes	Board Chair	Village of Valparaiso
David Potter	Asst. Gen. Admin	LPSNRD
Mary Baker	Client Manager	JEO Consulting
Sam Otte	Intern	JEO Consulting
Stephanie Fisher	City Administrator	City of Waverly
Terry Maul		Village of Sprague
Cass County – Tuesday, September 17th, 2024 @ 6:30pm Cass County Extension Office, Weeping Water NE *Review past and identify new mitigation actions, review of local data and community profile, discuss review process, complete NFIP summary information.*		
Becky Appleford	Project Manager	JEO Consulting
Bill Krejci	Zoning Administrator	City of Ashland
Chad Korte	Emergency Manager	Cass County
Charles Paukert	Flood Plain Manager	Village of Cedar Creek
Chris Juilfs	Board Member	Village of Alvo
David Porter	Assistant General Manager	Lower Platte South NRD
Gary Estes	Board Member	Village of Alvo
Heidi Hoglund	Zoning Administrator	City of Hickman
Joan Lindgren	Clerk	Village of Ceresco
Joel Jones	Public Works Director	Coty of Louisville
Leroy Lewis	Asst. Fire Chief	City of Plattsmouth
Michael Barrett	Mayor	City of Weeping Water
Nick Nystrom	Clerk	Village of Eagle
Ruva Tsoka	Community Junior Planner	JEO Consulting

One-on-One Meetings

In addition to Round 1 and Round 2 meetings, specific jurisdiction specific meetings were held for the City of Lincoln, Lower Platte South NRD, and school districts. The intent of these meetings were to address more nuanced concerns for each jurisdiction, as their needs and capacity to implement mitigation measures differ from the general planning area as a whole.

Additionally, follow up one-on-one meetings were held with several communities who did not have representatives present at public meetings. Attendees for all these meetings are detailed in the table below.

Table 6: LPSNRD One-on-One Meeting Attendees

Name	Title	Jurisdiction
City of Lincoln – Tuesday, June 16, 2024		
Emma Martin	City Planner	City of Lincoln
Jared Nelson	Watershed Management Division	City of Lincoln
Jim Davidsaver	Director Emergency Management	Lincoln/Lancaster County
Tim Zach	Watershed Management Division	City of Lincoln
Travis Laughin	Transportation and Utilities Security Manager	City of Lincoln – Lancaster County
Mike Smith	Assistant Fire Chief	Lincoln Fire and Rescue
Ben Kopsa	Police Captain	Lincoln Police
David Potter	Assistant General Manager	Lower Platte South NRD
Kim Morrow	Chief Sustainability Officer	City of Lincoln
Al Langdale	Operation/Maintenance Coordinator	Lower Platte South NRD
Leshan Tarum	Emergency Management	Lincoln/Lancaster County
Brooke Seachord	Planner	JEO Consulting Group

Name	Title	Jurisdiction
Becky Appleford	Project Manager	JEO Consulting Group
Lower Platte South NRD – Thursday, September 19, 2024		
Mike Sousek	General Manager	Lower Platte South NRD
David Potter	Assistant General Manager	Lower Platte South NRD
Craig Matulka	Stormwater/Watershed Specialist	Lower Platte South NRD
Al Langdale	Operation/Maintenance Coordinator	Lower Platte South NRD
Bryce Jensen	Land & Flood Control Operations Coordinator	Lower Platte South NRD
Drew Ratkovec	Projects Coordinator	Lower Platte South NRD
Will Inselman	Resources Coordinator	Lower Platte South NRD
Brooke Seachord	Project Planner	JEO Consulting Group
School Districts Meeting – Wednesday, October 30, 2024		
Scott Wieskamp	Director of Operation	Lincoln Public Schools, District 1
Bryon Hanson	Superintendent	Raymond Central Public Schools
Kevin Reiman	Superintendent	Weeping Water Public Schools
Michael Apple	Superintendent	Conestoga Public Schools
Brooke Seachord	Project Planner	JEO Consulting Group
Village of Elmwood – Tuesday, November 12, 2024		
Alicia Griese	Village Clerk	Village of Elmwood
Ruva Tsoka	Planner	JEO Consulting Group
Brooke Seachord	Project Coordinator	JEO Consulting Group
Village of Denton – Wednesday, November 13, 2024		
Charlotte TeBrink	Village Clerk	Village of Denton
Ruva Tsoka	Planner	JEO Consulting Group
Brooke Seachord	Project Coordinator	JEO Consulting Group
Village of Manley – Monday, November 18, 2024		
Lindsy Cronk	Village Clerk	Village of Manley
Ruva Tsoka	Planner	JEO Consulting Group
Brooke Seachord	Project Coordinator	JEO Consulting Group
Village of Raymond – Thursday, December 5, 2024		
Judy Nissen	Village Clerk	Village of Raymond
Wayne Regnier	Water Operator	Village of Raymond
Brooke Seachord	Project Coordinator	JEO Consulting Group

Public Outreach and Engagement

Stakeholders and Neighboring Jurisdictions

At the beginning of the planning process key stakeholder groups were identified that could provide other information or provide additional input to the planning process. Stakeholders can provide valuable information to regional risk assessment and community mitigation strategy implementation, while not directly eligible to participate in the HMP as a 'Participant'. A wide range of potential stakeholders were contacted and encouraged to participate which included local and regional agencies, agencies that regulate development, nonprofit organizations, airports, health departments, local churches, economic development districts, and state agencies.

The following tables lists stakeholder and neighboring communities or entities contacted and encouraged to participate or provide input in the planning process. Comments and information provided by stakeholders were incorporated into applicable community profiles or hazard descriptions as appropriate.

Table 7: Notified Stakeholder Groups

Stakeholder Name	Type	Stakeholder Name	Type
Access Family Medicine Direct Primary Care	Hospital	Lower Big Blue NRD	Neighboring Jurisdiction
Alivation Health	Hospital	Lower Platte North NRD	Neighboring Jurisdiction
Appian Way Lake Association Inc	High Hazard Dam	Madonna Rehabilitation Hospital Lincoln	Hospital
Assisted Living at Grand Lodge	Medical Facilities	Mills County	Neighboring Jurisdiction
Assisted Living at the Landing	Medical Facilities	NE Urban Indian Medical Center	Hospital
Aster Hill	Medical Facilities	Nebraska Game & Parks Commission	High Hazard Dam
Avant Total Health	Hospital	Nebraska Heart Hospital dba CHI Health Nebraska H	Hospital
Aviva Woodlands	Medical Facilities	Nebraska Internal Medicine	Hospital
Bailey Pointe on Van Dorn	Medical Facilities	Nebraska State Farm Service Agency	Farm Service Agency
Beaver Lake Association	High Hazard Dam	Nemaha Natural Resources District	High Hazard Dam
Bluestem Health 360	Hospital	Nemaha Natural Resources District	High Hazard Dam
Bluestem Main	Hospital	Nemaha NRD	Neighboring Jurisdiction
Bluestem Thompson	Hospital	Nolte Farms Airport	Airport (Privately Owned)
Browns Airport	Airport (Privately Owned)	Norris Public Power District	Public Power District
Bryan Medical Center	Hospital	NorthPointe Family Medicine	Hospital
Butler County	Neighboring Jurisdiction	Northrup & Associates	Hospital

Stakeholder Name	Type	Stakeholder Name	Type
Butler County	Neighboring Jurisdiction	O.U.R. Homes	Medical Facilities
Butler Public Power District	Public Power District	O.U.R. Supported Living	Medical Facilities
Can 210 Eastridge	Medical Facilities	Omaha Public Power District	Public Power District
Can 6720 Cleveland Street	Medical Facilities	Orchard Park	Medical Facilities
Capital Medical Clinic	Hospital	Otoe County	Neighboring Jurisdiction
Cass & Otoe County Extension	NE Extension Offices	Otoe County	Neighboring Jurisdiction
Cass County Farm Service Agency	Farm Service Agency	Papio-Missouri NRD	Neighboring Jurisdiction
Cass County Nebraska Economic Development Council	Economic Development District	Pediatrics at Kreshel Clinic	Hospital
Cedar Creek at High Plains	Medical Facilities	Pemberly Place Senior Living	Medical Facilities
CEDARS Youth Services	Vulnerable Population	Peoples City Mission	Vulnerable Population
CenterPointe	Hospital	Pine Lake Health	Hospital
Cheney Ridge Family Medical Clinic	Hospital	Plattsmouth Chamber of Commerce	Chamber of Commerce
CHI Direct Primary Care Stevens Creek	Hospital	Plattsmouth Municipal Airport	Airport
CHI Health Clinic	Hospital	Ponca Health Center	Hospital
CHI Health Clinic Antelope Creek	Hospital	Prescott Place	Medical Facilities
CHI Health Clinic- East Lincoln Internal Medicine	Hospital	Primary Care Partners	Hospital
City of Bellevue	Neighboring Jurisdiction	Primary Care Partners	Hospital
City of Crete	Neighboring Jurisdiction	Primary Care Partners	Hospital
City of David City	Neighboring Jurisdiction	Red Cross- Southeast Nebraska	Vulnerable Population
City of Hamburg	Neighboring Jurisdiction	Ross Internal Medicine PC	Hospital
City of Milford	Neighboring Jurisdiction	Saline County	Neighboring Jurisdiction
City of Nebraska City	Neighboring Jurisdiction	Saline County	Neighboring Jurisdiction
City of Papillion	Neighboring Jurisdiction	Salvation Army	Vulnerable Population

Stakeholder Name	Type	Stakeholder Name	Type
City of Plattsmouth	High Hazard Dam	Sarpy County	Neighboring Jurisdiction
City of Riverton	Neighboring Jurisdiction	Sarpy County	Neighboring Jurisdiction
City of Seward	Neighboring Jurisdiction	Sarpy/Cass Public Health Department	Health Department
City of Sidney	Neighboring Jurisdiction	Saunders County	Neighboring Jurisdiction
City of Springfield	Neighboring Jurisdiction	Saunders County	Neighboring Jurisdiction
City of Syracuse	Neighboring Jurisdiction	Seward County	Neighboring Jurisdiction
City of Tabor	Neighboring Jurisdiction	Seward County	Neighboring Jurisdiction
City of Thurman	Neighboring Jurisdiction	Southeast Lincoln Family & Internal Med	Hospital
City of Wilber	Neighboring Jurisdiction	Southeast Nebraska Development District	Economic Development District
Community Alternatives Nebraska	Medical Facilities	Southeast Region	NGPC
Community Alternatives Nebraska, Inc.	Medical Facilities	The Arbors	Medical Facilities
Complete Children's Health	Hospital	The Community Supports Network Inc 2620 SW 14th St	Medical Facilities
Complete Children's Health	Hospital	The Community Supports Network Inc 8125 Joshua Drive	Medical Facilities
Complete Children's Health	Hospital	The Community Supports Network Inc. 4800 Chiswick Drive	Medical Facilities
Denton Airfield Airport	Airport (Privately Owned)	The Community Supports Network Inc.1720 Timber Ridge Road	Medical Facilities
Duncan Aviation	Major Employers	The Grace Space	Medical Facilities
East Lincoln Family Health	Hospital	The Harbor Senior Care	Medical Facilities
Eastridge Adult Day Center	Medical Facilities	The Independence House at Coddington	Medical Facilities
Edgewood Family Physicians	Hospital	The Legacy	Medical Facilities
Fallbrook Assisted Living & Memory Care	Medical Facilities	The Lexington Assisted Living Center	Medical Facilities
Fallbrook Family Health Center	Hospital	The Monarch	Medical Facilities

Stakeholder Name	Type	Stakeholder Name	Type
Family Health & Wellness	Hospital	The Residence at Gramercy	Medical Facilities
Family Physicians Group	Hospital	The Waterford at Wilderness Hills Memory Care	Medical Facilities
Fremont County	Neighboring Jurisdiction	The Waterford at Williamsburg	Medical Facilities
Frontier Pediatric Care	Hospital	The Waterford Care Facility College View, INC	Medical Facilities
Gage County	Neighboring Jurisdiction	United States Army Corps of Engineers	High Hazard Dam
Gage County	Neighboring Jurisdiction	UNL Cultural Center	Vulnerable Population
Gateway Vista	Medical Facilities	UNL Cultural Center	Vulnerable Population
Gracepointe Assisted Living and Memory Care	Medical Facilities	Upper Big Blue NRD	Neighboring Jurisdiction
Hart & Arndt Family Health	Hospital	VA Nebraska Western Iowa	Hospital
Havelock Manor	Medical Facilities	Venture Park Region	NGPC
Haven Manor Hickman	Medical Facilities	Village Gardens Homeowner's Association	High Hazard Dam
Hickman Area Chamber of Commerce	Chamber of Commerce	Village of Adams	Neighboring Jurisdiction
Holmes Lake Family Medicine/Internal Med	Hospital	Village of Bee	Neighboring Jurisdiction
Knolls Senior Living	Medical Facilities	Village of Burr	Neighboring Jurisdiction
Lakeview Living	Medical Facilities	Village of Clatonia	Neighboring Jurisdiction
Lancaster County Extension	NE Extension Offices	Village of Cortland	Neighboring Jurisdiction
Lancaster County Farm Service Agency	Farm Service Agency	Village of Dewitt	Neighboring Jurisdiction
Legacy Estates	Medical Facilities	Village of Douglas	Neighboring Jurisdiction
Legacy Terrace	Medical Facilities	Village of Dunbar	Neighboring Jurisdiction
Lifebrook by Eastmont	Medical Facilities	Village of Dwight	Neighboring Jurisdiction
Lincoln Airport Authority	Airport	Village of Garland	Neighboring Jurisdiction
Lincoln Bickford Cottage L.L.C	Medical Facilities	Village of Garrison	Neighboring Jurisdiction

Stakeholder Name	Type	Stakeholder Name	Type
Lincoln Chamber of Commerce	Chamber of Commerce	Village of Ithaca	Neighboring Jurisdiction
Lincoln Children's Museum	Lincoln Children's Museum	Village of Memphis	Neighboring Jurisdiction
Lincoln Children's Zoo	Lincoln Children's Zoo	Village of Otoe	Neighboring Jurisdiction
Lincoln Country House II, LLC	Medical Facilities	Village of Palmyra	Neighboring Jurisdiction
Lincoln Country House III, LLC	Medical Facilities	Village of Pickrell	Neighboring Jurisdiction
Lincoln Country House, LLC	Medical Facilities	Village of Pleasant Dale	Neighboring Jurisdiction
Lincoln Family Medical Group	Hospital	Village of Staplehurst	Neighboring Jurisdiction
Lincoln Family Medicine Center	Hospital	Village of Ulysses	Neighboring Jurisdiction
Lincoln Family Wellness	Hospital	Village of Unadilla	Neighboring Jurisdiction
Lincoln Parks & Recreation Adult Day Structure Program	Medical Facilities	Waverly Chamber of Commerce	Chamber of Commerce
Lincoln Pediatric Group	Hospital	Wedgewood Manor Lake Association	High Hazard Dam
Lincoln Regional Center	Hospital	Weeping Water Chamber of Commerce	Chamber of Commerce
Lincoln Surgery Center, LLC DBA Lincoln Surgical Ho	Hospital	Williamsburg Family Physicians	Medical Facilities
Lincoln-Lancaster County Health Department	Health Department		

The project sponsor and local planning team representatives was also asked to identify any underserved communities or vulnerable populations in the planning area not already identified, so they could have the opportunity to be involved in the planning process. Several small communities were identified as underserved or vulnerable due to their limited capabilities of staff or capacity. For those communities or populations, the NRD and county Emergency Managers provided additional assistance through outreach and guidance in the planning process.

Public Survey

As identified by the project sponsor, finding effective ways to engage the public and gain feedback can be challenging because the HMP is a complex planning tool. It addresses issues that community members may be unaware of and identifies potential impacts that people may not have dealt with. As a method to engage the general public in the development of the HMP and capture local concerns, priorities, and ideas, the Lower Platte South NRD launched a community survey with the assistance of JEO Consulting Group. A public survey was shared via social media across the planning area to collect specific local information and comments. The public survey was available in English and Spanish to be more accessible to non-English speakers in the City of Lincoln or surrounding areas.

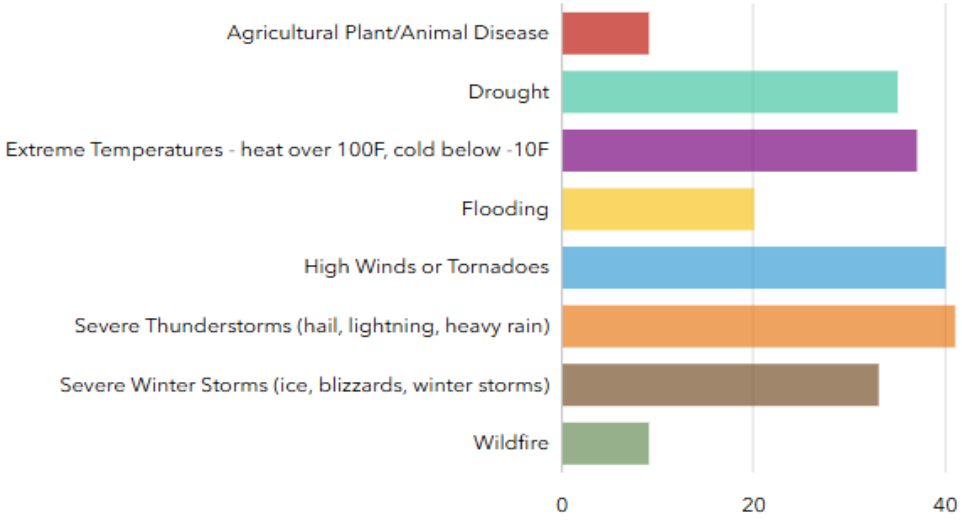
It was determined throughout this planning process that engagement fatigue is prevalent throughout the district and posed additional challenges during plan development.

In total there were 44 responses to the survey with key responses described below.

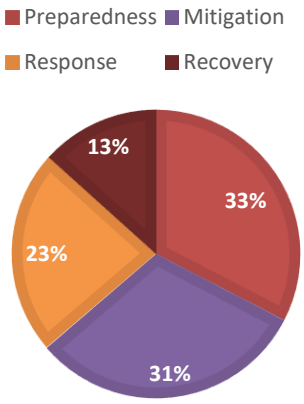
REPRESENTED COMMUNITIES IN PUBLIC SURVEY

Ashland (1)	Clinton (1)	Lincoln (21)	Palmyra (1)	Sprague (1)
Bennet (1)	Denton (1)	Murdock (1)	Plattsmouth (2)	Wahoo (1)
Cass County (2)	Hallam (1)	Murray (1)	Saunders County (1)	Waverly (1)
Ceresco (2)	Lancaster County (3)	NRD (1)	Seward County (1)	

QUESTION: WHAT TYPES OF HAZARDOUS EVENTS HAVE YOU EXPERIENCED IN YOUR CURRENT COMMUNITY?



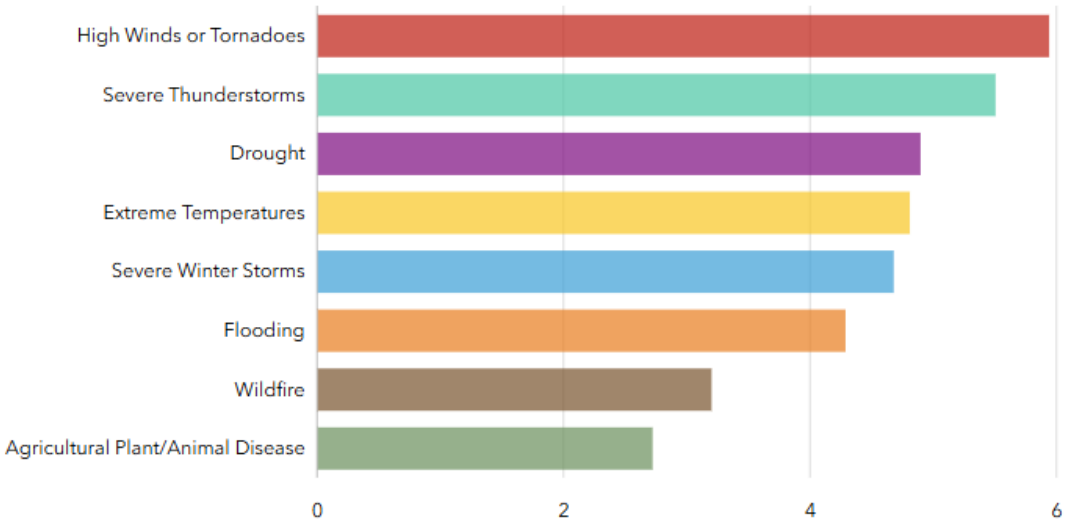
QUESTION: WHICH EMERGENCY MANAGEMENT PHASE DO YOU THINK IS THE MOST IMPORTANT?



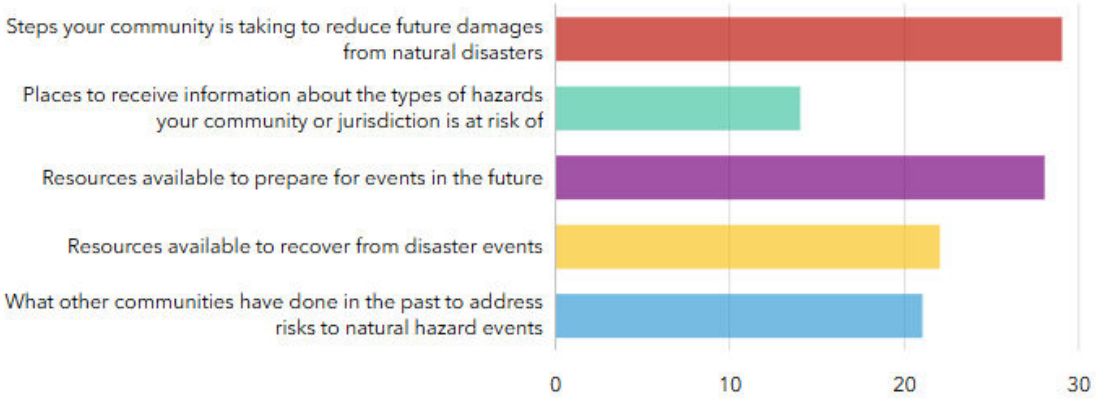
Preparedness was identified as the most important phase of emergency management in the survey, followed closely by mitigation. In the case of the survey, each was defined as:

- *Preparedness – to prepare to handle an emergency (develop plans, stockpile supplies, train or test exercises)*
- *Mitigation - prevent future events or minimize their damaging effects*

QUESTION: OF THE NATURAL HAZARDS LISTED BELOW, RANK EACH HAZARD BASED ON WHICH YOU ARE MOST CONCERNED ABOUT IMPACTING YOUR HOME, COMMUNITY, OR JURISDICTION.



QUESTION: WHAT WOULD YOU LIKE TO KNOW MORE ABOUT?



Lastly, respondents were asked what they would like to see their respective communities do in the future to protect people and infrastructure from future hazard events. Specific suggestions are included the *Community Profiles* as applicable; however, common themes and responses are listed below.

QUESTION: WHAT WOULD YOU LIKE TO SEE YOUR COMMUNITY OR JURISDICTION DO IN THE FUTURE TO REDUCE RISK TO NATURAL DISASTERS OR SEVERE WEATHER EVENTS?

Major themes were identified with specific comments listed below.

- **Outreach and Education**
  - *Continue education on the tools available for pre warning*
  - *Outreach to change behaviors related to fossil fuel consumption seems necessary to ""turn off the tap"" or at least turn down the tap. "*
  - *Educate the public on preventive measures.*
  - *Customized information - seems most of our public information is associated with the Omaha area. Tailored response information for Cass County.*
  - *Public education and outreach focusing on preparedness.*
  - *Promoting increased awareness of severe weather threats.*
  - *Outreach (x2)*
  - *More Community Outreach/information*
  - *Public awareness and practice of mitigation measures.*

    - *Inform the public more about the risks of climate change and how it will affect them personally.*
    - *Would like to see billboards!*
    - *More fun exercises and workshops*
- **Development Guidance**
    - *Plant more trees control, water, erosion and create more rain gardens*
    - *Continued efforts to prevent construction from encroaching on Wilderness Park and the Salt Creek areas. "*
    - *Ensure that with new development flood control measures are taken to prevent erosion and flooding.*
- **Infrastructure Improvements**
    - *Increasing the number of outdoor warning sirens in the county. "*
    - *Increase the reliability of the electric service*
    - *Required storm shelters at all apartment complexes*
    - *Harden infrastructure and conserve/protect groundwater.*
    - *Give each neighborhood bike lanes, trails and transit to quickly get members out of disaster areas. More areas to grow community gardens and localized power station like solar panels over parking lots to decrease reliance on the grid.*
    - *Add some neighborhood places that people can use in case of emergency. We live in an apartment and don't have a safe place to go in our neighborhood for tornadoes and extreme weather. Our power went out from a storm and it got extremely hot and there were no public places that we could go to get some relief for our newborn baby. We ended up having to drive just to get help.*
    - **Flood Specific Comments**
        - *"I would like to see continued protections surrounding the Salt Creek and greenways along the Salt Creek.*
        - *No dams.*
        - *"My primary concern is flooding similar to what we had in 2019. Since then the levees around Offutt Air Base and several flood control streams (Papio, I think) have been increased and fortified. There has not been any activity to mitigate flooding in our area near the Platte River. As far as I know, nothing has been done where the Platte meets the Missouri River. Earlier this spring the Missouri rose and the flow of the Platte reversed it flow for a while. We were getting pretty nervous. Your help with such a project would be greatly appreciated.*
        - *Specific outreach in areas prone to flooding to remove hazardous products and prepare residents for post flooding cleaning.*
        - *Keeping up to date on local infrastructure as it relates to disaster preparedness/projects to prevent future impacts -- knowing and memorizing the low spots that flood first during heavy storms and having related input from county or NRD sources. Disaster recovery info for utilities, food/water resources, damage assessments and claims, etc. Efforts being undertaken to address climate change related investments or divestment.*
- **Vulnerable Populations**
    - *More planning, communication and resources for those at the margins, particularly the unhoused to assist in extreme weather events.*
    -
- **Climate Change**
    - *Accept the fact that the climate is changing and plan for more extreme weather events.*

    - *I am grateful to be living in Lincoln where our mayor understands Climate Change and is leading Lincoln to prepare for problems which may arise.*
    -
- **Emergency Response and Collaboration**
    - *I would like to see my community set an example for the country as far as cooperation with other countries in mitigating climate change, so that our businesses meet international limits for pollution and things like that.*
    - *Better cooperation between NRD and local First Responders*
- **Funding Opportunities**
    - *Funding available for storm shelter as we are looking at doing a building addition to the Fire Station.*
    - *Help with funding project to remove or mitigate risk!*
- **Other**
    - *I appreciate all that the NRD does!*
    - *Would love to see people be more future and community minded. We are as strong as the weakest link, whether people acknowledge or fully understand that or not. People act out when they are desperate and under extreme stress. Sharing knowledge is key - lift everyone up.*
    - *With more frequent severe weather it seems like support to removed dead, unhealthy trees would be helpful. Lots of homeowners can't afford tree care.*

Public Review

Once the draft of the HMP was completed, a public review period was opened to allow for participants and community members at large to review the plan and provide comments and changes. The public review period was open from Monday, January 13, 2025 through Friday, February 14, 2025. Participating jurisdictions were mailed a letter notifying them of this public review period and a draft adoption resolution to ensure the plan was brought before board or council during the review period. The HMP was also made available on the project website (https://jeo.com/lower-platte-south-nrd-multi-jurisdictional-hazard-mitigation-plan-2025-update/) to download the document, and a notification was posted to the LPSNRD website. All other stakeholders and neighboring jurisdictions were also mailed a Public Review Period notice postcard to notify them of the review period and allow them an opportunity to review the draft plan or provide comments. Received comments and suggested changes were incorporated into the plan.

Additionally, specific hazard profiles from Section Four were sent to state technical experts for review. These sections included:

- Drought sent to NeDNR – Drought Division
- Flooding sent to NeDNR – Floodplain Management Section
- Dam Failure and Levee Failure sections sent to NeDNR Dam Safety Section

Received comments and suggested changes were incorporated into the plan. Examples of such revisions are listed in the table below.

Table 8: Public Review Revisions

Name, Title, and/or Agency	Plan Section	Comment/Revision
Ashland	Special Districts Appendix – City of Ashland Community Profile	Minor grammatical revisions. Update to Community Lifelines floodplain status. Updates to Mitigation Action *Wellfield Improvements, Evacuation Planning,* and *Backup Generators.*
Brainard	Special Districts Appendix – Village of Brainard Community Profile	Update to concerns regarding nitrates and removal of Drought as a hazard of top concern. Update to status of plans.

Name, Title, and/or Agency	Plan Section	Comment/Revision
Cass County RWD #1	Special Districts Appendix – Cass County RWD #1 Profile	Updates to Community Lifelines and description of well infrastructure.
Cedar Creek	Cass County Appendix – Village of Cedar Creek Community Profile	Updates to description of Floodplain Management activities and Community Lifelines floodplain status.
Ceresco	Special Districts Appendix – Village of Ceresco Community Profile	Revised Community Lifelines List, update to community boundary in map, updates to Floodplain Administrator, plans and studies, Future Development Trends, and alert sirens coverage.
Firth	Lancaster County Appendix – Village of Firth Community Profile	Revisions to plan and studies summary, status updates to mitigation actions, discussion of local vulnerabilities.
Hallam	Lancaster County Appendix – City of Hallam Community Profile	Updates to plans and studies dates for plan updates and adoption. Updates to future development trends.
Hickman	Lancaster County – City of Hickman Community Profile	Minor grammatical revisions.
Lancaster County – EMA	Lancaster County Appendix – Lancaster County Profile	Updates to community sirens language and capacity. Updates to mitigation action regarding EOC.
Lancaster County – EMA	Lancaster County Appendix – Lancaster County Profile	Updates to community sirens language and capacity. Updates to mitigation action regarding EOC.
Lancaster County – Sheriffs Office	Lancaster County Appendix – Lancaster County Profile	Add new Mitigation Action – Expand Radio Coverage
Lincoln	Lancaster County Appendix – City of Lincoln Profile	Minor grammatical revisions.
Louisville	Cass County Appendix – Village of Louisville Community Profile	Updates to planning team members list and updates to Floodplain Administrator.
Lower Platte South NRD	Special Districts Appendix – Lower Platte South NRD Profile	Updates to local planning team, staff positions and capacity, capabilities, minor grammatical revisions, updates to local plans and studies names, revisions to Future Development Trends, Dam Failure profile descriptions, mitigation action status', and addition of new mitigation action.
Malcolm		*Draft plan reviewed, no revisions requested.*
Manley	Cass County Appendix – Village of Manley Community Profile	Capabilities Updates, community boundary revisions for annexations, new mitigation action included.
Murray		*Draft plan reviewed, no revisions requested.*

Name, Title, and/or Agency	Plan Section	Comment/Revision
Nehawka	Cass County Appendix – Village of Nehawka Community Profile	Updates to local planning team members.
Plattsmouth	Cass County Appendix – City of Plattsmouth Community Profile	Updates to Future Development Trends, minor grammatical updates, revisions to Community Lifelines list and map. Updates to ongoing project updates.
Sprague	Lancaster County Appendix – Village of Sprague Profile	Updates to mitigation action.
Union	Cass County Appendix – Village of Union Community Profile	Updates to local community demographics, water infrastructure information updates, removal of High Winds and Tornadoes as hazard of top concern, update of completed mitigation action.
Valparaiso	Special Districts Appendix – Village of Valparaiso Community Profile	Update to Mitigation Action – Lift Station Improvements
Weeping Water Public Schools		*Draft plan reviewed, no revisions requested.*

Plan Adoption

Based on FEMA requirements, this multi-jurisdictional hazard mitigation plan must be formally adopted by each participant through approval of a resolution. This approval will create 'individual ownership' of the plan by each participant. Formal adoption provides evidence of a participant's full commitment to implement the plan's goals, objectives, and action items. A copy of the resolution draft submitted to participating jurisdictions is located in *Appendix A*. Copies of adoption resolutions may be requested from the State Hazard Mitigation Officer.

Requirement §201.6(c)(5): For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.

Hazard mitigation plans are living documents. Once an HMP has been adopted locally, participants are responsible for implementing identified projects, maintaining the plan with relevant information, and fully updating the plan every five years. The plan must be monitored, evaluated, and updated on a five-year or less cycle. Those who participated directly in the planning process would be logical champions during reviews between and during the five-year cycle update of the plan. It is critical that the plan be reviewed at regular intervals and when a hazard event occurs that significantly affects the area or individual participants. These reviews are the responsibility of each jurisdiction's local planning team and should be documented and reflected in the plan via amendments. Participants are encouraged to work alongside the project sponsor (Lower Platte South NRD), their local County Emergency Management departments or the consultant (JEO) to document updates and revise the HMP as needed.

Additional implementation of the mitigation plan should include integrating HMP goals and mitigation and strategic actions into local planning mechanisms as available. Section Six describes the system that jurisdictions participating in the HMP have established to monitor the plan; provides a description of how, when, and by whom the HMP process and mitigation and strategic actions will be evaluated; presents the criteria used to evaluate the plan; and explains how the plan will be maintained and updated.

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SECTION THREE
PLANNING AREA PROFILE

INTRODUCTION

To identify jurisdictional vulnerabilities, it is vitally important to understand the people and built environment of the planning area. The following section provides a summary of characteristics for the Lower Platte South NRD District. Many characteristics are covered in each jurisdiction's community profile, including: demographics; transportation routes; and structural inventory. Redundant information will not be covered in this section. Therefore, this section will highlight at-risk populations and characteristics of the built environment that add to regional vulnerabilities

PLANNING AREA GEOGRAPHIC SUMMARY

The LPSNRD is located is eastern Nebraska and covers 1,670 square miles and includes all or part of six counties including: Lancaster, Cass, Otoe, Saunders, Butler, and Seward Counties. The majority of the over one million acres of land in the NRD lies within Rolling Hill regions, with some small areas in the including Valleys, Bluffs and Escarpments, and Plains topography. Rolling hills are hilly lands with moderate to steep slopes and rounded ridge crests; valleys are flat-lying land along major streams and include stream-deposited silt, clay, sand, and gravel materials; bluffs and escarpments are rugged areas with very steep and irregular slopes; and plains are flat-lying land that lies above the valley.

The main rivers in the planning area are the Missouri River which runs along the eastern border of LPSNRD and Cass County, and the Platte River which runs along the northern border of the NRD. Several important tributaries are also located within the planning area including, but not limited to: Salt Creek, Haines Branch Creek, Olive Brach Creek, Hickman Branch, Stevens Creek, Weeping Water Creek, Oak Creek, Rock Creek, and Wahoo Creek. Major waterbodies within the planning area include Branched Oak Lake, Pawnee Lake, Twin Lakes, Conestoga Lake, Yankee Hill Lake, Bluestem Lake, Olive Creek Lake, Stagecoach Lake, Wagon Train Lake, and Beaver Lake.[5]

The planning area includes one of the most heavily populated areas in the state, the City of Lincoln, with most of the remaining area comprised of developed communities, pasture/grassland, cropland, rivers and water bodies.

DEMOGRAPHICS AND AT-RISK POPULATIONS

The planning area includes all of Lancaster and Cass Counties, and portions of Otoe, Seward, Butler, and Saunders Counties. While neither the NRD or U.S. Census Bureau collects specific demographic information for the NRD, it serves an estimated population of 359,458.[6] This population includes a range of demographics and persons at risk to natural and man-made disasters.

Table 9: Estimated Population for Planning Area

Age	Planning Area	State of Nebraska
<5	5.5%	6.9%
5-18	18.1%	20.7%
19-64	58.1%	57.6%
>64	18.3%	14.8%
Median	40.4	36.3

Source: U.S. Census Bureau
**Numbers include estimates from Lancaster and Cass Counties and the communities of Ashland, Brainard, Ceresco, and Valparaiso*

[5] Lower Platte South Natural Resources District. Public Lakes and Wildlife Management Areas. Accessed March 2019. https://lpsnrd.maps.arcgis.com/apps/MapJournal/index.html?appid=a07535d5d2f64bffbef4ca2ec6c8cd0e.
[6] Lower Platte South Natural Resources District. 2024. Lower Platte South About. https://www.lpsnrd.org/about.

AT-RISK POPULATIONS

In general, at-risk populations may have difficulty with medical issues, poverty, extremes in age, and communications due to language barriers. Several outliers may be considered when discussing potentially at-risk populations, including:

- Not all people who are considered "at-risk" are at-risk;
- Outward appearance does not necessarily mark a person as at-risk;
- A hazard event will, in many cases, impact at-risk populations in different ways.

The National Response Framework defines at-risk populations as "…populations whose members may have additional needs before, during, and after an incident in functional areas, including but not limited to: maintaining independence, communication, transportation, supervision, and medical care."[7]

Dependent children under 19 years old are one of the most vulnerable populations to disasters.[8] The majority of people in this age group do not have access to independent financial resources, transportation, or cellular telephones. They also lack practical knowledge necessary to respond appropriately during a disaster. Despite this vulnerability, children are generally overlooked in disaster planning because the presence of a care-taker is assumed. With over a quarter of the planning area's total population younger than 19, children are a key vulnerable group to address in the planning process. Nearly a quarter of these children are under the age of five, further exacerbating their vulnerability.

Schools house a high number of children within the planning area during the daytime hours of weekdays, as well as during special events on evenings and weekends. The following table identifies the various school districts located within the planning area, and Figure 3 is a map of the school district boundaries. This list is comprehensive and does not represent only the school districts participating in this plan.

Table 10: School Inventory

School District	Total Enrollment (2023-2024)	# of Schools in District
Conestoga Public Schools	700	2
Crete Public Schools	2,268	5
East Butler Public Schools	310	3
Elmwood-Murdock Public Schools	519	2
Lincoln Public Schools	41,654	67
Louisville Public Schools	689	3
Malcolm Public Schools	639	2
Norris Public Schools	2,409	4
Plattsmouth Community Schools	1,459	4
Raymond Central Public Schools	752	5
Waverly Public School District	2,134	5
Weeping Water Public Schools	306	3

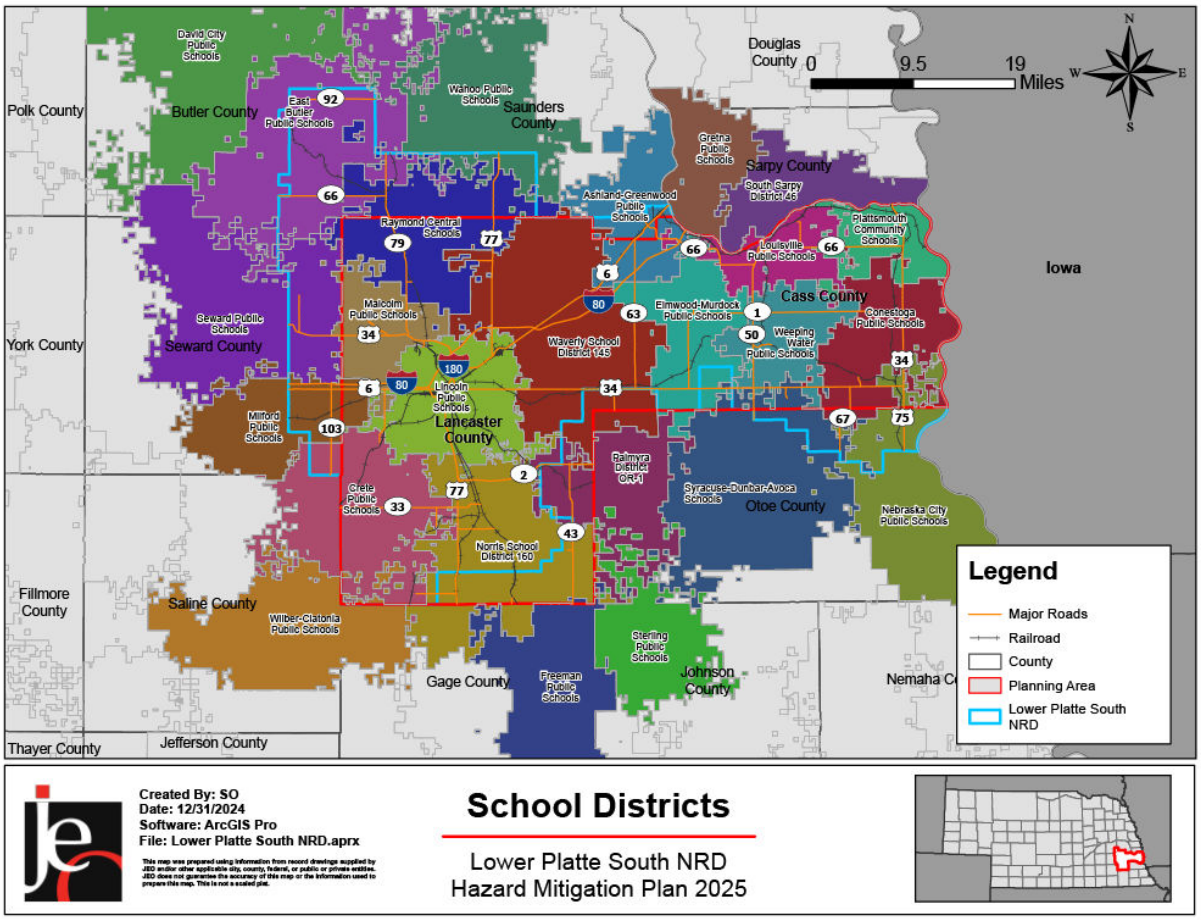
Source: Nebraska Department of Education[9]

[7] United States Department of Homeland Security. June 2016. "National Response Framework Forth Edition." https://www.fema.gov/media-library-data/1572366339630-0e9278a0ede9ee129025182b4d0f818e/National_Response_Framework_4th_20191028.pdf.

[8] Flanagan, Gregory, Hallisey, Heitgerd, & Lewis. 2011. "A Social Vulnerability Index for Disaster Management." Journal of Homeland Security and Emergency Management, 8(11): Article 3.

[9] Nebraska Department of Education. 2019. "Nebraska Education Profile: District and School Data." Accessed March 2019. http://nep.education.ne.gov/ .

Figure 3: Regional School Districts



Like minors, seniors (age 65 and greater) are often more significantly impacted by temperature extremes. During prolonged heat waves, seniors may lack resources to effectively address hazard conditions and as a result may incur injury or potentially death. Prolonged power outages (either standalone events or as the result of other contributing factors) can have significant impacts on any citizen relying on medical devices for proper bodily functions. One study conducted by the Center for Injury Research and Policy found that increases in vulnerability related to severe winter storms (with significant snow accumulations) begin at age 55.[10] The study found that on average there are 11,500 injuries and 100 deaths annually related to snow removal. Males over the age of 55 are 4.25 times more likely to experience cardiac symptoms during snow removal.

While the previously identified populations do live throughout the planning area, there is the potential that they will be located in higher concentrations at care facilities. Table 11 identifies the number and capacity of care facilities throughout the planning area.

Table 11: Inventory of Care Facilities

Jurisdiction	Hospitals	Hospital Beds	Health Clinics	Adult Care Homes	Adult Care Beds	Assisted Living Homes	Assisted Living Beds
Cass County	0	0	1	3	244	4	179

[10] Center for Injury Research and Policy. January 2011. "Snow Shoveling Safety." Accessed July 2017. http://www.nationwidechildrens.org/cirp-snow-shoveling.

Jurisdiction	Hospitals	Hospital Beds	Health Clinics	Adult Care Homes	Adult Care Beds	Assisted Living Homes	Assisted Living Beds
Lancaster County	8	1,349	24	15	1,573	43	2,603
*Ashland	0	0	0	1	97	1	129

Source: Nebraska Department of Health and Human Services[11,12,13,14]
**Ashland is located in Saunders County, however the community is participating in this plan update*

In addition to residents being classified as at-risk by age, there are other specific groups within the planning area that experience vulnerabilities related to their ability to communicate or their economic status. 14 provides statistics per county regarding households with English as a second language (ESL) and population reported as in poverty within the past 12 months.

Table 12: ESL and Poverty At-Risk Populations

County	Percent That Speaks English as Second Language	Families Below Poverty Level
Cass County	2.6%	4.9%
Lancaster County	11.5%	11.2%

Source: U.S. Census Bureau[15,16]

Residents below the poverty line may lack resources to prepare for, respond to, or recover from hazard events. Residents with limited economic resources will struggle to prioritize the implementation of mitigation measures over more immediate needs. Further, residents with limited economic resources are more likely to live in older, more vulnerable structures. These structures could be: mobile homes; located in the floodplain; located near know hazard sites (i.e. chemical storage areas); or older poorly maintained structures. Residents below the poverty line will be more vulnerable to all hazards within the planning area.

Residents who speak English as a second language may struggle with a range of issues before, during, and after hazard events. General vulnerabilities revolve around what could be an inability to effectively communicate with others or an inability to comprehend materials aimed at notification and/or education. When presented with a hazardous situation it is important that all community members be able to receive, decipher, and act on relevant information. An inability to understand warnings and notifications may prevent non-native English speakers from reacting in a timely manner. Further, educational materials related to regional hazards are most often developed in the dominant language for the area, for the planning area that would be English. Residents who struggle with English in the written form may not have sufficient information related to local concerns to effectively mitigate potential impacts. Residents with limited English proficiency would be at an increased vulnerability to all hazards within the planning area.

Similar to residents below the poverty line, racial minorities tend to have access to fewer financial and systemic resources that would enable them to implement hazard mitigation projects and to respond and recover from hazard events, including residence in standard housing and possession of financial stability. While the planning area is primarily White, not Hispanic, diversity has increased since 2010. However, these small changes in racial inequity will likely not significantly affect the community's vulnerability to hazards (Table 13).

[11] Department of Health and Human Services. December 2024. "Assisted Living Facilities" https://dhhs.ne.gov/licensure/Documents/ALF%20Roster.pdf."
[12] Department of Health and Human Services. December 2024. "Hospitals." http://dhhs.ne.gov/publichealth/Documents/Hospital%20Roster.pdf.
[13] Department of Health and Human Services. December 2024. "Long Term Care Facilities." http://dhhs.ne.gov/publichealth/Documents/LTCRoster.pdf .
[14] Department of Health and Human Services. December 2024. "Rural Health Clinic." http://dhhs.ne.gov/publichealth/Documents/RHC_Roster.pdf.
[15] U.S. Census Bureau. 2024. "Language Spoken at Home: 2023 American Community Survey (ACS) 5-year estimates." https://data.census.gov/.
[16] U.S. Census Bureau. 2024. "Selected Economic Characteristics: 2023 ACS 5-year estimate." https://data.census.gov/.

Table 13: Racial Composition Trends

RACE	2010 NUMBER	2010 % OF TOTAL	2020 NUMBER	2020 % OF TOTAL	% CHANGE
WHITE, NOT HISPANIC	278,280	90.0%	260,403	74.6%	-15.4%
BLACK	9,341	3.0%	13,862	4.0%	1.0%
AMERICAN INDIAN AND ALASKAN NATIVE	1,803	0.6%	2,764	0.8%	0.20%
ASIAN	9,888	3.2%	14,194	4.1%	0.70%
NATIVE HAWAIIAN AND OTHER PACIFIC ISLANDER	220	0.1%	215	0.06%	-0.04%
OTHER RACES	3,208	1.0%	10,776	3.1%	2.1%
TWO OR MORE RACES	6,447	2.1%	24,324	7%	4.9%
TOTAL POPULATION	309,187	-	349,206	-	12.9%

Source: U.S. Census Bureau[17,18]
**Numbers include estimates from Cass and Lancaster Counties*

BUILT ENVIRONMENT AND STRUCTURAL INVENTORY

The US Census provides information related to housing units and potential areas of vulnerability. The selected characteristics examined in Table 14 include: lacking complete plumbing facilities; lacking complete kitchen facilities; no telephone service available; housing units that are mobile homes; and housing units with no vehicles.

Table 14: Selected Housing Characteristics

	Cass	Lancaster	Total
Occupied housing units	**10,561 (90%)**	**132,162 (96.0%)**	**142,723**
Lacking complete plumbing facilities	0.1%	0.1%	**143**
Lacking complete kitchen facilities	0.5%	0.7%	**978**
No telephone service available	1.3%	0.6%	**930**
Housing unit with no vehicles available	3%	5.2%	**7,189**
Mobile Homes	4.2%	1.6%	**2,558**

Source: U.S. Census Bureau, 2020[19]
**Indicated percentages are determined based on total housing units*

Less than two percent of housing units lack access to landline telephone service. This does not necessarily indicate that there is not a phone in the housing unit, as cellular telephones are increasingly a primary form of telephone service. However, this lack of access to landline telephone service does represent a population at increased risk to disaster impacts. Reverse 911 systems are designed to contact households via landline services and as a result, some homes in hazard prone areas may not receive notification of potential impacts in time to take protective actions. Emergency managers should continue to promote the registration of cell phone numbers with emergency alert systems.

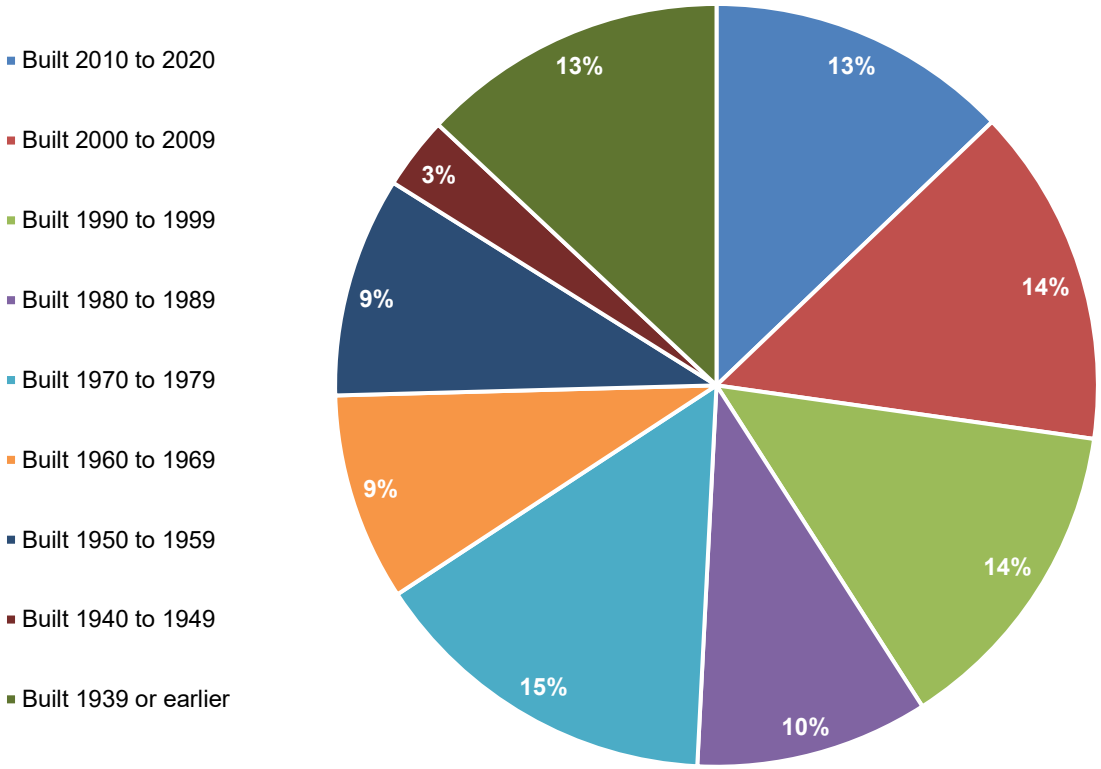
Approximately two percent of housing units in the planning area are mobile homes. Cass County has more mobile homes than Lancaster County, however they make up less than five percent of total housing type. Mobile homes have a higher risk of sustaining damages during high wind events, tornadoes, severe thunderstorms, and severe winter storms. Mobile homes that are either not anchored or are anchored incorrectly can be overturned by 60 mph winds. A thunderstorm is classified as severe when wind speeds exceed 58 mph, placing improperly anchored mobile homes at risk.

[17] U.S. Census Bureau. 2024. "Race: 2010 ACS 5-year estimate." https://data.census.gov/.
[18] U.S. Census Bureau. 2024. "Race: 2020 ACS 5-year estimate." https://data.census.gov/.
[19] U.S. Census Bureau. 2024. "Selected Housing Characteristics: 2023 ACS 5-year estimate." https://data.census.gov/.

Cass County has a higher percentage of unoccupied housing units. Unoccupied homes may not be maintained as well as occupied housing, thus adding to their vulnerability. Furthermore, approximately five percent of all housing units in the planning area do not have a vehicle available. Households without vehicles may have difficulty evacuating during a hazardous event and a reduced ability to access resources in time of need.

Housing age throughout the planning area is spread relatively evenly between prior to 1939 through 2020 (Figure 4). Housing age can serve as an indicator of risk, as structures built prior to state building codes being developed may be more vulnerable. Residents living in these homes maybe at higher risk to the impacts of high winds, tornadoes, severe winter storms, and thunderstorms.

Figure 4: Housing Age in Planning Area



State and Federally Owned Properties

The following table provides an inventory of state and federally-owned properties within the planning area by county. Note that this list includes counties not participating in this plan update but have properties which fall within the Lower Platte South NRD's jurisdictional boundaries. Only properties located within the NRD boundaries are included here.

Table 15: State and Federally-Owned Facilities

Facility	Nearest Community
Cass County	
Civil Bend (USACE)	Union
Eugene T. Mahoney State Park	Ashland
Louisville State Recreation Area	Louisville

Facility	Nearest Community
Platte River State Park	South Bend
Rakes Creek Wildlife Management Area	Murray
Randall W. Schilling Wildlife Management Area	Plattsmouth
Van Horn's Bend (USACE)	Union
William Gillmour Wildlife Management Area	Plattsmouth
Lancaster County	
Administrative Services Department of Nebraska	Lincoln
Aeronautics Dept Of Nebraska	Lincoln
Assistive Technology Partnership & Nebraska Child Fund	Lincoln
Athletic Commission State	Lincoln
Banking & Finance Department of Nebraska	Lincoln
Barber Examiners Board of Nebraska, Energy Office	Lincoln
Bluestem State Recreation Area & Wildlife Management Area	Martell
Branched Oak State Recreation Area & Wildlife Management Area	Raymond
Conestoga Lake State Recreation Area & Wildlife Management Area	Denton
Cotton Tail Wildlife Management Area	Sprague
Deaf & Hard Hearing Commission	Lincoln
Economic Development Department, Revenue Department of NE, Tourism Commission, Employee Relations, Material Division, Risk Management, Task Force for Building Renewal, Agriculture Department of NE, Crime Commission, Education Department of NE, Equal Opportunity Commission, Ethanol Board, Health & Human Services Department of NE, Law Enforcement & Criminal Justice, Nebraska Department of Motor Vehicles, & NE Department of Natural Resources	Lincoln
Engineers & Architects Board Of NE, Geologists Board of NE, & Landscape Architects State Board of NE	Lincoln
Environmental Trust	Lincoln
Farm Service Agency	Lincoln
Federal Aviation Administration	Lincoln
Federal Bureau of Investigation, National Agricultural Statistics Service, Natural Resources Conservation Service, National Soil Survey Center, Office of Inspector General, Rural Development, US Court, National Park Service, US Department of Labor, Social Security Administration, Federal Highway Administration, Federal Motor Carrier Safety Administration	Lincoln
Fire Marshal	Lincoln
Game and Parks	Lincoln
Hedgefield Wildlife Management Area	Panama
Helmuth Public Access Area	Raymond
Insurance Dept Of Nebraska	Lincoln
Jack Sinn Memorial Wildlife Management Area	Ceresco
Killdeer Wildlife Management Area	Martell
Labor Department of Administrative Offices	Lincoln
Lincoln USDA Service Center	Lincoln
Little Salt Creek West Wildlife Management Area	Raymond
Little Salt Fork Marsh Preserve Wildlife Management Area	Raymond
Merganser Wildlife Management Area	Martell
National Agroforestry Center	Lincoln
National Guard Headquarters	Lincoln
National Soil Mechanics Center	Lincoln
Nebraska Forest Service	Lincoln
Nebraska Public Service Commission, Abstracters Boards of Examiners, & Department of Environmental Quality	Lincoln
Nebraska State Penitentiary	Lincoln

Facility	Nearest Community
Olive Creek State Recreation Area & Wildlife Management Area	Hallam
Pawnee Lake State Recreation Area & Wildlife Management Area	Malcolm
State Personnel Division	Lincoln
Roads Department State Headquarters	Lincoln
Stagecoach Lake State Recreation Area & Wildlife Management Area	Hallam
State Patrol	Lincoln
Surplus Property	Lincoln
Tanglewood Wildlife Management Area	Hallam
Teal Wildlife Management Area	Hallam
USDA Agricultural Research Service	Lincoln
USGS Water Resources Division	Lincoln
VA Nebraska-Western Iowa Health Care	Lincoln
Wagon Train State Recreation Area & Wildlife Management Area	Hickman
Wild Plum Wildlife Management Area	Crete
Wildwood Wildlife Management Area	Valparaiso
Yankee Hill Wildlife Management Area	Lincoln
Butler County	
Timber Point Watershed Management Area	Brainard
Otoe County	
Wilson Creek Wildlife Management Area	Otoe
Saunders County	
Catfish Run Wildlife Management Area	Ashland
Jack Sinn Memorial Wildlife Management Area	Ceresco
Larkspur Watershed Management Area	Valparaiso
Red Cedar Watershed Management Area	Brainard
Seward County	
Branched Oak Wildlife Management Area	Raymond
Twin Lakes Wildlife Management Area	Pleasant Dale
Meadowlark Wildlife Management Area	Valparaiso

Source: Nebraska Game and Parks[20]

HISTORICAL SITES

According to the National Register of Historic Places for Nebraska by the National Park Service (NPS), there are 148 historic sites located in the planning area.

Table 16: Historical Sites

Site Name	Date Listed	Nearest Community	County	In Floodplain?
Agricultural Hall	12/10/2010	Lincoln	Lancaster County	No
Albert Watkins House	4/3/1989	Lincoln	Lancaster County	No
Antelope Grocery	3/17/1988	Lincoln	Lancaster County	No
Arthur C Ziemer House	11/23/1977	Lincoln	Lancaster County	No
Ashland Archeological District	11/29/2000	Ashland	Saunders County	No
Ashland Archeological Site	2/10/1975	Ashland	Cass County	No
Ashland Bridge	6/29/1992	Ashland	Saunders County	No
Ashland Public Library	1/27/1983	Ashland	Saunders County	No
Barnes Oil Company	12/5/2002	Ashland	Saunders County	No
Barr Terrace	10/1/1979	Lincoln	Lancaster County	No
Beal Slough Bridge	6/29/1992	Lincoln	Lancaster County	No
Beatrice Creamery Company Lincoln Plant	3/12/2012	Lincoln	Lancaster County	Yes

20 Nebraska Game and Parks. 2019. "Public Access ATLAS." [Web Map]. https://www.google.com/search?q=public+atlas+access&rlz=1C1GCEA_enUS812US812&oq=public+atlas+access&aqs=chrome..69i57j69i60j0l4.3399j0j7&sourceid=chrome&ie=UTF-8 .

Site Name	Date Listed	Nearest Community	County	In Floodplain?
Boulevards Historic District	12/10/2008	Lincoln	Lancaster County	No
Bridge	6/29/1992	Louisville	Cass County	No
Brownbilt Residential Historic District	8/29/2012	Lincoln	Lancaster County	No
Burckhardt House	6/25/1999	Lincoln	Lancaster County	No
Burr Block	5/18/1979	Lincoln	Lancaster County	No
Capt John O'Rourke House	3/2/2006	Plattsmouth	Cass County	No
Cass County Courthouse	1/10/1990	Plattsmouth	Cass County	No
Charles Hurlbut House	9/17/1999	Lincoln	Lancaster County	No
Chicago, Burlington & Quincy Steam Locomotive No. 710	6/20/1997	Lincoln	Lancaster County	Yes
Christian Kupke Farmstead	12/19/2012	Murdock	Cass County	No
Christian Record Building	12/1/1986	Lincoln	Lancaster County	No
City Hall	10/15/1969	Lincoln	Lancaster County	No
College View Public Library	6/28/1984	Lincoln	Lancaster County	No
Davis Theodore Site	5/19/1972	Weeping Water	Cass County	No
Dovey, George E House	11/5/2018	Plattsmouth	Cass County	No
Eastridge Historic District	7/31/2017	Lincoln	Lancaster County	No
Eddy-Taylor House	7/21/1983	Lincoln	Lancaster County	No
Edgar A. Burnett House	7/12/2006	Lincoln	Lancaster County	No
Ehlers Round Barn	6/30/1995	Roca	Lancaster County	No
Fairview	10/15/1966	Lincoln	Lancaster County	No
Federal Trust Building	4/25/2002	Lincoln	Lancaster County	No
First National Bank Building	3/5/1998	Lincoln	Lancaster County	No
First State Bank of Bethany	7/24/1986	Lincoln	Lancaster County	No
Frank and Emma Gillen House	3/5/1998	Lincoln	Lancaster County	No
Frank and Nelle Cochrane Woods House	6/30/1995	Lincoln	Lancaster County	No
Frank M. Spalding House	3/25/1999	Lincoln	Lancaster County	No
Gibson House	3/20/1986	Weeping Water	Cass County	No
Gilmore, Walker, Site (22CC28)	10/15/1966	Murray	Cass County	No
Glenn and Addie Perry Farmhouse	11/8/2006	Plattsmouth	Cass County	No
Goffriend Gustav Pitz Barn	8/27/2012	Plattsmouth	Cass County	No
Gold and Company Store Building	10/19/1982	Lincoln	Lancaster County	No
Government Square	4/15/2004	Lincoln	Lancaster County	No
Greek Row Historic District	6/25/1997	Lincoln	Lancaster County	No
Greer, James and Margaret, Farmstead	3/21/2011	Alvo	Cass County	No
Guy A. Brown House	3/5/1998	Lincoln	Lancaster County	No
Harris House	9/2/1982	Lincoln	Lancaster County	No
Hayward School	8/23/1985	Lincoln	Lancaster County	Yes
Helmer-Winnett-White Flats	10/1/1979	Lincoln	Lancaster County	No
Herter Farmstead	7/24/2000	Walton	Lancaster County	No
Herter Farmstead (Boundary Increase)	7/28/2004	Walton	Lancaster County	No
Hotel Capital	12/5/1983	Lincoln	Lancaster County	No
Hurlbut, Aeneas--Yates, Charles, House	9/17/1999	Lincoln	Lancaster County	No

Site Name	Date Listed	Nearest Community	County	In Floodplain?
Israel Beetison House	4/18/1977	Ashland	Saunders County	No
James A. Beattie House	12/4/1990	Lincoln	Lancaster County	No
James and Margaret Greer Farmstead	3/21/2011	Alvo	Cass County	No
James D. Calhoun House	4/26/2002	Lincoln	Lancaster County	No
Jasper Newton Bell House	6/21/1984	Lincoln	Lancaster County	No
John and Christina Yost House	4/26/2002	Lincoln	Lancaster County	No
John M. Thayer House	12/5/2002	Lincoln	Lancaster County	No
Kehlbeck Farmstead	9/26/1985	Avoca	Cass County	No
Kupke, Christian, Farmstead	12/19/2012	Murdock	Cass County	No
Lancaster Block	4/12/1989	Lincoln	Lancaster County	No
Leonard, Velosco V. House	11/8/2018	Plattsmouth	Cass County	No
Lewis-Syford House	2/18/1971	Lincoln	Lancaster County	No
Lincoln Army Air Field Regimental Chapel	6/17/1993	Lincoln	Lancaster County	No
Lincoln Haymarket Historic District	7/8/2014	Lincoln	Lancaster County	No
Lincoln Liberty Life Insurance Building	1/19/1988	Lincoln	Lancaster County	No
Lincoln Veterans Administration Hospital Historic District	9/10/2012	Lincoln	Lancaster County	No
Lincoln YWCA Building	6/21/1984	Lincoln	Lancaster County	No
Lyman Terrace	10/1/1979	Lincoln	Lancaster County	No
Manley School	12/30/2004	Manley	Cass County	No
Masonic Temple	8/5/2005	Lincoln	Lancaster County	No
McLaughlin-Waugh-Dovey House	10/14/1980	Plattsmouth	Cass County	No
McWilliams House	6/25/1999	Lincoln	Lancaster County	No
Mount Emerald and Capitol Additions Historic Residential District	6/5/1980	Lincoln	Lancaster County	No
Municipal Lighting and Waterworks Plant	7/24/1986	Lincoln	Lancaster County	No
Murphy, William L. and Sydney V., House	11/4/1994	Lincoln	Lancaster County	No
Naomi Institute	3/24/1977	Murray	Cass County	No
National Bank of Ashland	1/27/1983	Ashland	Saunders County	No
Nebraska City to Fort Kearny Cutoff Ruts at Spring Creek Prairie	7/11/2002	Lincoln	Lancaster County	No
Nebraska Governor's Mansion	3/12/2008	Lincoln	Lancaster County	No
Nebraska State Capitol	10/16/1970	Lincoln	Lancaster County	No
Nebraska State Historical Society Building	8/21/2003	Lincoln	Lancaster County	No
Nebraska Telephone Company Building	11/16/1978	Lincoln	Lancaster County	No
Nehawka Flint Quarries	1/26/1970	Nehawka	Cass County	No
Nehawka Public Library	12/5/2002	Nehawka	Cass County	No
Nimrod Ross House	6/25/1999	Lincoln	Lancaster County	No
Nine-Mile Prairie	7/30/1986	Lincoln	Lancaster County	No

Site Name	Date Listed	Nearest Community	County	In Floodplain?
Old Main, Nebraska Wesleyan University	5/21/1975	Lincoln	Lancaster County	No
Old University Library	8/6/1975	Lincoln	Lancaster County	No
Olive Branch Bridge	6/29/1992	Sprague	Lancaster County	No
Palisade and Regent Apartments	3/5/1998	Lincoln	Lancaster County	No
Park Hill	9/3/2010	Lincoln	Lancaster County	No
Park Manor Residential Historic District	9/4/2013	Lincoln	Lancaster County	No
Paul Fitzgerald House	3/2/2006	Louisville	Cass County	No
Paul Gering House	7/12/2006	Plattsmouth	Cass County	No
Perry, Glenn and Addie, Farmhouse	11/8/2006	Plattsmouth	Cass County	No
Peter Peterson Farmstead	2/11/1980	Waverly	Lancaster County	No
Phi Delta Theta Fraternity House	5/28/1986	Lincoln	Lancaster County	No
Phi Kappa Tau Fraternity House	11/25/2005	Lincoln	Lancaster County	No
Pioneers Park	6/17/1993	Lincoln	Lancaster County	No
Pitz, Gottfried Gustav, Barn	8/27/2012	Plattsmouth	Cass County	No
Plattsmouth Bridge	4/15/1993	Plattsmouth	Cass County	No
Plattsmouth Main Street Historic District	9/26/1985	Plattsmouth	Cass County	No
President and Ambassador Apartments	12/10/1993	Lincoln	Lancaster County	No
Quinn Chapel African Methodist Episcopal Church and Parsonage	6/25/1999	Lincoln	Lancaster County	No
R.O. Philips House	11/29/1979	Lincoln	Lancaster County	No
R.O. Stake House	4/27/2005	Lincoln	Lancaster County	No
Retzlaff Farmstead	5/31/1979	Walton	Lancaster County	No
Rock Island Depot	9/3/1971	Lincoln	Lancaster County	No
Rose Kirkwood Brothel	8/28/2012	Lincoln	Lancaster County	No
Royer-Williams House	6/14/1982	Lincoln	Lancaster County	No
Ruffner, Peter E. House	1/26/2016	Plattsmouth	Cass County	No
Ryons-Alexander House	7/8/1982	Lincoln	Lancaster County	No
Schrader Archeological Site	1/21/1974	Roca	Lancaster County	No
Scottish Rite Temple	12/1/1986	Lincoln	Lancaster County	No
Sheldon Memorial Art Gallery	9/3/2013	Lincoln	Lancaster County	No
Sky Park Manor	6/17/2016	Lincoln	Lancaster County	No
Snoke Farmstead	3/5/1998	Eagle	Cass County	No
South Bottoms Historic District	7/17/1986	Lincoln	Lancaster County	No
St. Charles Apartments	9/12/1985	Lincoln	Lancaster County	No
St. Stephen's Episcopal Church	1/25/1979	Ashland	Saunders County	No
State Arsenal	9/17/1981	Lincoln	Lancaster County	No
Stuart Building	12/23/2003	Lincoln	Lancaster County	No
Temple of Congregation B'nai Jeshurun	6/25/1982	Lincoln	Lancaster County	No
Terminal Building	12/29/1986	Lincoln	Lancaster County	No
The Elms	3/24/1977	Elmwood	Cass County	No
Theodore A. Kiesselbach House	7/1/1994	Lincoln	Lancaster County	No

Site Name	Date Listed	Nearest Community	County	In Floodplain?
Thomas P Kennard House	4/16/1969	Lincoln	Lancaster County	No
Tifereth Israel Synagogue	5/9/1985	Lincoln	Lancaster County	No
Union Jail	7/12/2006	Union	Cass County	No
University Place Historic Residential District	2/7/2003	Lincoln	Lancaster County	No
Upper Oak Creek Descent Ruts of the Woodbury Cutoff, Ox Bow Trail of the California Road	11/27/1992	Brainard	Butler County	No
Veith Building	9/18/1980	Lincoln	Lancaster County	No
W.F. Hitchcock House	12/5/2002	Lincoln	Lancaster County	No
Walker Gilmore Site	10/15/1966	Murray	Cass County	No
Weeping Water Historic District	12/8/1972	Weeping Water	Cass County	No
Whitehall	10/29/1982	Lincoln	Lancaster County	No
William H. Charlton House	1/25/1997	Roca	Lancaster County	No
William H. Ferguson House	11/29/1972	Lincoln	Lancaster County	No
William H. Tyler House	4/6/1978	Lincoln	Lancaster County	No
Woods Brothers Building	9/18/1980	Lincoln	Lancaster County	No
Woodshire Residential Historic District	3/29/2011	Lincoln	Lancaster County	No
Wyuka Cemetery	7/19/1982	Lincoln	Lancaster County	No
Yost, John H. and Christina, House	4/26/2002	Lincoln	Lancaster County	No
Young Cemetery Cabin	12/30/2004	Plattsmouth	Cass County	No

Source: National Park Service[21]

Data Sources and Information

Effective hazard mitigation planning requires the review and inclusion of a wide range of data, documents, plans, and studies. The following table identifies many of the sources utilized during this planning process. Individual examples of plan integration are identified in *Section Seven: Community Profiles.*

Table 17: General Plans, Documents, and Information

Data Sources and Information Documents	
Disaster Mitigation Act of 2000 DMA https://www.fema.gov/media-library/assets/documents/4596?id=1935	Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards (2013) https://www.fema.gov/sites/default/files/2020-06/fema-mitigation-ideas_02-13-2013.pdf
Final Rule (2007) https://www.federalregister.gov/documents/2007/10/31/E7-21263/flood-mitigation-assistance	National Flood Insurance Program Community Status Book (2018) https://www.fema.gov/national-flood-insurance-program-community-status-book
Hazard Mitigation Assistance Unified Guidance (2013) https://www.fema.gov/media-library/assets/documents/33634	National Response Framework (2019) https://www.fema.gov/sites/default/files/2020-04/NRF_FINALApproved_2011028.pdf
Hazard Mitigation Assistance Guidance and Addendum (2015) https://www.fema.gov/media-library/assets/documents/103279	Robert T. Stafford Disaster Relief and Emergency Assistance Act (2016) https://www.fema.gov/media-library/assets/documents/15271
Local Mitigation Plan Review Guide (2011)	The Census of Agriculture (2012)

21 National Park Service. June 2019. "National Register of Historic Places NPGallery Database." https://npgallery.nps.gov/nrhp .

Data Sources and Information	
https://www.fema.gov/sites/default/files/2020-06/fema-local-mitigation-plan-review-guide_09_30_2011.pdf	https://www.agcensus.usda.gov/Publications/2012/Full_Report/Census_by_State/Nebraska/
Local Mitigation Planning Handbook (2013) https://scrcog.org/wp-content/uploads/hazard_mitigation/background_material/FEMA_Local_Mitigation_Planning_Handbook_Mar13.pdf	What is a Benefit: Guidance on Benefit-Cost Analysis on Hazard Mitigation Projects https://www.fema.gov/grants/tools/benefit-cost-analysis#:~:text=Benefit%2DCost%20Analysis%20(BCA),BCR%20is%201.0%20or%20greater.
Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards (2013) https://www.fema.gov/sites/default/files/2020-06/fema-mitigation-ideas_02-13-2013.pdf	
Plans and Studies	
Lower Platte South NRD Hazard Mitigation Plan (2025) https://jeo.com/lower-platte-south-nrd-multi-jurisdictional-hazard-mitigation-plan-2025-update/	National Climate Assessment (2014) https://nca2018.globalchange.gov/
Flood Insurance Studies http://www.fema.gov/floodplain-management/flood-insurance-study	Nebraska Drought Mitigation and Response Plan (2000) http://carc.nebraska.gov/docs/NebraskaDrought.pdf
Fourth National Climate Assessment (2018) https://nca2018.globalchange.gov/	State of Nebraska Hazard Mitigation Plan (2014) https://govdocs.nebraska.gov/epubs/m2200/b012-2014.pdf
Technical Resources	
Arbor Day Foundation – Tree City Designation https://www.arborday.8org/programs/treecityusa/directory.cfm	Nebraska Department of Natural Resource – Geographic Information Systems (GIS) https://dnr.nebraska.gov/data
Environmental Protection Agency - Chemical Storage Sites https://myrtk.epa.gov/info/search.jsp	Nebraska Department of Natural Resources http://www.dnr.ne.gov
Federal Emergency Management Agency http://www.fema.gov	Nebraska Department of Natural Resources – Dam Inventory https://www.nebraskamap.gov/datasets/06028e0343764fcb9370dc5a4bf53dc7_0/about
FEMA Flood Map Service Center https://msc.fema.gov/portal/advanceSearch	Nebraska Department of Revenue – Property Assessment Division www.revenue.ne.gov/PAD
High Plains Regional Climate Center https://hprcc.unl.edu/	Nebraska Department of Transportation http://dot.nebraska.gov/
National Agricultural Statistics Service http://www.nass.usda.gov/	Nebraska Emergency Management Agency http://www.nema.ne.gov
National Centers for Environmental Information https://www.ncei.noaa.gov/	Nebraska Forest Service – Wildland Fire Protection Program http://nfs.unl.edu/fire
National Consortium for the Study of Terrorism and Responses to Terrorism (START) http://www.start.umd.edu/gtd/	Nebraska Forest Service (NFS) https://nfs.unl.edu/
National Drought Mitigation Center – Drought Impact Reporter http://droughtreporter.unl.edu/map/	Nebraska Public Power District Service http://econdev.nppd.com/
National Drought Mitigation Center – Drought Monitor http://droughtmonitor.unl.edu/	Nebraska State Historical Society http://www.nebraskahistory.org/histpres/index.shtml

Data Sources and Information Technical Resources	
National Environmental Satellite, Data, and Information Service http://www.nesdis.noaa.gov/	Stanford University - National Performance of Dams Program https://npdp.stanford.edu/
National Fire Protection Association https://www.nfpa.org/	Storm Prediction Center Statistics http://www.spc.noaa.gov
National Flood Insurance Program https://www.fema.gov/national-flood-insurance-program	United States Army Corps of Engineers – National Levee Database https://levees.sec.usace.army.mil/
National Flood Insurance Program https://dnr.nebraska.gov/floodplain/flood-insurance	United States Census Bureau http://www.census.gov
National Historic Registry https://www.nps.gov/subjects/nationalregister/index.htm	United States Census Bureau https://www.census.gov/
National Oceanic Atmospheric Administration (NOAA) http://www.noaa.gov/	United States Department of Agriculture http://www.usda.gov
National Weather Service http://www.weather.gov/	United States Department of Agriculture – Risk Management Agency http://www.rma.usda.gov
Natural Resources Conservation Service www.ne.nrcs.usda.gov	United States Department of Agriculture – Web Soil Survey https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx
Nebraska Association of Resources Districts http://www.nrdnet.org	United States Department of Commerce http://www.commerce.gov/
Nebraska Climate Assessment Response Committee http://carc.agr.ne.gov	United States Department of Transportation – Pipeline and Hazardous Materials Safety Administration https://www.phmsa.dot.gov/
Nebraska Department of Education http://nep.education.ne.gov/	United States Geological Survey http://www.usgs.gov/
Nebraska Department of Education https://www.education.ne.gov/	United States National Response Center https://www.epa.gov/emergency-response/national-response-center
Nebraska Department of Environment and Energy http://www.deq.state.ne.us/	United States Small Business Administration http://www.sba.gov
Nebraska Department of Health and Human Services http://dhhs.ne.gov/Pages/default.aspx	UNL – College of Agricultural Sciences and Natural Resources – Schools of Natural Resources http://casnr.unl.edu

SECTION FOUR
RISK ASSESSMENT

INTRODUCTION

The ultimate purpose of this hazard mitigation plan is to minimize the loss of life and property across the planning area. The basis for the planning process is the regional and local risk assessment. This section contains a description of potential hazards, regional vulnerabilities and exposures, probability of future occurrences, and potential impacts and losses. By conducting a regional and local risk assessment, participating jurisdictions can develop specific strategies to address areas of concern identified through this process. The following table defines terms that will be used throughout this section of the plan.

HAZARD IDENTIFICATION

The identification of relevant hazards for the region began with a review of the 2021 Nebraska State Hazard Mitigation Plan. The Regional Planning Team reviewed, discussed, and determined the list of hazards to be profiled in this hazard mitigation plan update. The hazards for which a risk assessment was completed are listed below.

Table 18: Hazards Addressed in the Plan

Hazards Addressed in the Plan		
Agricultural Plant and Animal Disease	Flooding	Levee Failure
Dam Failure	Grass/Wildfire	Severe Thunderstorms
Drought	Hazardous Materials Release	Severe Winter Storms
Extreme Temperatures	High Winds & Tornadoes	Terrorism

Hazards identified in the 2021 Nebraska State Hazard Mitigation Plan that were not identified in the LPSNRD Hazard Mitigation Plan update include Human Infectious Disease and Power Failure.[22] These hazards were reviewed by the Regional Planning Team and were chosen to not be included in this plan due to a variety of reasons. Power failure is discussed within the hazards that may cause the failure. The Regional Planning Team felt Human Infectious Disease would be better addressed in other planning documents or mechanisms.

Several changes were made to hazards from the 2020 LPSNRD HMP. These revisions were made with the intention to "right size" the plan for the planning area. Changes to hazards included:

- Combined Chemical Fixed Sites & Chemical Transportation into Hazardous Materials Release
- Changed Extreme Heat to Extreme Temperatures (including Heat and Cold)
- Combined Hail with Severe Thunderstorms
- Combined High Winds with Tornadoes
- Eliminated Earthquakes as a hazard due to lack of local concern and historical occurrences in the planning area.

METHODOLOGY

The risk assessment methodology utilized for this plan follows the risk assessment methodology outlined in the FEMA Local Mitigation Planning Handbook. This process consists of four primary steps: 1) Describe the hazard; 2) Identify vulnerable community assets; 3) Analyze risk; and 4) Summarize vulnerability.

When describing the hazard, this plan will examine the following items: previous occurrences of the hazard within the planning area; locations where the hazard has occurred in the past or is likely to occur in the future; extent of past events and likely extent for future occurrences; and probability of future occurrences. While the identification of vulnerable assets will be conducted across the entire planning area, Section

[22] Nebraska Emergency Management Agency. January 2021. "2021 Nebraska State Hazard Mitigation Plan". https://nema.nebraska.gov/assets/files/hazard-mitigation/hazmitplan2021.pdf.

Seven will discuss community-specific assets at risk for relevant hazards. Analysis for regional risk will examine historic impacts and losses and what is possible should the hazard occur in the future. Risk analysis will include both qualitative (i.e., description of historic or potential impacts) and quantitative data (i.e., assigning values and measurements for potential loss of assets). Finally, each hazard identified in the plan will provide a summary statement encapsulating the information provided during each of the previous steps of the risk assessment process.

For each of the hazards profiled, the best and most appropriate data available have been considered. Further discussion relative to each hazard is discussed in the hazard profile portion of this section.

The following sections provide an overview of the data contained in the hazard profiles. There are five main pieces of data used within these tables.

- **Property and Crop Damage in Dollars:** This is the total dollar amount of all property damage and crop damage as recorded in federal, state, and local data sources. The limitation to these data sources is that dollar figures usually are estimates and often do not include all damages from every event, but only officially recorded damages from reported events.

- **Total Years of Record:** This is the span of years there is data available for recorded events.

- **Number of Hazard Events:** This shows how often an event occurs. The frequency of a hazard event will affect how a community responds. Severe winter storms may not cause much damage each time, but multiple storms can have an incremental effect on housing and utilities. In contrast, tornadoes and high wind can have a widespread effect on a community.

Requirement §201.6(c)(2): Risk assessment. The plan shall include a risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.

Requirement §201.6(c)(2)(i): The risk assessment shall include a] description of the type … of all natural hazards that can affect the jurisdiction.

Requirement §201.6(c)(2)(i): The risk assessment shall include a] description of the … location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

Requirement §201.6(c)(2)(ii): The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.

Requirement §201.6(c)(2)(ii): The risk assessment] must also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged floods.

Requirement §201.6(c)(2)(ii)(A): The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard area.

Requirement §201.6(c)(2)(iii): For multi-jurisdictional plans, the risk assessment must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

- **Historical probability:** This can be calculated based on the total years of record and the total number of years in which an event occurred. An example of the annual historical probability estimate is found below:

$$\textbf{\textit{Historical Probability}}\ (\%) = \frac{Total\ Years\ with\ an\ Event\ Occuring\ (\#)}{Total\ Years\ of\ Record\ (\#)}\ x\ 100$$

- **Future Likelihood:** This is the probability that a hazard will occur in the future. Future likelihood takes into account historical probability, climate change, and future development. It is broken down into the four categories listed below.

  Very Unlikely = Hazard is expected to occur once every 50+ years.

Unlikely = Hazard is expected to occur once every 10+ to 50 years.

Likely = Hazard is expected to occur once every 5+ to 10 years.

Very Likely = Hazard is expected to occur once every 1 to 5 years.

The following table provides loss estimates for hazards with sufficient data. It should be noted that NCEI data are not all inclusive and the database provides very limited information on crop losses. To provide a better picture of the crop losses associated with the hazards within the planning area, crop loss information provided by the United States Department of Agriculture (USDA) Risk Management Agency (RMA) was utilized for this update of the plan. Data for all the hazards are not always available, so only those with an available dataset are included in the loss estimation.

Average Annual Damages and Frequency

FEMA ***Requirement §201.6(c)(2)(ii) (B)*** suggests that when the appropriate data is available, hazard mitigation plans should also provide an estimate of potential dollar losses for structures in vulnerable areas. This risk assessment methodology includes an overview of assets at risk and provides historic average annual dollar losses for all hazards for which historic event data is available. Additional loss estimates are provided separately for those hazards for which sufficient data is available. These estimates can be found within the relevant hazard profiles.

Average annual losses from historical occurrences can be calculated for those hazards for which there is a robust historic record and for which monetary damages are recorded. There are three main pieces of data used throughout this formula.

Hazard Assessment Summary Tables

The following table provides an overview of the data contained in the hazard profiles. Hazards listed in this table and throughout the section are in alphabetical order. This table is intended to be a quick reference for people using the plan and does not contain source information. Source information and full discussion of individual hazards are included later in this section.

Table 19: Regional Risk Assessment

HAZARD	PREVIOUS OCCURRENCE EVENTS/YEARS	APPROXIMATE ANNUAL PROBABILITY	LIKELY EXTENT
AG PLANT DISEASE	40	100%	Varies by event - Likely to occur
AG ANIMAL DISEASE	59	90%	Avg. 1 animal/outbreak. Range 1 – 126 animals
DAM FAILURE	3/110	<1%	Varies by Structure
DROUGHT	443/1,1550 months	29%	D1-D2
EXTREME TEMPERATURES	Heat - 5 days/yr Cold - 4 days/yr	66% 61%	Extreme Heat Range 100°F to 115°F Extreme Cold Range 0°F to -33°F
FLOODING	129/28	100%	Flooding likely to occur within the mapped flood risk hazard areas (see FIRMs). Some inundation of structures and roads near streams. Some evacuations of people may be necessary (<1% of population)
GRASS/WILDFIRES	1,295/24	100%	<8 acres Some homes and structures threatened or at risk
HAZARDOUS MATERIALS – FIXED	210 /34	100%	~800 Liquid Gallons

HAZARD	PREVIOUS OCCURRENCE EVENTS/YEARS	APPROXIMATE ANNUAL PROBABILITY	LIKELY EXTENT
HAZARDOUS MATERIALS – TRANSPORTATION	238 /35	100%	~0 to 23,000 Gallons
HIGH WINDS	52/28	100%	≤50 mph Avg 55mph; Range 35-57 EG
LEVEE FAILURE	3	~1%	Varies by Extent
SEVERE THUNDERSTORMS	956/28	100%	≥1" rainfall Avg 55 mph winds; Range 45-85 EG H2-H5 Avg 1.14"; Range 0.52-5.0"
SEVERE WINTER STORMS	167/28	100%	0.25" – 0.5" Ice (SPIA Level 2) 20°-40° below zero (wind chill) 4-8" snow 25-35 mph winds
TERRORISM	2/48	<1%	Unknown
TORNADOES	55/28	100%	Avg: EF0 Range EF0-EF4

The following table provides loss estimates for hazards with sufficient data. Detailed description of major events are included in *Section Seven: Community Profiles.*

Table 20: Loss Estimation for the Planning Area

HAZARD TYPE		Count	Property	Crop
Agricultural Disease	Animal Disease	59	407 animals	N/A
	Plant Disease	40	N/A	$300,996
Dam Failure		3	N/A	N/A
Drought		443/1,1550 months	$0	$136,719,893
Extreme Temperatures	Extreme Heat	Avg. 5 days/yr	$0	$9,039,795
	Extreme Cold	Avg. 4 days/yr	$100,000	$359,455
Flooding	Flash Flood	70	$5,067,000	$2,778,045
	Flood	59	$122,051,000	
Grass/Wildfires		1,295	9,079 acres	$31,023
Hazardous Materials	Chemical Fixed Sites[3]	210	$1,500,000	N/A
	Chemical Transportation[4]	238	$1,376,640	
High Winds & Tornadoes	High Winds	51	$28,000	$1,108,865
	Tornadoes	55	$101,309,000	
Levee Failure		3	-	N/A
Severe Thunderstorms	Hail	581	$2,049,000	$17,413,215
	Heavy Rain	14	$0	
	Lightning	13	$1,236,400	
	Thunderstorm Wind	348	$2,049,000	
Severe Winter Storms	Blizzard	18	$-	$568,924
	Heavy Snow	9	$19,000,000	
	Ice Storm	6	$-	
	Winter Storm	95	$-	
	Winter Weather	39	$75,000	
Terrorism		2	<$1 million	N/A
Total		**3,660**	**$255,841,040**	**$ 168,320,211**

N/A: Data not available

Historical Disaster Declarations

The following tables show past disaster declarations that have been granted within the planning area.

Farm Service Agency Small Business Administration Disasters

The U.S. Small Business Administration (SBA) was created in 1953 as an independent agency of the federal government to aid, counsel, assist, and protect the interests of small business concerns, to preserve free competitive enterprise, and maintain and strengthen the overall economy of our nation. A program of the SBA includes disaster assistance for those affected by major natural disasters. The following table summarizes the SBA Disasters involving the planning area in the last decade.

Table 21: SBA Declarations

Disaster Declaration Number	Declaration Date	Description	Primary Counties	Contiguous Counties
NE-00073	2019	Flooding	Cass	

Disaster Declaration Number	Declaration Date	Description	Primary Counties	Contiguous Counties
NE-00067			Cass	
NE-00065	6/25/2015	Severe Storms, Tornadoes, Straight-line Winds, and Flooding.	Cass, Lancaster	
NE-00064	5/27/2015	Severe Storms, Tornadoes, High Winds and Flooding		Lancaster
NE-00063	7/28/2014	Tornadoes, Straight-line Winds, and Flooding	Cass	
NE-00057	5/30/2014	Severe Weather and a Tornado		Lancaster
NE-00053		Drought	Cass, Lancaster	
NE-00052		Drought		Lancaster
NE-00051		Drought	Cass, Lancaster	
NE-00050		Drought		Cass, Lancaster
NE-00043	08/12/2011 & 12/12/2011	Flooding	Cass	
NE-00042	7/18/2011	Flooding	Cass	Lancaster
NE-00041	09/07/2011 & 08/12/2011 & 11/18/2011	Flooding	Cass	
NE-00040	10/21/2010	Severe Storms, Flooding, Tornado, and Straight-line Winds	Cass	
NE-00035	04/21/2010 & 6/10/2010	Severe Storms, Ice Jams, and Flooding.	Cass, Lancaster	
NE-00033	02/25/2010 & 3/26/2010	Severe Winter Storms and Snowstorm	Cass, Lancaster	
NE-00021	06/20/2008 & 06/24/2008 & 7/29/2008	Severe Storms, Tornadoes, and Flooding	Cass, Lancaster	
NE-00020	06/20/2008 / 06/24/2008 & 7/29/2008	Severe Storms, Tornadoes, and Flooding		Cass, Lancaster
NE-00013	06/06/2007 & 07/06/2007	Severe Storms, Flooding, and Tornadoes	Cass	

Source: Small Business Administration, 2005-2018[23]

At the time of this plan development historical state disasters for Nebraska were not available. At attempt was made to request such disaster data from the state but at this time, there is no database which records past Nebraska disasters which can be included for reference. Future plan updates should explore if such a database has been created for inclusion into HMP planning efforts.

PRESIDENTIAL DISASTER DECLARATIONS

The presidential disaster declarations involving the planning area from 1953 to December 2024 are summarized in the following table. Declarations prior to 1962 are not designated by county on the FEMA website and are not included below.

[23] Small Business Administration. 2005-2016. "SBA Disaster Loan Data." https://www.sba.gov/loans-grants/see-what-sba-offers/sba-loan-programs/disaster-loans/disaster-loan-data.

Table 22: Presidential Disaster Declarations

Disaster Declaration Number	Declaration Date	Title	Affected Counties	Total Public Assistance
228	7/18/1967	SEVERE STORMS & FLOODING	Cass, Lancaster	-
406	10/20/1973	SEVERE STORMS & FLOODING	Cass, Lancaster	-
552	3/24/1978	STORMS, ICE JAMS, SNOWMELT & FLOODING	Cass	-
716	7/3/1984	TORNADOES & FLOODING	Cass	-
998	7/19/1993	SEVERE STORMS AND FLOODING	Cass, Lancaster	-
1190	11/1/1997	SEVERE SNOW STORMS, RAIN, AND STRONG WINDS	Cass, Lancaster	-
1517	5/25/2004	SEVERE STORMS, TORNADOES AND FLOODING	Cass, Lancaster	$13,351,657.77
1706	6/6/2007	SEVERE STORMS, FLOODING, AND TORNADOES	Cass	$6,109,252.52
1770	6/20/2008	SEVERE STORMS, TORNADOES, AND FLOODING	Cass, Lancaster	$36,258,650.19
1878	2/25/2010	SEVERE WINTER STORMS AND SNOWSTORM	Cass, Lancaster	$6,577,021.37
1902	4/21/2010	SEVERE STORMS, ICE JAMS, AND FLOODING	Cass, Lancaster	$3,112,391.72
1924	7/15/2010	SEVERE STORMS AND FLOODING	Cass	$49,926,354.50
1945	10/21/2010	SEVERE STORMS, FLOODING, TORNADO, AND STRAIGHT-LIN	Cass	$2,138,551.99
3245	9/13/2005	HURRICANE KATRINA EVACUEES	Cass, Lancaster	$393,813.27
3323	6/18/2011	FLOODING	Cass	-
4013	8/12/2011	FLOODING	Cass	$62,808,331.04
4185	7/28/2014	SEVERE STORMS, TORNADOES, STRAIGHT-LINE WINDS, AND FLOODING	Cass	$3,837,595.30
4225	6/25/2015	SEVERE STORMS, TORNADOES, STRAIGHT-LINE WINDS, AND FLOODING	Cass, Lancaster	$14,309,444.52
4325	8/1/2017	SEVERE STORMS, TORNADOES, AND STRAIGHT-LINE WINDS	Cass	$15,078,067.97
4420	3/21/2019	SEVERE WINTER STORM, STRAIGHT-LINE WINDS, AND FLOODING	Cass, Lancaster	$1,858,661.84
4521	4/4/2020	COVID-19 PANDEMIC	Cass, Lancaster	-
4616	9/6/2021	SEVERE STORMS AND STRAIGHT-LINE WINDS	Cass	-
4641	2/23/2022	SEVERE STORMS, STRAIGHT-LINE WINDS, AND TORNADOES	Cass	-
4838	10/21/2024	SEVERE STORMS, STRAIGHT-LINE WINDS, TORNADOES, AND FLOODING	Cass, Lancaster	-
5462	4/9/2023	WACONDA-BEAVER LAKE FIRE COMPLEX	Cass	-

Source: Federal Emergency Management Agency, 1953-2024[24]

[24] Federal Emergency Management Agency. 2019. "Disaster Declarations." Accessed April 2019. https://www.fema.gov/openfema-dataset-disaster-declarations-summaries-v1.

FEMA National Risk Index

FEMA's National Risk Index is an online tool that analyzes natural hazard and community risk factors to develop a risk measurement for each county in the United States. Eighteen natural hazards are given a score from very high to very low. The table below gives the National Risk Index ratings for Hamilton County, Seward County, and York County. Risk Index scores are calculated using an equation that combines scores for expected annual loss, social vulnerability, and community resilience. All values fall between 0 (lowest possible value) and 100 (highest possible value).

Table 23: National Risk Index

Hazard	Lancaster County	Cass County
Avalanche	N/A	N/A
Coastal Flooding	N/A	N/A
Cold Wave	Relatively Low (43.7)	Relatively Low (33.9)
Drought	Relatively Moderate (85.1)	Relatively Moderate (83.2)
Earthquake	Very Low (49.2)	Very Low (18.3)
Hail	Relatively Moderate (89.1)	Relatively Low (76.1)
Heat Wave	Relatively Low (31.8)	Relatively Low (31.7)
Hurricane	N/A	N/A
Ice Storm	Very High (99.9)	Relatively Moderate (72.7)
Landslide	Relatively Low (21.6)	Relatively Low (29.9)
Lightning	Relatively Low (57.0)	Very Low (27.5)
Riverine Flooding	Relatively High (97.1)	Relatively Low (62.6)
Strong Wind	Relatively High (92.8)	Relatively Moderate (60.6)
Tornado	Relatively High (98.9)	Relatively Moderate (71.0)
Tsunami	N/A	N/A
Volcanic Activity	N/A	N/A
Wildfire	Relatively Low (68.7)	Very Low (32.4)
Winter Weather	Very High (99.6)	Relatively Low (52.8)
Overall Score	**Relatively Moderate (92.81)**	**Very Low (42.0)**

Source: FEMA[25]

[25] FEMA. January 2024. "The National Risk Index". https://hazards.fema.gov/nri/map.

CLIMATE ADAPTATION

Long-term climate trends have shifted throughout the 21st century and have created significant changes in precipitation and temperature which have altered the severity and subsequent impacts from severe weather events. Changes in the regional climate is a growing concern impacting communities, Indian tribes, residents, local economies, and infrastructure throughout the planning area. Discussions on temperature, precipitation, and climate impacts are included below.

Great Plains Region

The planning area is in the Northern Great Plains region of the United States, which stretches from Montana and North Dakota southward to Wyoming and Nebraska. A large elevation change across the region contributes to high geographical, ecological, and climatological variability, including a strong gradient of decreasing precipitation moving from east to west across the region. Significant weather extremes impact this area, including winter storms, extreme heat and cold, severe thunderstorms, and drought.

The Fourth National Climate Assessment has provided an overview of potential impacts within the planning area.[26]

- **Water**: Water is the lifeblood of the Northern Great Plains, and effective water management is critical to the region's people, crops and livestock, ecosystems, and energy industry. Even small changes in annual precipitation can have large effects downstream; when coupled with the variability from extreme events, these changes make managing these resources a challenge. Future changes in precipitation patterns, warmer temperatures, and the potential for more extreme rainfall events are very likely to exacerbate these challenges.
- **Agriculture:** Agriculture is an integral component of the economy, the history, and the culture of the Northern Great Plains. Recently, agriculture has benefited from longer growing seasons and other recent climatic changes. Some additional production and conservation benefits are expected in the next two to three decades as land managers employ innovative adaptation strategies but rising temperatures and changes in extreme weather events are very likely to have negative impacts on parts of the region. Adaptation to extremes and to longer-term, persistent climate changes will likely require transformative changes in agricultural management, including regional shifts of agricultural practices and enterprises.
- **Recreation and Tourism:** Ecosystems across the Northern Great Plains provide recreational opportunities and other valuable goods and services that are at risk in a changing climate. Rising temperatures have already resulted in shorter snow seasons, lower summer stream flows, and higher stream temperatures. These changes have important consequences for local economies that depend on winter or river-based recreational activities. Climate-induced land-use changes in agriculture can have cascading effects on closely entwined natural ecosystems, such as wetlands, and the diverse species and recreational amenities they support.
- **Energy:** Fossil fuel and renewable energy production and distribution infrastructure is expanding within the Northern Great Plains. Climate change and extreme weather events put this infrastructure at risk, as well as the supply of energy it contributes to support individuals, communities, and the U.S. economy. The energy sector is also a significant source of greenhouse gases and volatile organic compounds that contribute to climate change and ground-level ozone pollution.

NEBRASKA'S CHANGING CLIMATE

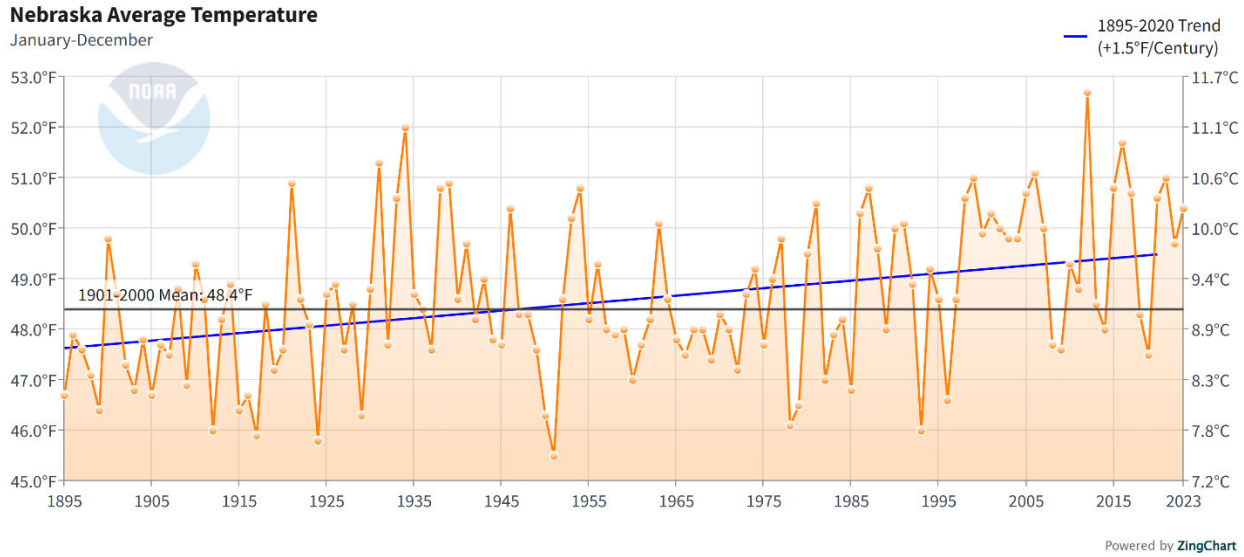
The United States is experiencing significant changes in temperature, precipitation, and severe weather events resulting from climate change. Long term climate trends will lead to an increase in the frequency and intensity of hazardous events, which will cause several significant economic, social, and environmental impacts on Nebraskans.

[26] U.S. Global Change Research Program. 2018. "Fourth National Climate Assessment". https://nca2018.globalchange.gov/.

CHANGES IN TEMPERATURE

Since 1895, Nebraska's overall average temperature has increased by about 1.5°F. Climate modeling suggests warmer temperature conditions will continue in the coming decades and rise steadily into mid-century. Warming has increased the most in winter and spring months with winter minimum temperatures rising 2-4°F. In addition, there is greater warming for nighttime lows than for daytime highs. Since 1985, the length of the frost season has increased by an average of more than one week across Nebraska, with the length likely to continue to increase in the future. Projected temperature changes range from 2-11°F by 2100 depending on emissions projects (Figure 6).[27]

Figure 5: Average Temperature (1895-2024)

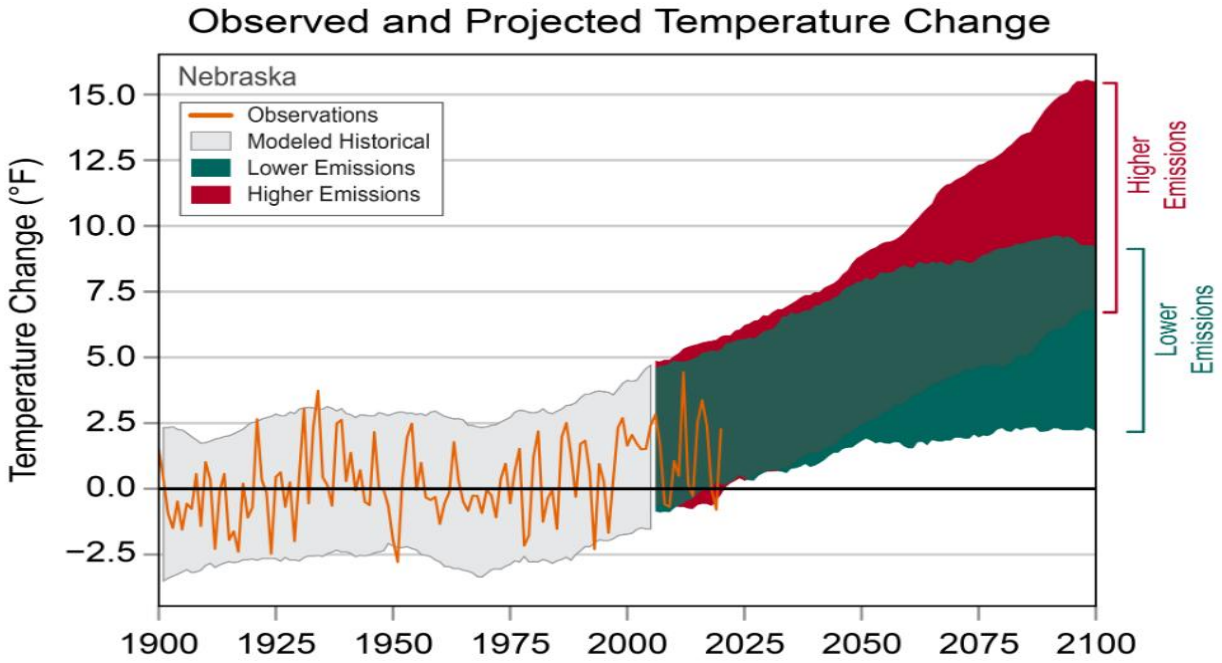


Source: NOAA, 2024.[28]

[27] NCEI. 2022. "State Climate Summaries – Nebraska". https://statesummaries.ncics.org/chapter/ne/#:~:text=The%20state%20is%20located%20far,(1895%E2%80%932020)%20averag.

[28] NOAA. 2021. "Climate at a Glance: Statewide Time Series.". Accessed March 2022. https://www.ncdc.noaa.gov/cag/statewide/time-series/25/tavg/12/12/1895-2020?base_prd=true&begbaseyear=1901&endbaseyear=2000&trend=true&trend_base=100&begtrendyear=1895&endtrendyear=2021.

Figure 6: Observed and Projected Temperature Change - Nebraska

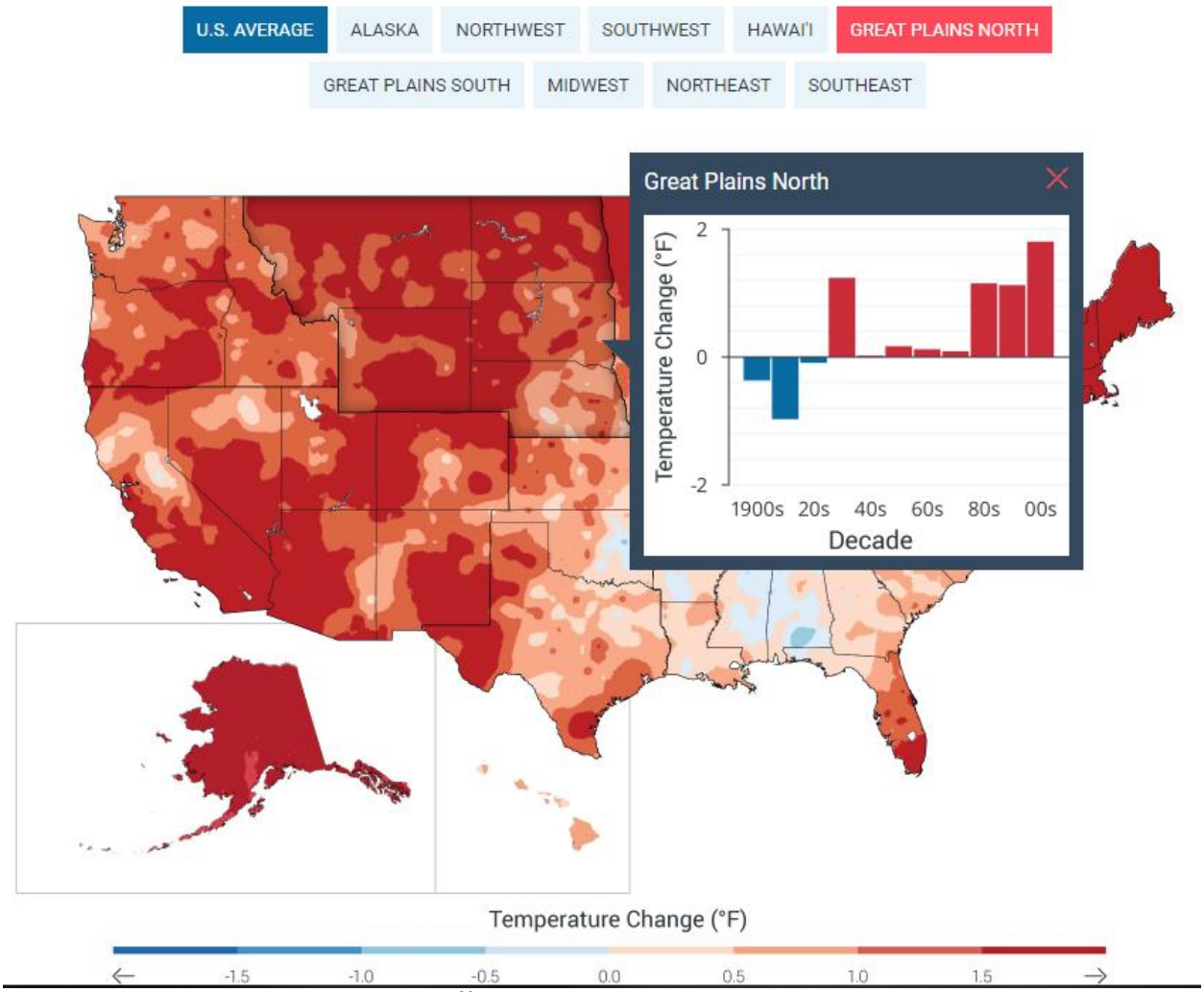


Source: NCEI

Additionally, the length of the frost-free season (i.e., growing season) has been increasing nationally since the 1980s. While a longer growing season may provide some benefit for heavily agricultural areas, concurrent changes in temperature, water availability, and pest pressures may cause additional impacts. For instance, longer growing seasons coinciding with periods of drought and extreme heat can indicate lower production from increased plant mortality and increased risk to wildfire ignition probability and fuel load potentials. On average, the Great Plains has seen an increase of ten days to the annual growing season.[29]

[29] U.S. Global Change Research Program. "2014 National Climate Assessment: Frost-free Season." Accessed 2020. https://nca2014.globalchange.gov/report/our-changing-climate/frost-free-season#tab2-images

Figure 7: Observed U.S. Temperature Change



Source: National Climate Assessment, 2014[30]

CHANGES IN PRECIPITATION

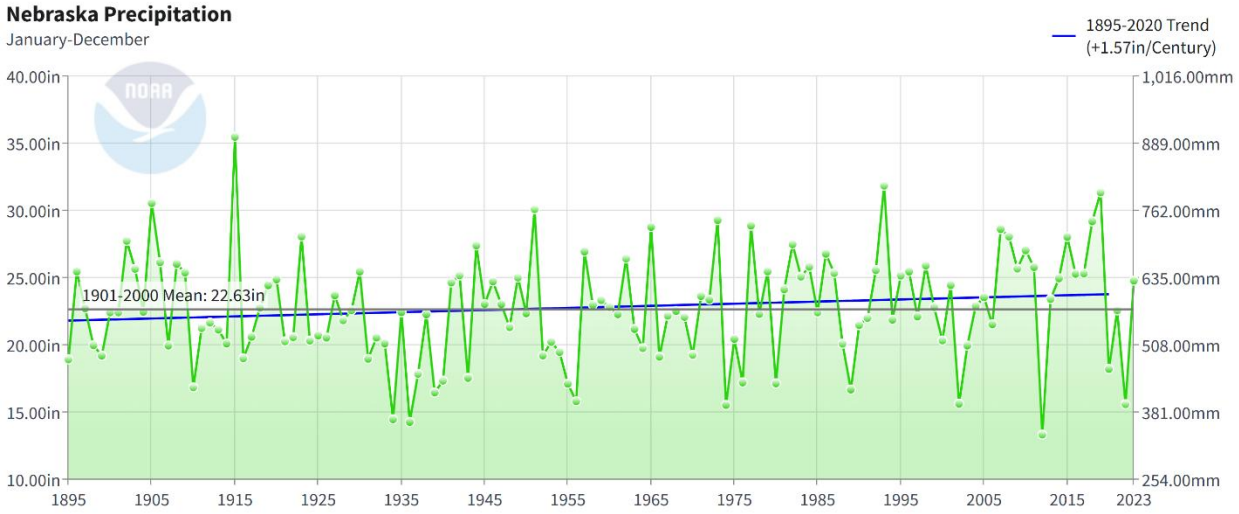
Changing extremes in precipitation are anticipated in the coming decades, with more significant rain and snowfall events and more intense drought periods. Seasonal variations will be heightened, with more frequent and more significant rainfall expected in the spring and winter and hotter, drier periods in the summer. Since 1895, yearly annual precipitation for Nebraska has increased slightly. With a changing climate, winter and spring precipitation is projected to increase across Nebraska. According to climate projections, winter and spring will likely become 20 percent wetter, with summers becoming 10 percent drier.

Climate modeling may show only moderate precipitation and streamflow changes; however, most of the Northern Great Plains region is already at risk to large annual and seasonable variability as seen by flooding and drought events occurring in concurrent years. There will likely be more days with a heavy precipitation event (rainfall of greater than one inch per day) across the region and subsequent impacts to riverine flooding events or overwhelmed local stormwater management systems. Groundwater and reservoir water sources are increasingly important to communities and residents in the planning area to meet water needs during periods of shortage. Precipitation varies significantly across the state and moves in a longitudinal gradient. The east receives twice as much precipitation (35 inches annually) as the Nebraska Panhandle

[30] U.S. Global Change Research Program. "2014 National Climate Assessment." Accessed 2020. https://nca2014.globalchange.gov/

(15 inches) on average.[31] The planning area is located on the northeastern side of the state with a lower overall precipitation total than the southeastern portion. Winter precipitation is projected to increase in intensity and may benefit Nebraska's agricultural economy by improving soil moisture but could potentially delay crop planting in the summer. Increased spring precipitation may lead to heightened runoff and flooding, reducing water quality and eroding soils.[32]

Figure 8: Nebraska Average Precipitation (1895-2024)



Source: NOAA, 2024[33]

IMPACTS FROM CLIMATE CHANGE

Observed changes in the intensity and frequency of extreme events are a significant concern now and in the future because of the social, environmental, and economic costs associated with their impacts. Challenges that are expected to affect communities, environments, and residents because of climate change include:

- Developing and maintaining sustainable agricultural systems
- Resolving increasing competition among land, water, and energy resources
- Conserving vibrant and diverse ecological systems
- Enhancing the resilience of the region's people to the impacts of climatic extremes

Certain groups of people may face greater difficulty when dealing with the impacts of a changing climate. Older adults, immigrant communities, and those living in poverty are particularly susceptible. Additionally, specific industries and professions tied to weather and climate, like outdoor tourism, commerce, and agriculture, are especially vulnerable.[34]

As seen in the figure below, Nebraska is experiencing an increase in the number of billion-dollar natural disasters.

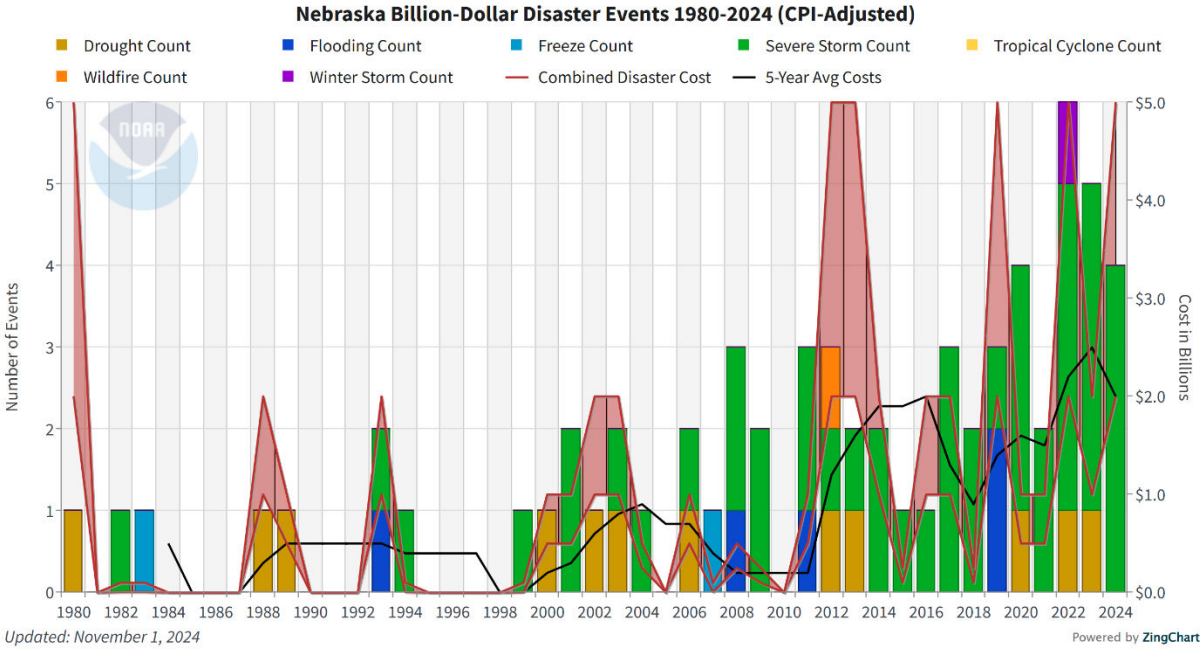
[31] North Central Climate Collaborative. January 2020. "NC3 Nebraska Climate Summary." Accessed December 2022. https://northcentralclimate.org/files/2020/01/nc3-Nebraska-Climate-Summary-FINAL_2.12.pdf?x24082

[32] NOAA NCEI. 2017. "Nebraska State Climate Summary." Accessed 2021. https://statesummaries.ncics.org/chapter/ne/

[33] NOAA. 2021. "Climate at a Glance: Statewide Time Series.". Accessed December 2022. https://www.ncdc.noaa.gov/cag/statewide/time-series/25/pcp/12/12/1895-2020?base_prd=true&begbaseyear=1901&endbaseyear=2000&trend=true&trend_base=100&begtrendyear=1895&endtrendyear=2020

[34] U.S. Environmental Protection Agency. "Climate Impacts on Society." Accessed April 2021. https://19january2017snapshot.epa.gov/climate-impacts/climate-impacts-society_.html

Figure 9: Nebraska Billion Dollar Disasters



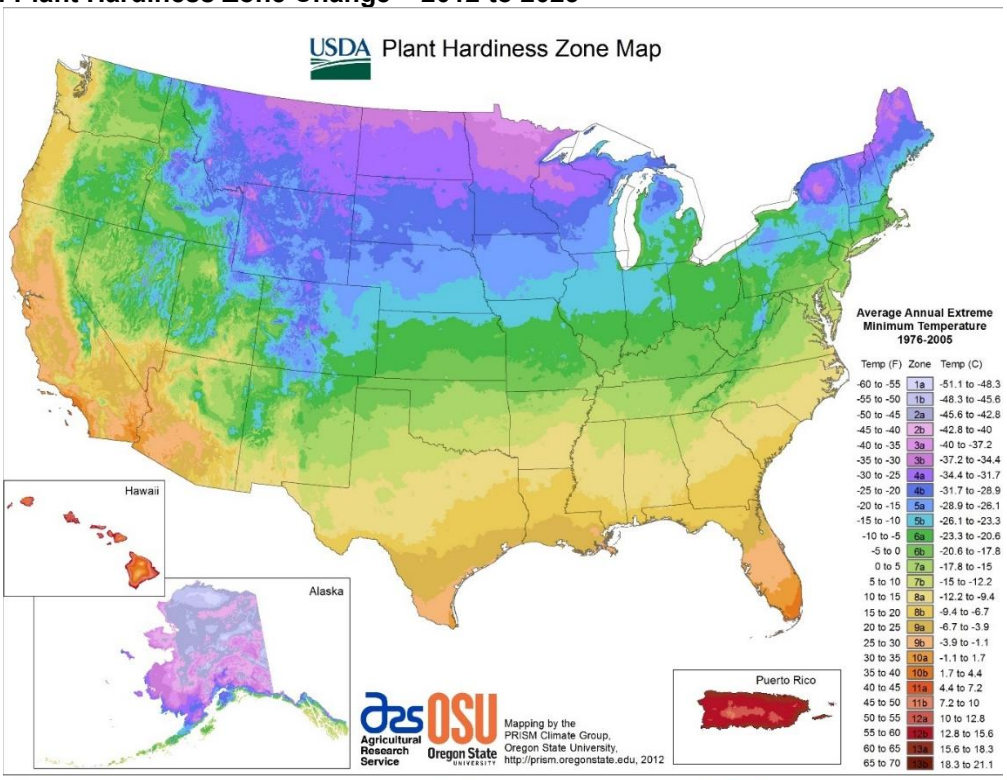
Source: NOAA, 2024.[35]

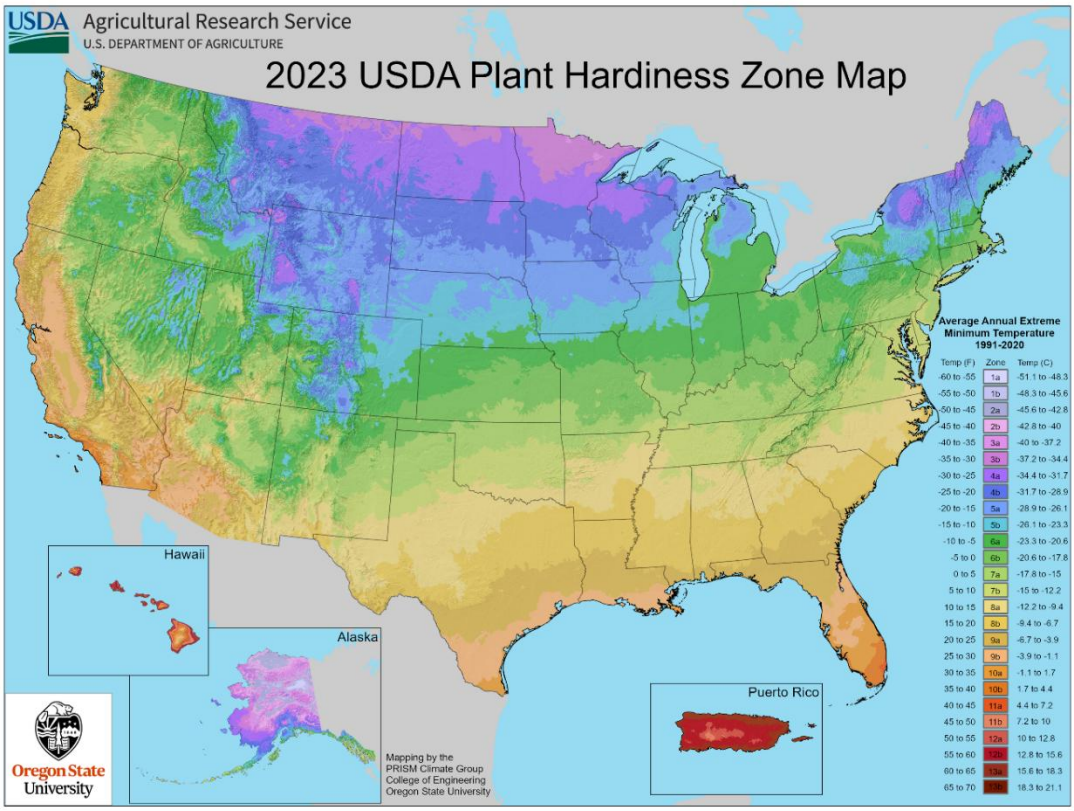
Agriculture

The agricultural sector will experience an increase in droughts, an increase in grass and wildfire events, changes in the growth cycle as winters warm, an influx of new and damaging agricultural diseases or pests, and changes in the timing and magnitude of rainfall. As described in the Plant Hardiness Zone maps (Figure 10) available for the United States, these changes have shifted the annual growing season and expected agricultural production conditions. Nebraska is vulnerable to changes in growing season duration and growing season conditions as a heavily agriculturally dependent state. These added stressors on agriculture could have devastating economic effects if new agricultural and livestock management practices are not adopted.

[35] NOAA National Centers for Environmental Information. December 2024. "Nebraska Billion-Dollar Weather and Climate Disasters". https://www.ncei.noaa.gov/access/billions/time-series/NE .

Figure 10: Plant Hardiness Zone Change – 2012 to 2023





Source: USDA, 2023[36]

Air Quality
Rising temperatures will also impact air quality. Harmful air pollutants and allergens increase as temperatures increase. More extended periods of warmth contribute to longer pollen seasons that allow plant spores to travel farther and increase exposure to allergens. More prolonged exposure to allergens can increase the risk and severity of asthma attacks and worsen existing allergies in individuals.[37] An increase in air pollutants can occur from the growing number of grass and wildfires. The public can be exposed to harmful particulate matter from smoke and ash that can cause various health issues. Depending on the length of exposure, age, and individual susceptibility, effects from wildfire smoke can range from eye and respiratory irritation to severe disorders like bronchitis, asthma, and aggravation of pre-existing respiratory and cardiovascular diseases.[38]

Water Quality
Increasing temperatures, shifting precipitation patterns, and extreme weather events impact water quality throughout the state. As average temperatures increase, water temperatures also rise and put water bodies at risk for eutrophication and excess algal growth that reduce water quality. Extreme weather events and shifting precipitation can lead to fluctuating river flows, erosion, sediment accumulation, and morphological changes to water bodies and surrounding landscapes. In agricultural landscapes, major storm events can cause sediment and nutrients such as phosphorous and nitrogen to runoff into nearby water sources. Runoff can contribute to the buildup of nutrients in the water, increasing plant and algae growth that can deplete oxygen and kill aquatic life. Nutrient enrichment can lead to toxic cyanobacterial harmful algae blooms (cyanoHABs), which can be harmful to animal and human health. CyanoHABs can cause economic damage such as decreasing property values, reducing recreational revenue, and increasing the costs for treating drinking water.[39]

With the increasing intensity and frequency of extreme precipitation events, impacts to water systems ultimately threaten human health. Events can lead to flooding and stormwater runoff that can carry pollutants across landscapes and threaten human health by contaminating water wells, groundwater, and other bodies of water. Common pollutants include pesticides, bacteria, nutrients, sediment, animal waste, oil, and hazardous waste. Flooding impacts property, infrastructure, economies, and the ecology of water bodies.

Energy
Shifting climate trends will have a direct impact on water and energy demands. As the number of 100°F days increases, along with warming nights, the stress placed on the energy grid will likely increase and possibly lead to more power outages. Severe weather events also stress energy production, infrastructure transmission, and transportation. Roads, pipelines, and rail lines are all at risk of damages from flooding, extreme heat, erosion, or added stress from increased residential demands.[40] Critical facilities and vulnerable populations that are not prepared to handle periods of power outages, particularly during heat waves, will be at risk.

Future Adaptation and Mitigation
The planning area will have to adapt to a changing climate and its impacts or experience an increase in economic loss, property damage, agricultural damage, and loss of life. The magnitude of expected changes will exceed those experienced in the last century. Past events have typically informed HMPs to be more resilient to future events. Existing adaptation and planning efforts are inadequate to respond to these

[36] United States Department of Agriculture. 2023. “2023 USDA Plant Hardiness Zone Map.” https://planthardiness.ars.usda.gov/.
[37] Asthma and Allergy Foundation of America. 2010. “Extreme Allergies and Climate Change.” Accessed 2021. https://www.aafa.org/extreme-allergies-and-climate-change/
[38] AirNow. 2019. “Wildfire Smoke: A Guide for Healthcare Professionals.” Accessed 2021. https://www.airnow.gov/sites/default/files/2020-10/wildfire-smoke-guide-revised-2019-chapters-1-3_0.pdf
[39] USGS. “Nutrients and Eutrophication”. Accessed February 2021. https://www.usgs.gov/mission-areas/water-resources/science/nutrients-and-eutrophication?qt-science_center_objects=0#qt-science_center_objects
[40] USGCRP, 2018: Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II: Report-in-Brief [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, 186 pp.

projected impacts. This HMP includes strategies for the planning area to address these changes and increase resilience. However, each iteration and update of this HMP or other planning efforts should consider including adaptation as a core strategy to be better informed by "future" projections on the frequency, intensity, and distribution of hazards. Communities that are already the most vulnerable to weather and climate extremes will be stressed even further by more frequent extreme events occurring within an already highly variable climate system. Jurisdictions in the planning area should consider past and future climate changes and impacts when incorporating mitigation actions into local planning processes.

HAZARD PROFILES

Information from participating jurisdictions was collected and reviewed alongside hazard occurrence, magnitude, and event narratives as provided by local, state, and federal databases. Based on this information, profiled hazards were determined to either have a historical record of occurrence or the potential for occurrence in the future. The following profiles will broadly examine the identified hazards across the region. Hazards of local concern or events which have deviated from the norm are discussed in greater detail in each respective community profile (see *Section Seven* of this plan). Jurisdictional local planning teams selected hazards from the regional hazard list as the prioritized hazards for the jurisdiction based on historical hazard occurrences, potential impacts, the jurisdictions' capabilities, and the capacity to pursue mitigation projects. However, it is important to note that while a jurisdiction may not have selected a specific hazard to be profiled, hazard events can impact any jurisdiction at any time and their selection is not a full indication of risk. The following table identifies the top hazards of concern for participating jurisdictions.

As identified by the participating jurisdictions, the overall top hazards of concern in the planning area from greatest concern to least concern are:

- High Winds and Tornadoes
- Severe Thunderstorms
- Flooding
- Hazardous Materials
- Severe Winter Storms
- Drought
- Dam Failure
- Levee Failure
- Terrorism
- Grass/Wildfire
- Extreme Temperatures
- Agricultural Plant and Animal Disease

Table 24: Top Hazards of Concern by Jurisdiction

Jurisdiction	Ag Disease – Plant / Animal	Dam Failure	Drought	Extreme Temperatures	Flooding	Grass or Wildfire	Hazardous Materials	High Winds &Tornadoes	Levee Failure	Severe Thunderstorms	Severe Winter Storms	Terrorism
Lower Platte South NRD		X	X		X				X	X		
Cass County			X		X		X	X		X	X	
Alvo							X	X				
Avoca					X					X		
Cedar Creek					X		X	X		X		
Eagle					X		X	X		X		X
Elmwood							X	X		X	X	
Greenwood							X	X		X		
Louisville					X			X		X		
Manley							X	X			X	
Murdock			X				X	X		X	X	
Murray							X	X			X	
Nehawka					X			X				
Plattsmouth					X		X			X	X	
South Bend					X						X	
Union			X					X		X		
Weeping Water					X					X	X	
Lancaster County				X	X			X		X	X	
Bennet			X		X		X	X		X		
Davey								X		X	X	
Denton					X		X	X		X		
Firth			X		X		X	X				
Hallam			X			X	X	X				
Hickman		X	X		X		X	X				
Lincoln	X	X			X		X	X	X	X	X	
Malcolm			X		X							

Jurisdiction	Ag Disease – Plant / Animal	Dam Failure	Drought	Extreme Temperatures	Flooding	Grass or Wildfire	Hazardous Materials	High Winds &Tornadoes	Levee Failure	Severe Thunderstorms	Severe Winter Storms	Terrorism
Panama								X		X	X	
Raymond					X			X		X		
Roca					X		X	X		X		
Sprague			X					X		X		
Waverly		X			X		X	X		X		
Brainard										X		
Ashland			X		X			X	X			
Ceresco							X	X		X	X	
Valparaiso					X		X					
Cass County Rural Water District #1			X		X							
Conestoga Public Schools							X	X		X	X	X
Lincoln Public Schools							X	X		X	X	
Norris School District					X			X		X	X	
Raymond Central Public Schools						X		X		X	X	X
Weeping Water Public Schools								X		X	X	X

AGRICULTURAL PLANT AND ANIMAL DISEASE

Agriculture Disease is any biological disease or infection that can reduce the quality or quantity of either livestock or vegetative crops. This section looks at both animal disease and plant disease, as both make up a significant portion of Nebraska's and the planning area's economy. The economy of the state of Nebraska is heavily vested in both livestock and crop sales. According to the Nebraska Department of Agriculture (NDA) in 2022, the market value for Nebraska of agricultural products sold was estimated at more than $29 billion; this total is split between crops (estimated $14 billion) and livestock (estimated $15.4 billion). For the planning area, the market value of sold agricultural products exceeded $70 million.[41]

Table 25 shows the population of livestock within the planning area. This count does not include wild populations that are also at risk from animal diseases.

Table 25: Livestock Inventory

County	Market Value of 2022 Livestock Sales	Cattle and Calves	Hogs and Pigs	Poultry Egg Layers	Sheep and Lambs
Cass	$8,738,000	7,730	5,016	(D)	574
Lancaster	$61,489,000	24,796	9,130	5,570	924
Total	**$70,227,000**	32,526	14,146	5,570	1,498

Source: U.S. Census of Agriculture, 2022
(D) – data not disclosed

According to the NDA, the primary crops grown throughout the state include alfalfa, corn, sorghum, soybeans, and wheat. The planning area is a mixture of pasture/grassland and cropland (primarily corn and soybeans). The following tables provide the value and acres of land in farms for the planning area.

Table 26: Land and Value of Farms in the Planning Area

County	Number of Farms	Land in Farms (acres)	Market Value of 2022 Crop Sales
Cass	662	299,543	$191,375,000
Lancaster	1,771	407,381	$202,777,000
Total	2,433	706,924	$394,152,000

Source: U.S. Census of Agriculture, 2022

Table 27: Crop Values

County	Corn		Soybeans		Wheat	
	Acres Planted	Value	Acres Planted	Value	Acres Planted	Value
Cass	124,027	$113,727,000	126,907	$72,648,000	560	(D)
Lancaster	149,209	$118,345,000	151,428	$71,640,000	1,775	$917,000
Total	273,236	$232,072,000	278,335	$144,288,000	2,335	$917,000

Source: U.S. Census of Agriculture, 2022

[41] US Department of Agriculture, National Agricultural Statistics Server. 2012. "2012 Census of Agriculture – County Data."

LOCATION

Given the strong agricultural presence in the planning area, animal and plant diseases have the potential to occur across the planning area. If a major outbreak were to occur, the economy in the entire planning area would be affected, including urban areas.

The primary land uses where animal and plant disease will be observed include: agricultural lands; range or pasture lands; and forests. It is possible that animal or plant disease will occur in domestic animals or crops in urban areas.

HISTORICAL OCCURRENCES

Animal Disease

The NDA provides reports on diseases occurring in the planning area. There were 59 instances of animal diseases reported between 2014 and 2024 by the NDA (Table 28). These outbreaks affected a total of 407 animals.

Table 28: Livestock Diseases Reported in the Planning Area

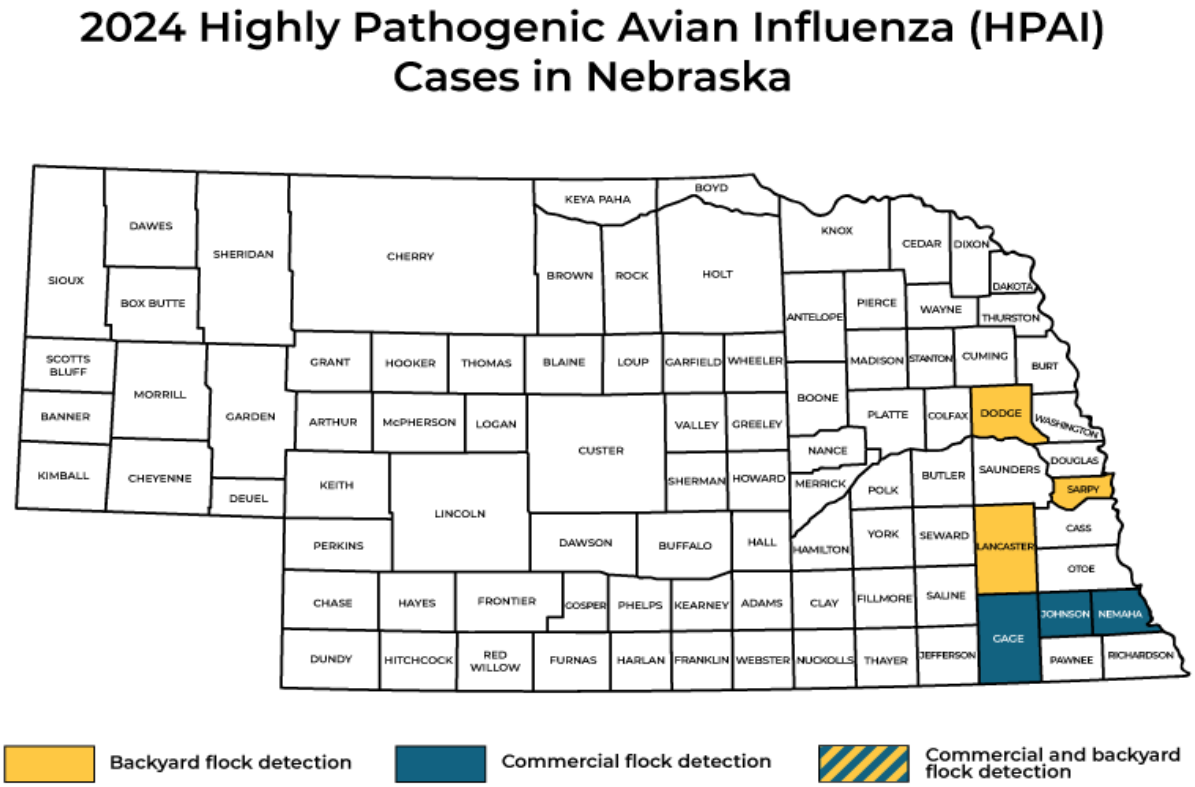
Disease	County	Year	Population Impacted
Anaplasmosis	Cass	2019; 2020; 2023	1; 1; 1
	Lancaster	2016; 2017; 2018	4; 126; 4; 45; 8; 2; 3
Avian Infectious Laryngotracheitis	Lancaster	2019	1
Bovine Viral Diarrhea	Cass	2014	1
	Lancaster	2014; 2016; 2018; 2019; 2020; 2022; 2023	2; 6; 2; 3; 1; 1; 1; 1
Caprine Arthritis/Encephalitis	Lancaster	2019	50
Epizootic Hemorrhagic Disease (Blue Tongue)	Cass	2023	1
Enzootic Bovine Leukosis	Cass	2024	1
	Lancaster	2014; 2016; 2017; 2018; 2022; 2023; 2024	1; 5; 5; 1; 2; 8; 3
Equine Herpesvirus	Cass	2022	1
	Lancaster	2019; 2022	1; 1
Equine Influenza	Cass	2019	2
Infectious bovine Rhiotracheitis	Lancaster	2014	1
Infectious bovine Rhiotracheitis/Infectious Pustula	Lancaster	2014	1
Leptospirosis	Lancaster	2017	2
Mycoplasmosis	Lancaster	2017	2
Paratuberculosis	Cass	2017; 2020	1; 1
	Lancaster	2014; 2015; 2016; 2018; 2020; 2022; 2023; 2024	1; 651; 3; 2; 2; 8; 4
Porcine Circovirus	Cass	2016; 2018	1; 2
Porcine Epidemic Diarrhea	Lancaster	2015; 2016; 2017; 2018	3; 3; 2; 1

Disease	County	Year	Population Impacted
Porcine Reproductive and Respiratory Syndrome	Cass	2018; 2024	2; 1
	Lancaster	2014; 2016	3; 1
Q Fever	Lancaster	2023	1
Salmonellosis	Cass	2014	1
Transmissible Gastroenterit	Lancaster	2018	1
Trichomoniasis	Cass	2016	1
West Nile Fever	Lancaster	2023	1

Source: Nebraska Department of Agriculture, 2014 -2024[42]

Avian Influenza is a viral disease that affects chickens, turkeys, pheasants, quail, waterfowl, swans, peafowl, and guinea fowl. The virus is highly transferable between birds and can cause decreased egg production, respiratory issues, and death within the bird population. Avian Influenza was first detected in Nebraska in a non-commercial backyard flock in March 2022. As of December 2024 there is an Avian Influenza outbreak occurring in the planning area.[43]

Figure 11: Avian Flu in Nebraska



Source: Nebraska Department of Agriculture, 2024

Of note, existing resources do not adequately track the outbreak and extent of Avian Bird Flu. Several outbreaks have occurred across the Midwest and in Nebraska in the past decade which have contributed to mass animal fatalities and rising food costs.

[42] Nebraska Department of Agriculture. 2024. "Livestock Disease Reporting." http://www.nda.nebraska.gov/animal/reporting/index.html.
[43] Nebraska Department of Agriculture. October 20, 2022. "Avian Influenza". Accessed October 28, 2022. https://nda.nebraska.gov/animal/avian/index.html .

PLANT DISEASE

A variety of diseases can impact crops and often vary from year to year. The NDA and the USDA provide information on some of the most common plant diseases, which are listed below.

Table 29: Common Crop Diseases in Nebraska by Crop Types

Crop Diseases		
Corn	Anthracnose	Southern Rust
	Bacterial Stalk Rot	Stewart's Wilt
	Common Rust	Common Smut
	Fusarium Stalk Rot	Gross's Wilt
	Fusarium Root Rot	Head Smut
	Gray Leaf Spot	Physoderma
	Maize Chlorotic Mottle Virus	
Soybeans	Anthracnose	Pod and Stem Blight
	Bacterial Blight	Purple Seed Stain
	Bean Pod Mottle	Rhizoctonia Root Rot
	Brown Spot	Sclerotinia Stem Rot
	Brown Stem Rot	Soybean Mosaic Virus
	Charcoal Rot	Soybean Rust
	Frogeye Leaf Spot	Stem Canker
	Phytophthora Root and Stem Rot	Sudden Death Syndrome
Wheat	Barley Yellow Dwarf	Leaf Rust
	Black Chaff	Tan Spot
	Crown and Root Rot	Wheat Soy-borne Mosaic
	Fusarium Head Blight	Wheat Streak Mosaic
Sorghum	Ergot	Zonate Leaf Spot
	Sooty Stripe	
Trees	Emerald Ash Borer	Dutch Elm Disease
	Burr Oak Blight	Leaf Spot and Blight
	Powdery Mildew	Crown Gall
	Canker (various types)	Root Rot
	Pine Wilt Disease	

Emerald Ash Borer

The spread and presence of the Emerald Ash Borer (EAB) has become a rising concern for many Nebraskan communities in recent years. The beetle spreads through transport of infected ash trees, lumber, and firewood. All species of North American ash trees are vulnerable to infestation. As of July 2021, it has been detected in 35 states and the District of Columbia. Nebraska's first confirmed cases occurred on private land in Omaha and Greenwood in 2016 and Lancaster County in 2018.[44] Figure 12 shows the locations of Nebraska's confirmed EAB cases as of 2024. Many communities across the state are prioritizing the removal of ash trees to help curb potential infestations and tree mortality.

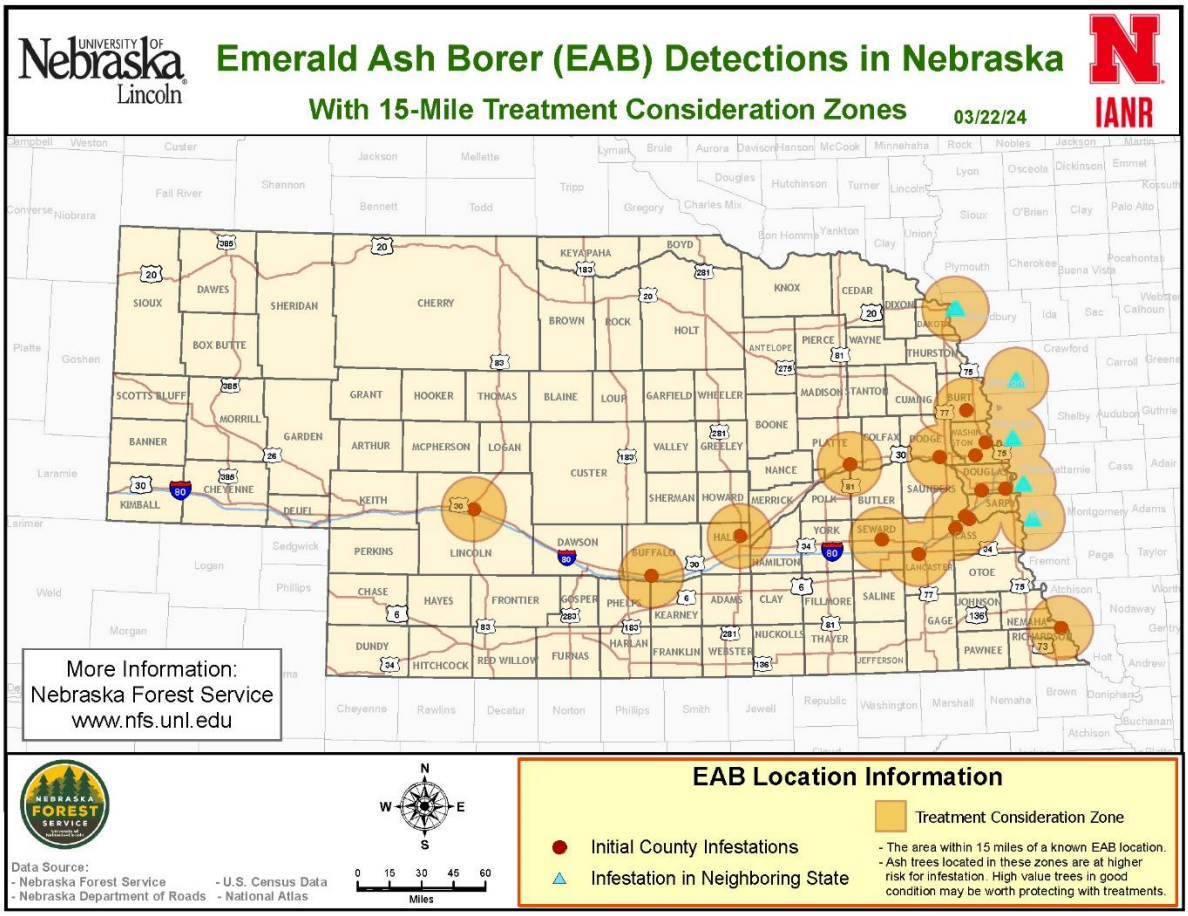
While adult beetles cause little damage, larvae damage trees by feeding on the inner bark of mature and growing trees, causing tunnels. Effects of EAB infestation include: extensive damage to trees by birds, canopy dieback, bark splitting, and water sprout growth at the tree base, and eventual tree mortality. EAB has impacted millions of trees across North America, killing young trees one to two years after infestation

[44] Emerald Ash Borer Information Network. April 2018. "Emerald Ash Borer." http://www.emeraldashborer.info/.

and mature trees three to four years after infestation.[45] Estimated economic impacts to Nebraska's 44 million ash trees exceeds $961 million.[46] Dead or dying trees affected by EAB are also more likely to cause damage during high winds, severe thunderstorms, or severe winter storms from weakened or hazardous limbs and can contribute a significant fuel load to grass/wildfire events.

Because of the Nebraska infestations, a quarantine has been established in Cass, Dodge, Douglas, Otoe, Sarpy, Saunders, Washington, and Lancaster Counties that restricts the movement of Ash trees and lumber to further mitigate the spread of EAB. The Nebraska Department of Agriculture regulates and monitors the sale and distribution of firewood in the state to restrict the flow of firewood from outside the state. Several communities across Nebraska, including the City of Lincoln, have developed Nebraska Emerald Ash Borer Response Plans to guide and regulate EAB.

Figure 12: EAB Confirmation in Nebraska



Source: NDA, 2024[47]

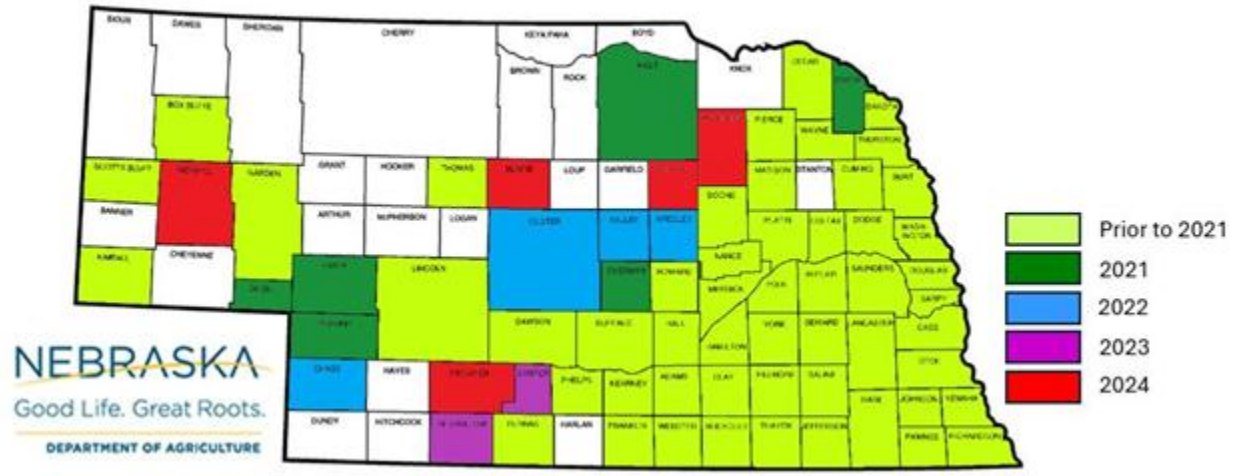
Japanese Beetles

Japanese beetles are a rising concern in the state and planning area. Japanese beetles are highly destructive invasive pests found in many counties across Nebraska. The figure shows counties declared as infested by the beetles. Both Lancaster and Cass County declared infestation prior to 2021. In 2021 Nebraska moved to Category 3 status under the Japanese Beetle Harmonization Plan. This change elevated Nebraska's status from Category 2, partially infested, to wholly infested. These beetles cause

[45] Arbor Day Foundation. 2015. "Emerald Ash Borer." https://www.arborday.org/trees/health/pests/emerald-ash-borer.cfm.
[46] "Nebraska Emerald Ash Borer Response Plan." May 2015. https://nfs.unl.edu/NebraskaEABResponsePlan.pdf.
[47] Nebraska Department of Agriculture. 2024. "Emerald Ash Borer." https://nda.nebraska.gov/plant/entomology/eab/index.html.

damage in the larval state (root damage) and adult stage (defoliation). Adult Japanese beetles can defoliate a tree quickly as other beetles are attracted to feeding sites by both the scent of the plant and pheromones sent out by other beetles. Chemical pesticides provide temporary protection however there are no long-range protection measures.

Figure 13: Japanese Beetle Distribution in Nebraska



Extent

There is no standard for measuring the magnitude of agricultural disease. Historical events have impacted a relatively small to moderate number of livestock and/or crops. The planning area is heavily dependent on the agricultural economy and the extent scale for this hazard applies the same to each jurisdiction in the plan. Any severe plant or animal disease outbreak which may impact this sector would negatively impact the entire planning area.

Average Annual Damages

According to the USDA RMA there were 40 plant disease events planning area. The RMA does not track losses for livestock, but annual crop losses from plan disease can be estimated. The USDA RMA also does not include losses associated with Ash tree mortality from EAB.

Table 30: Agricultural Plan Disease Losses

Hazard Type	Number of Events	Events per Year	Total Crop Loss	Average Annual Crop Loss
Plant Disease	40	1.6	$300,996	$12,040

Source: RMA, 2000-2024

Historical Probability and Future Likelihood

Given the historical record of agricultural plant disease (40 disease outbreaks reported out of 25 years) the annual probability of plant disease is stated at 100 percent (Highly Likely). Given the historical record for animal disease events (59 disease outbreak reported in 10 of 11 years), for the purposes of this plan, the annual probability of animal disease occurrence is 90 percent (Highly Likely). The likelihood of agricultural disease outbreaks is likely to remain consistent or increase as future development occurs; particularly if agricultural production remains a strong driving economic sector in the planning area. Higher production demand will lead farmers, ranchers, or other producers to increase population densities of livestock and crops.

Table 31: Historical Probability & Future Likelihood – Agricultural Disease

Hazard	Historical Probability	Climate Change Impact	Future Development Impact	Future Likelihood
Animal Disease	**90%**	Increase in Frequency and Extent	Consistent to increase in Frequency	**Highly Likely**
Plant Disease	**100%**	Increase in Frequency and Extent	Increase in Frequency	**Highly Likely**

Future Development

The likelihood of agricultural disease outbreaks is likely to remain consistent or increase as future development occurs; particularly if agricultural production remains a strong economic factor in the planning area. Higher production demand will lead farmers, ranchers, or other producers to increase population densities of livestock and crops. For communities, diversification of trees and other landscape vegetation will help reduce the impacts and likelihood of invasive species and plant disease outbreaks. Communities can require new developments to only have a certain percentage of trees from one specific species. Cass County is more susceptible to negative impacts from Agricultural Plant and Animal Disease than Lancaster County.

Climate Change Impacts

The distribution and severity of agricultural disease outbreaks will likely increase alongside climate change impacts. Shifting climatic conditions will stress existing agricultural populations and plant species, creating vulnerability for new diseases to take hold. The perceived trend toward higher average temperatures and increased periods of severe drought increases the stress levels on animal populations, increasing the risk of disease taking hold. Additionally, uncommon diseases may return to higher amounts as changes in the environment cause the release of previously contained diseases or promote the mutation of diseases.

As noted by the Fourth National Climate Assessment: "*rural communities, where economies are more tightly interconnected with agriculture than with other sectors, are particularly vulnerable to the agricultural volatility related to climate… Crop and livestock production in certain regions will be adversely impacted both by direct effects of climate change (such as increasing trends in daytime and nighttime temperatures; changes in rainfall patterns; and more frequent climate extremes, flooding, and drought) and consequent secondary effects (such as increased weed, pest, and disease pressures; reduced crop and forage production and quality; and damage to infrastructure). While climate change impacts on future agricultural production in specific regions of the United States remain uncertain, the ability of producers to adapt to climate change through planting decisions, farming practices, and use of technology can reduce its negative impact on production*."[48]

Changes to crop growth cycles due to warming winters and alterations in the timing and magnitude of rainfall events have already been observed as these trends continue, they will require new agriculture and livestock management practices.

Community Top Hazard Status

The following jurisdictions identified Agricultural Plant and Animal Disease as a top hazard of concern.

- City of Lincoln

Regional Vulnerabilities

Regional vulnerabilities to agricultural disease vary based on surrounding development and how rural or developed surrounding areas are. As communities and the region develop, considerations should be made to a variety of local vulnerabilities. The following table provides information related to regional vulnerabilities; for jurisdictional-specific vulnerabilities, refer to *Section Seven: Community Profiles.*

[48] Fourth National Climate Assessment. 2018. "Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II. https://nca2018.globalchange.gov/.

Table 32: Regional Dam Failure Vulnerabilities

SECTOR	VULNERABILITY
PEOPLE	-Those in direct contact with infected livestock -Potential food shortage during prolonged events -Residents in poverty if food prices increase
ECONOMIC	-Economic power tied to the agricultural industry -Large scale or prolonged events may impact tax revenues and local capabilities -Land value may largely drive population changes within the planning area
BUILT ENVIRONMENT	None
INFRASTRUCTURE	-Transportation routes can be closed during quarantine
CRITICAL FACILITIES	None
CLIMATE	-Changes in seasonal normals can promote spread of invasive species and agricultural disease

DAM FAILURE

According to the Nebraska Administrative Code, dams are "any artificial barrier, including appurtenant works, with the ability to impound water, wastewater, or liquid-borne materials and which is:

- twenty-five feet or more in height from the natural bed of the stream or watercourse measured at the downstream toe of the barrier, or from the lowest elevation of the outside limit of the barrier if it is not across a stream channel or watercourse, to the maximum storage elevation or
- has an impounding capacity at maximum storage elevation of fifty acre-feet or more, except that any barrier described in this subsection which is not in excess of six feet in height or which has an impounding capacity at maximum storage elevation of not greater than fifteen acre-feet shall be exempt, unless such barrier, due to its location or other physical characteristics, is classified as a high hazard potential dam.

Dams do not include:

- an obstruction in a canal used to raise or lower water;
- a fill or structure for highway or railroad use, but if such structure serves, either primarily or secondarily, additional purposes commonly associated with dams it shall be subject to review by the department;
- canals, including the diversion structure, and levees; or
- water storage or evaporation ponds regulated by the United States Nuclear Regulatory Commission."[49]

The NeDNR uses a classification system for dams throughout the state, including those areas participating in this plan. The classification system includes three classes, which are defined in the table below.

Table 33: Dam Size Classification

SIZE	EFFECTIVE HEIGHT (FEET) X EFFECTIVE STORAGE (ACRE-FEET)	EFFECTIVE HEIGHT
SMALL	≤ 3,000 acre-feet	and ≤ 35 feet
INTERMEDIATE	> 3,000 acre-feet to < 30,000 acre-feet	or > 35 feet
LARGE	≥ 30,000 acre-feet	Regardless of Height

Source: NeDNR, 2013[50]

The effective height of a dam is defined as the difference in elevation in feet between the natural bed of the stream or watercourse measured at the downstream toe (or from the lowest elevation of the outside limit of the barrier if it is not across stream) to the auxiliary spillway crest. Effective storage is defined as the total storage volume in acre-feet in the reservoir below the elevation of the crest of the auxiliary spillway. If the dam does not have an auxiliary spillway, the effective height and effective storage should be measured at the top of dam elevation.

[49] Nebraska Department of Natural Resources. "Department of Natural Resources Rules for Safety of Dam and Reservoirs." Nebraska Administrative Code, Title 458, Chapter 1, Part 001.09.

[50] Nebraska Department of Natural Resources. 2013. "Classification of Dams: Dam Safety Section." https://dnr.nebraska.gov/sites/dnr.nebraska.gov/files/doc/dam-safety/resources/Classification-Dams.pdf.

Dam failure, as a hazard, is described as a structural failure of a water impounding structure. Structural failure can occur during extreme conditions, which include, but are not limited to:

- Reservoir inflows in excess of design flows
- Flood pools higher than previously attained
- Unexpected drop in pool level
- Pool near maximum level and rising
- Excessive rainfall or snowmelt
- Large discharge through spillway
- Erosion, landslide, seepage, settlement, and cracks in the dam or area
- Earthquakes
- Vandalism
- Terrorism

The NeDNR regulates dam safety and has classified dams by the potential hazard each poses to human life and economic loss. The following are classifications and descriptions for each hazard class:

- **Minimal Hazard Potential** - failure of the dam expected to result in no economic loss beyond the cost of the structure itself and losses principally limited to the owner's property.

- **Low Hazard Potential** - failure of the dam expected to result in no probable loss of human life and in low economic loss. Failure may damage storage buildings, agricultural land, and county roads.

- **Significant Hazard Potential** - failure of the dam expected to result in no probable loss of human life but could result in major economic loss, environmental damage, or disruption of lifeline facilities. Failure may result in shallow flooding of homes and commercial buildings or damage to main highways, minor railroads, or important public utilities.

- **High Hazard Potential** - failure of the dam expected to result in loss of human life is probable. Failure may cause serious damage to homes, industrial or commercial buildings, four-lane highways, or major railroads. Failure may cause shallow flooding of hospitals, nursing homes, or schools.

LOCATION

Communities or areas downstream of a dam, especially high hazard dams, are at greatest risk of dam failure. In total, there are 208 dams located within the two-county planning area, and an additional 53 dams in the surrounding area within the LPSNRD boundaries. There are 31 high hazard dams in the planning area. Figure 14 maps the location of these dams.

Table 34: Dam Classification in the Planning Area and LPSNRD Boundary

County	Minimal Hazard	Low Hazard	Significant Hazard	High Hazard
Cass	2	39	17	8
Lancaster	6	99	15	22
Neighboring County Dams within LPSNRD Boundary				
Butler*	0	14	1	0
Otoe*	0	1	0	0
Saunders*	1	10	0	0
Seward*	1	22	1	2
Planning Area Total	**10**	**185**	**34**	**32**

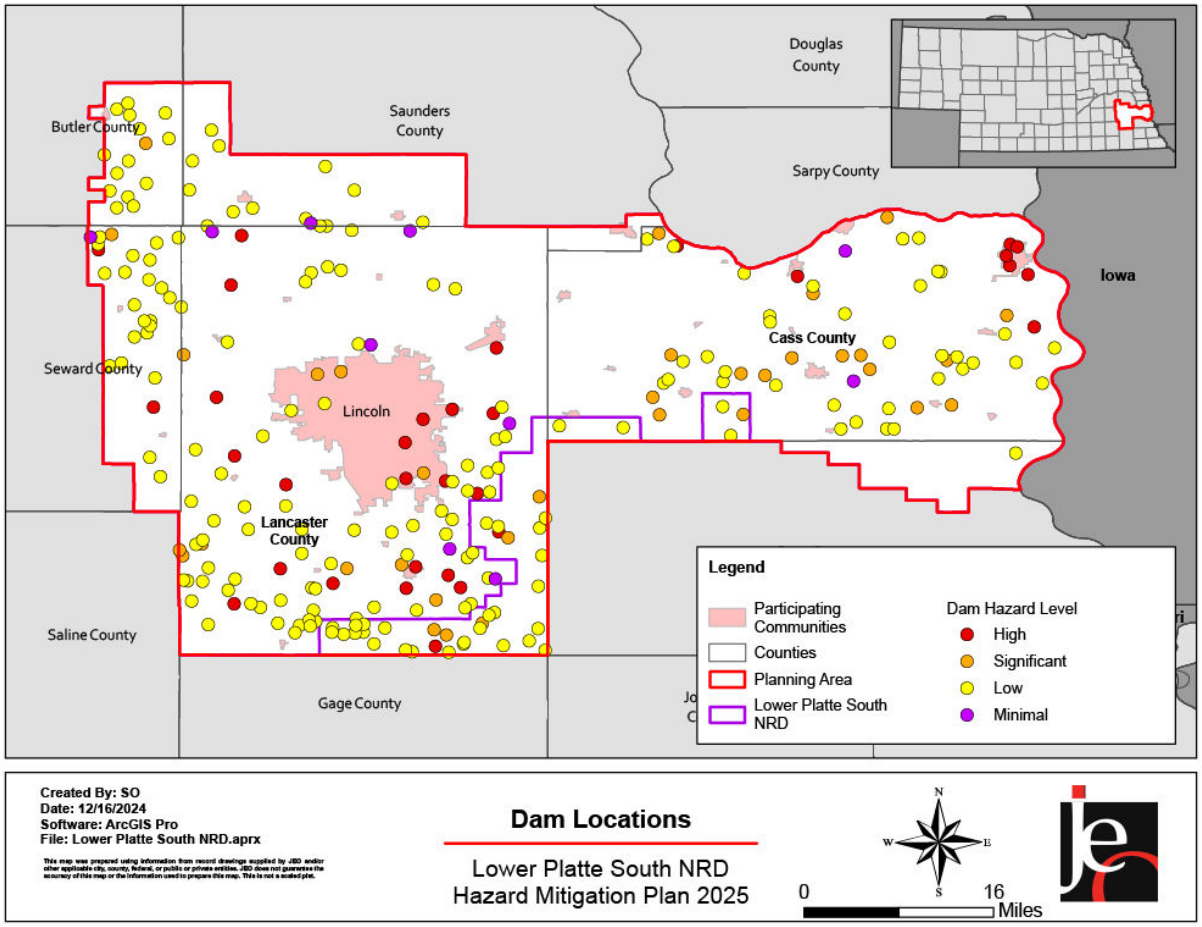
**Note: Only portions of Butler, Otoe, Saunders, and Seward Counties are located within the LPSNRD. Dams in these counties located outside of the LPSNRD boundaries are not included here.*

Source: NeDNR, 2024.[51]

Dams classified with high hazard potential require the creation of an Emergency Action Plan (EAP). The EAP defines responsibilities and provides procedures designed to identify unusual and unlikely conditions which may endanger the structural integrity of the dam within sufficient time to take mitigating actions and to notify the appropriate emergency management officials of possible, impending, or actual failure of the dam. The EAP may also be used to provide notification when flood releases will create major flooding. An emergency situation can occur at any time; however, emergencies are more likely to happen when extreme conditions are present.

Dam owners and the NeDNR have opted, at this time, to not include dam breach maps or inundation maps in hazard mitigation plans due to the sensitive nature of this information. Requests can be made of the dam owner or the Dam Safety Division of NeDNR to view an inundation to view an inundation map specific to a dam.

Figure 14: Dam Locations



Upstream Dams Outside the Planning Area

Several dams and reservoirs are located upstream from the LPSNRD boundary in the Missouri River basin. Of these dams and reservoirs, six are located on the main stem of the Missouri River and provide the majority of the flood peak discharge reduction along Cass County's eastern border from the Missouri River. Data on these dams are provided in the following table.

[51] Nebraska Department of Natural Resources. 2024. "Nebraska Dam Inventory." https://dnr.nebraska.gov/dam-safety/nebraska-dam-inventory.

Table 35: Upstream Missouri River Dams

Dam Name	Location	Year Operational	Level of Risk
Big Bend	Fort Thompson, South Dakota	1964	High
Fort Peck	Fort Peck, Montana	1940	High
Fort Randall	Pickstown, South Dakota	1953	High
Garrison	Riverdale, North Dakota	1955	High
Gavins Point	Yankton, South Dakota	1955	High
Oahe	Pierre, South Dakota	1962	High

During significant flood events heightened releases from upstream dams may contribute to flooding impacts in the planning area. Of the dams listed above, only four are designed for significant flood control: Fort Peck, Garrison, Oahe, and Fort Randall. Notably during the 2011 and 2019 flood events, heightened dam release rates, including from Gavins Point, contributed to flooding impacts. The March 2019 flood event saw significant rainfall and snowmelt upstream of the Gavins Point Dam which filled the dam reservoir to capacity and necessitated release. Unfortunately, additional precipitation was also entering Missouri River from heavy flows on the Platte River. The combination of heightened flows on the Missouri, including the released water from the dam, and the flood waters from the Platte River contributed to the flood conditions along the Missouri River bordering Cass County and primarily in the City of Plattsmouth. These dams have not been tested significantly again since 2019.

An additional dam is located in western Nebraska on the North Platte River and would impact areas along the Platte River in the planning area if it were to fail.

Table 36: Upstream Platte River Dam

Dam Name	Location	Year Operational	Level of Risk
Kingsley Dam (Lake McConaughy)	Keystone, Nebraska	1941	High

Historically, no dams listed above have experienced failure events. Each dam is inspected on a regular basis and after flash flood events. If problems are found during an inspection, the proper course of action is taken to ensure the structural integrity of the dam is preserved. In the event that dam failure is imminent, the EAP for the dam governs the course of action.

Historical Occurrences

According to the Stanford University National Performance of Dams Program, there have been three dam failure events within the planning area.[52] According to the NeDNR Inventory of Dams, there are no recorded dam failures in the planning area. The following table lists information about failure events with available data. No events resulted in reported damages, injuries, or fatalities.

Table 37: Dam Failure Events

Dam Name	County	Incident Date	Incident Type	Level of Risk
Hurt Dam	Butler County	6/19/1995	Seepage; Piping	Low
Hurt Dam	Butler County	5/17/2000	Seepage; Piping	Low

Source: Stanford University, 2019

Extent

While a breach of a high hazard dam would certainly impact those in inundation areas, the total number of people and property exposed to this threat would vary based on the dam location. Inundation maps are not made publicly available for security reasons.

[52] Stanford University. 1911-2019. "National Performance of Dams Program Dam Incident Database." Accessed March 2019. http://npdp.stanford.edu/dam_incidents.

AVERAGE ANNUAL DAMAGES

Due to lack of data and the sensitive nature of this hazard, potential losses are not calculated for this hazard. Community members in the planning area that wish to quantify the threat of dam failure should contact their County Emergency Management, the LPSNRD, or the NeDNR.

HISTORICAL PROBABILITY AND FUTURE LIKELIHOOD

According to the 2021 Nebraska State Hazard Mitigation Plan and Tim Gokie, Chief Dam Safety Section at NeDNR, "*The probability of failure of a well-maintained, well-designed dam is low. Nevertheless, with over 2,900 dams in Nebraska of varying age and condition, there is typically at least one dam failure in the State each year. Large storm systems that result in regional flooding, like the widespread flood events of 2010 and 2019, often result in several dam failures. The majority of the dams that fail are small, low hazard potential dams located in rural areas where the resulting damage is mostly limited to the dam itself and the dam owners' property. Low and minimal hazard potential dams are typically designed to safely pass either a 50-year or 100-year design flood event, so larger events will overtop the dam, which can result in dam failure. Dams that are classified as significant and high hazard potential are required to meet higher standards and failure of these dams is rare*."

The NeDNR has stated that there is typically at least one dam failure in the State of Nebraska each year. For the purpose of this plan, the probability of dam failure will be stated at less than one percent annually as three dam failure events has occurred in the planning area (Unlikely). It should be noted that dam failure events are more likely to occur concurrently with extensive flooding or other dam failure events as systems are stressed by consecutive failures. As excessive rainfall events are likely increase due to the impacts of climate change in the coming decades, the probability of future dam failure events is also likely to increase.

Table 38: Historical Probability & Future Likelihood - Dam Failure

Hazard	Historical Probability	Climate Change Impact	Future Development Impact	Future Likelihood
Dam Failure	<1%	Increase in Frequency	Neither Increase nor Decrease in Frequency. Increase in Exposure	Unlikely

FUTURE DEVELOPMENT

Any future growth in dam inundation areas increases the impacts from dam failure. Additionally, any increase in development downstream of any existing dams may elevate these dams to a high hazard rating. As many dam inundation areas are also identified floodplain locations, developing outside these areas will reduce vulnerability to both hazards. Closer to the dam, the breach inundation zone is frequently larger than the identified floodplain, so caution should be used when developing areas just downstream of a dam. Communities or counties could implement requirements for any new development or substantial improvements in dam inundation areas similar to floodplain ordinances to minimize the number of people and property impacted during a dam failure event.

However, overall flood risk and risk from dam failure events in the Lower Platte South NRD area is moderate. Future development will may occur in areas at risk from dam failure as the majority of dams in the area are used for recreational or flood control purposes.

CLIMATE CHANGE IMPACTS

While climate change does not directly affect dam failure events, changes in precipitation and temperature swings and extremes are highly likely to impact the planning area. Increased rainfall events, either in frequency and/or in magnitude, will lead to exacerbated stress on infrastructure systems including dams. Additionally, past streamflow records are typically used to design or determine dam construction requirements and maintenance requirements. Climate change may impact dam systems in the following ways:

- Drought/Extreme Heat – land subsidence, erosion, embankment settling, or foundation cracking

- Flooding – increased embankment erosion, sloughing, overtopping risk, or damage from ice jams

COMMUNITY TOP HAZARD STATUS

The following jurisdictions identified Dam Failure as a top hazard of concern.

- Lower Platte South NRD
- Cass County
- Lancaster County
- City of Lincoln
- City of Hickman
- City of Waverly

REGIONAL VULNERABILITIES

Regional vulnerabilities to dam failure vary based on surrounding development and other flood control measures. As communities and the region develop, considerations should be made to a variety of local vulnerabilities. The following table provides information related to regional vulnerabilities; for jurisdictional-specific vulnerabilities, refer to *Section Seven: Community Profiles.*

Table 39: Regional Dam Failure Vulnerabilities

SECTOR	VULNERABILITY
PEOPLE	-Those living downstream of high hazard dams -Evacuation likely with high hazard dams -Hospitals, nursing homes, and the elderly at greater risk due to low mobility
ECONOMIC	-Businesses located in the inundation areas would be impacted and closed for an extended period of time -Employees working in the inundation area may be out of work for an extended period of time
BUILT ENVIRONMENT	-Damage to homes and buildings
INFRASTRUCTURE	-Transportation routes could be closed for extended period of time
CRITICAL FACILITIES	-Critical facilities in inundation areas are vulnerable to damages
CLIMATE	-Increased annual precipitation contributes to sustained stress on systems -Changes in water availability and supply can constrain energy production and reservoir stores

DROUGHT

Drought is generally defined as a natural hazard that results from a substantial period of below normal precipitation. Although many erroneously consider it a rare and random event, drought is a normal, recurrent feature of climate. It occurs in virtually all climatic zones, but its characteristics vary significantly from one region to another. A drought often coexists with periods of extreme heat, which together can cause significant social stress, economic losses, and environmental degradation.

Drought is a slow-onset, creeping phenomenon that can affect a wide range of people and industries. While many drought impacts are non-structural, there is the potential that during extreme or prolonged drought events structural impacts can occur. Drought normally affects more people than other natural hazards, and its impacts are spread over a larger geographical area. As a result, the detection and early warning signs of drought conditions and assessment of impacts are more difficult to identify than that of quick-onset natural hazards (e.g., flood) that results in more visible impacts. According to the National Drought Mitigation Center (NDMC), droughts are classified into four major types:

> **Drought** is a normal, recurrent feature of climate, although many erroneously consider it a rare and random event. It occurs in virtually all climatic zones, but its characteristics vary significantly from one region to another.
>
> ~National Drought Mitigation Center

- **Meteorological Drought** – is defined based on the degree of dryness and the duration of the dry period. Meteorological drought is often the first type of drought to be identified and should be defined regionally as precipitation rates and frequencies (norms) vary.

- **Agricultural Drought** – occurs when there is deficient moisture that hinders planting germination, leading to low plant population per hectare and a reduction of final yield. Agricultural drought is closely linked with meteorological and hydrological drought; as agricultural water supplies are contingent upon the two sectors.

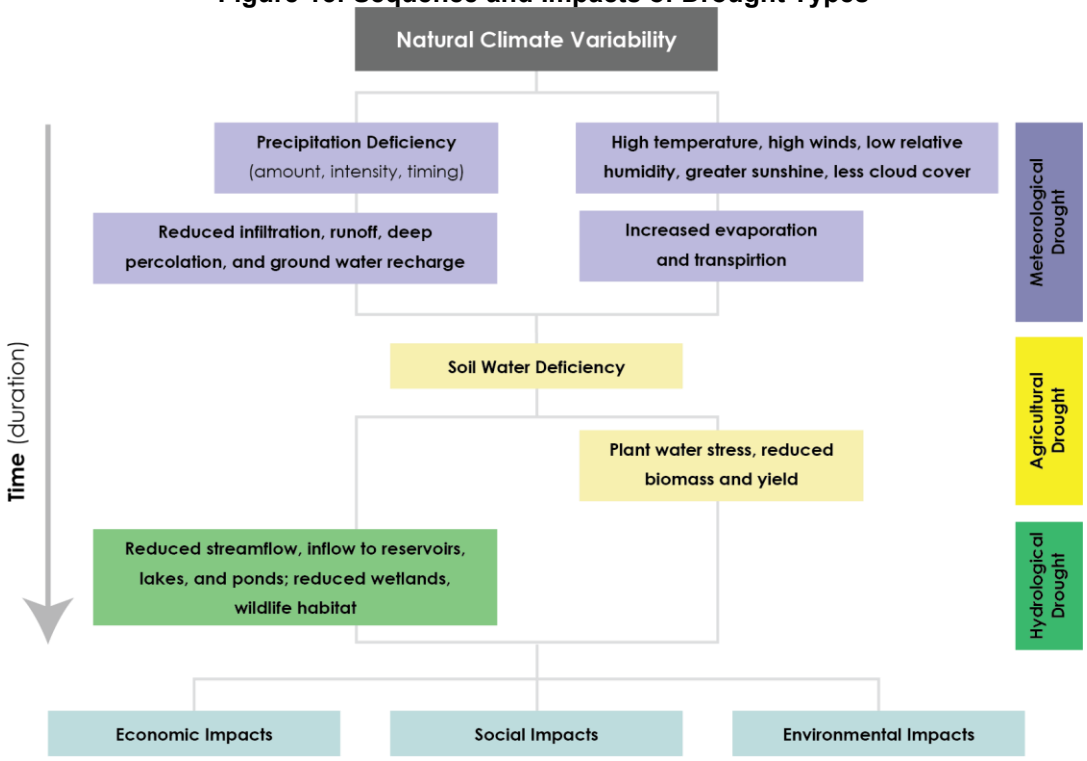
- **Hydrologic Drought** – occurs when water available in aquifers, lakes, and reservoirs falls below the statistical average. This situation can arise even when the area of interest receives average precipitation. This is due to the reserves diminishing from increased water usage, usually from agricultural use or high levels of evapotranspiration, resulting from prolonged high temperatures. Hydrological drought often is identified later than meteorological and agricultural drought. Impacts from hydrological drought may manifest themselves in decreased hydropower production and loss of water based recreation.

- **Socioeconomic Drought** – occurs when the demand for an economic good exceeds supply due to a weather-related shortfall in water supply. The supply of many economic goods includes, but are not limited to, water, forage, food grains, fish, and hydroelectric power.[53]

The following figure indicates different types of droughts, their temporal sequence, and the various types of effects they can have on a community.

[53] National Drought Mitigation Center. 2017. "Drought Basics." http://drought.unl.edu/DroughtBasics.aspx.

Figure 15: Sequence and Impacts of Drought Types

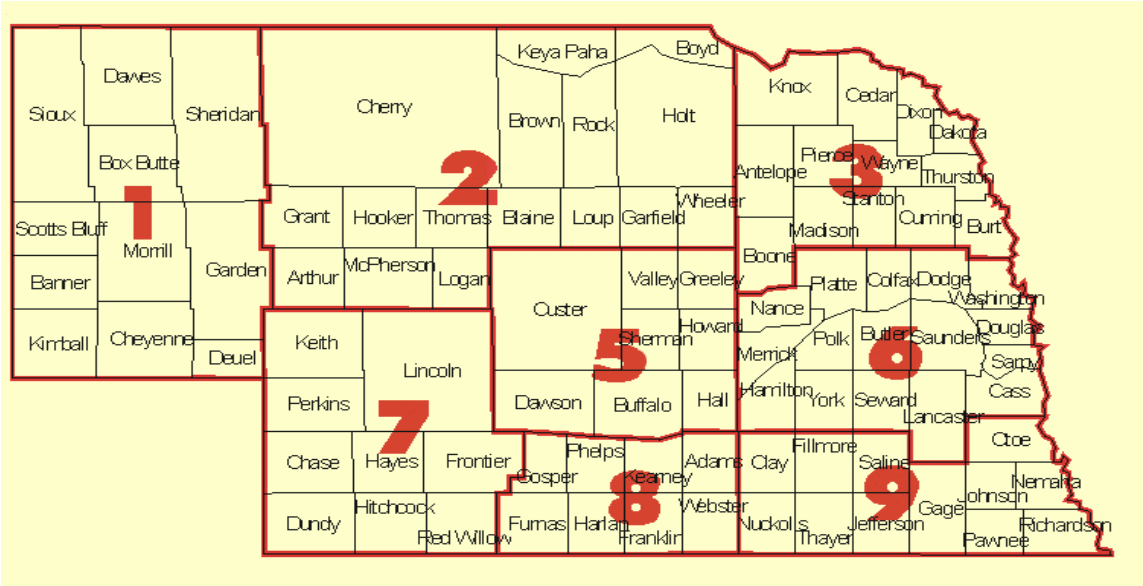


Source: National Drought Mitigation Center, University of Nebraska-Lincoln, 2017.[54]

LOCATION

The entire planning area is susceptible to impacts resulting from drought. The Palmer Drought Severity Index (PDSI) is utilized by climatologists to standardize global long-term drought analysis. The data for the planning area was collected for Climate Division 6, which includes the planning area.

Figure 16: Nebraska Climate Divisions



Source: Climate Prediction Center

[54] National Drought Mitigation Center. 2017. "Types of Drought." http://drought.unl.edu/DroughtBasics/TypesofDrought.aspx.

HISTORICAL OCCURRENCES

The Palmer Drought Severity Index (PDSI) is utilized by climatologists to standardize global long-term drought analysis. The data for the planning area was collected for Climate Division 6, which includes the planning area. This particular station's period of record started in 1895. Table 41 shows the data from this time period. The negative Y axis represents a drought, for which '-2' indicates a moderate drought, '-3' a severe drought, and '-4' an extreme drought. Table 40 shows the details of the Palmer classifications.

Table 40: Palmer Drought Severity Index Classification

NUMERICAL VALUE	DESCRIPTION	NUMERICAL VALUE	DESCRIPTION
4.0 or more	Extremely wet	-0.5 to -0.99	Incipient dry spell
3.0 to 3.99	Very wet	-1.0 to -1.99	Mild drought
2.0 to 2.99	Moderately wet	-2.0 to -2.99	Moderate drought
1.0 to 1.99	Slightly wet	-3.0 to -3.99	Severe drought
0.5 to 0.99	Incipient wet spell	-4.0 or less	Extreme drought
0.49 to -0.49	Near normal	--	--

Source: Climate Prediction Center

Table 41: Historic Droughts

DROUGHT MAGNITUDE	MONTHS IN DROUGHT	PERCENT CHANCE
-1 MAGNITUDE (MILD)	183/1,550	12%
-2 MAGNITUDE (MODERATE)	104/1,550	7%
-3 MAGNITUDE (SEVERE)	59/1,550	4%
-4 MAGNITUDE OR GREATER (EXTREME)	97/1,550	6%

Source: NCEI, Jan 1895-Feb 2024.[55]

The 2012 drought event is the most recent significant event for the planning area; however, the overall event did not warrant a presidential disaster declaration within Nebraska. The whole state of Nebraska was in severe drought conditions from the middle of July in 2012 to the end of May in 2013 and over 70% of the state was in exceptional drought conditions for over eight months. Numerous communities and water providers across the state implemented mandatory water restrictions, and some encouraged voluntarily water conservation during that timeframe. As many as 81 municipal water systems in the state experienced drought-related water supply issues in 2012 according to the Nebraska Department of Health and Human Services.[56]

The images on the next pages show a general timeline of worsening drought conditions from the 2012 drought in Nebraska from the state's 2012 Annual Summary Report. The planning area experienced intermittent impacts from January 2012 to June 2021, before being in severe drought conditions through 2013.

[55] National Centers for Environmental Information. 1895-2024. Accessed December 2024. https://www7.ncdc.noaa.gov/CDO/CDODivisionalSelect.jsp.

[56] Nebrasaka Department of Health and Human Services. 2012. "Nebraska's Public Water System Program 2012 Annual Report – January 1 to December 31, 2012." https://dhhs.ne.gov/Reports/Public%20Water%20System%20Annual%20Report%202012.pdf.

Figure 17: 2012 Drought Timeline

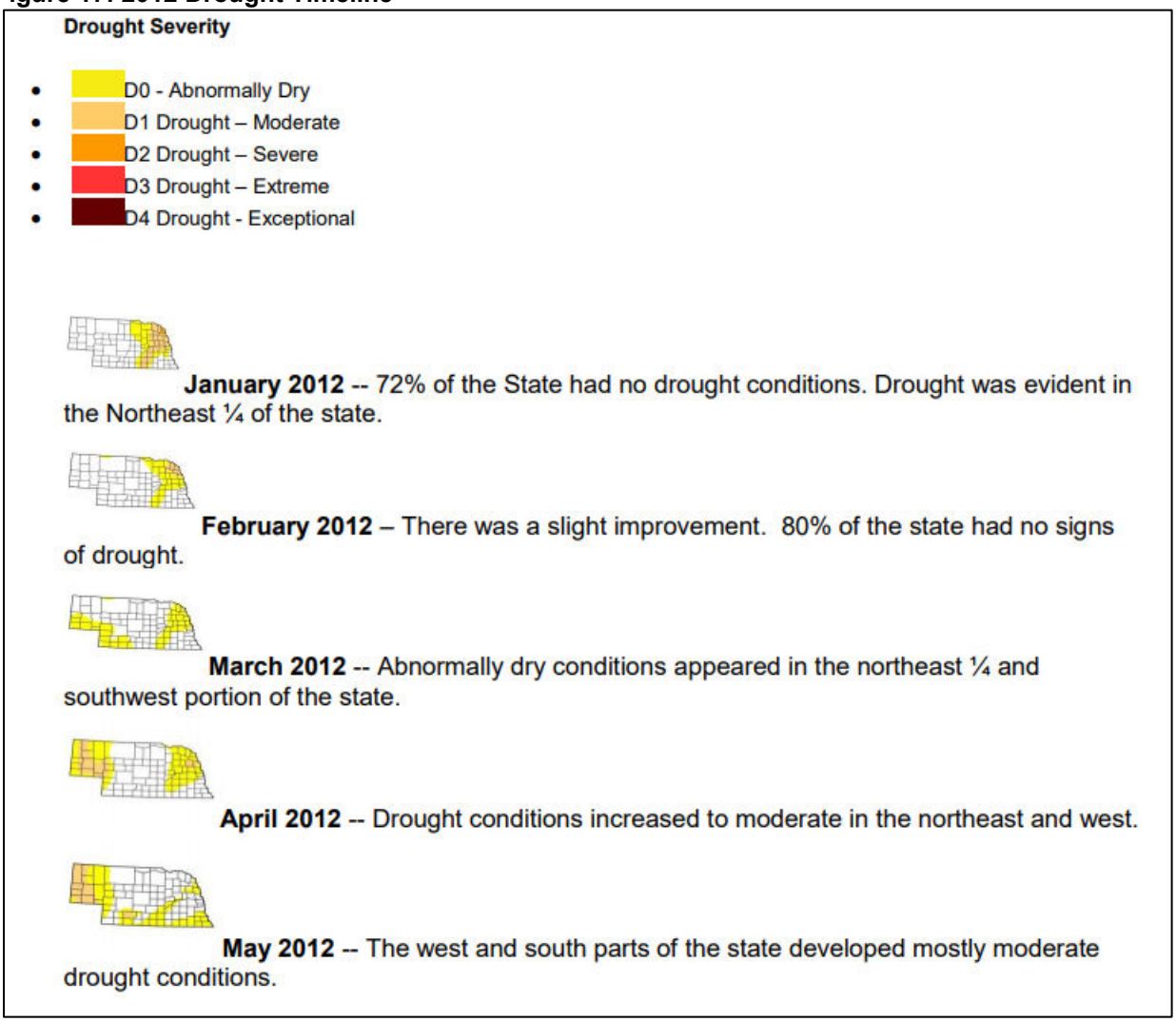
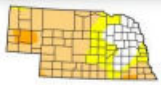
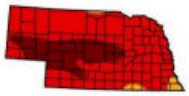


Figure 18: 2012 Drought Timeline (cont.)

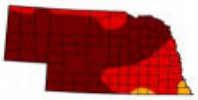


June 2012 -- Conditions continued to worsen to severe over 40% of the state, which involved the central and western parts of the state. About 7% of community water systems began asking consumers to voluntarily restrict their use of water.

July 2012 -- The entire state was under some degree of drought conditions. Throughout July, conditions deteriorated to 83% being under extreme conditions with 3.5% being defined as worst case conditions or exceptional drought. Water system restrictions showed a 65% increase. Most (78%) of those systems used voluntary restrictions while 22% went to mandatory restrictions. These restrictions ranged from allowing watering of lawns only on odd/even days to no lawn watering or vehicle washing.



August 2012 -- Exceptional drought conditions expanded to cover the central part of the state running east from Highway 281, west to Colorado and Wyoming. Another 15% of water systems began voluntary restrictions and another 12% began mandatory restrictions.



Sept 2012 -- Approximately 73% of the state experienced exceptional drought conditions. For the most part only the southeast corner of the state had severe to extreme conditions. No additional water systems were added to the list of those using restrictions.

Oct 2012 -- Exceptional drought conditions covered 77.5% of the state.

Nov & Dec 2012 – Conditions remained the same.

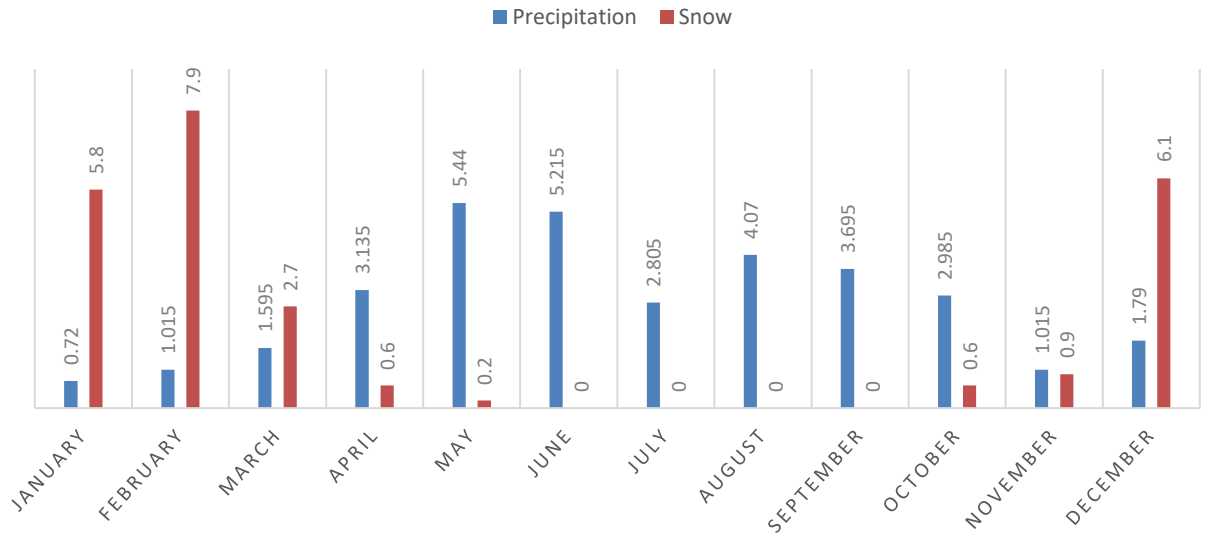
Nebraska in 2012 was the driest on record for the state, with record dryness occurring between June and August. The area will remain vulnerable to periodic drought as most projected increases in precipitation are anticipated to occur during the winter months, while increasing temperatures lead to increased soil drying.

EXTENT

It is reasonable to expect drought conditions to occur roughly 29% of all months (443 months out of 1,550 total months). Non-drought conditions (incipient dry spell, near normal, or incipient wet spell conditions) occurred in 1107 months, or 71% percent of months.

The figure below shows the normal average monthly precipitation for the planning area, which is helpful in determining whether any given month is above, below, or near normal in precipitation. Prolonged negative deviations from the norm showcase drought conditions, which influenced growing conditions for producers at those times. The overall extent of impact from drought on communities in the planning area is anticipated to be consistent. Communities with limited water resources may be at greater vulnerability to drought impacts such as those with only one well or those with water quality issues. Several communities in the planning area do not have a central water system but rely on individual or private wells.

Table 42: Average Monthly Precipitation



Source: NCEI, 2024

Average Annual Losses

The annual property estimate was determined based upon NCEI Storm Events Database since 1996. The annual crop loss was determined based upon the RMA Cause of Loss Historical Database since 2000. This does not include losses from displacement, functional downtime, economic loss, injury, or loss of life. The NCEI database reported $0 in total property damage. The RMA listed over $136 million in crop damage from drought. The direct and indirect effects of drought are difficult to quantify. Potential losses such as power outages could affect businesses, homes, and critical facilities. High demand and intense use of air conditioning or water pumps can overload the electrical systems and cause damage to infrastructure.

Table 43: Loss Estimate for Drought

Hazard Type	Total Property Loss[1]	Average Annual Property Loss[1]	Total Crop Loss[2]	Average Annual Crop Loss[2]
Drought	$0	$0	$136,719,893	$5,696,662

Source: 1 Indicates data is from NCEI (Jan 1996 to Oct 2023); 2 Indicates data is from USDA RMA (2000 to 2023)

The extreme drought in 2012 significantly affected the agricultural sector of the state. The USDA reported over $150 million in drought relief to Nebraska from 2008 to 2011 for all five disaster programs: Supplemental Revenue Assistance Payments (SURE); Livestock Forage Disaster Assistance Program (LFD); Emergency Assistance for Livestock, Honeybees, and Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish Program (ELAP); Livestock Indemnity Program (LIP); and Tree Assistance Program (TAP). According to the PDSI for the planning area, 2012's average severity index was ranked at a -2.79, with extremes in September and November of -4.81 and -4.70 respectively.

Historical Probability and Future Likelihood

The following table summarizes the magnitude of drought and monthly probability of occurrence as summarized and calculated using the PDSI index. Nearly 29% of the time, a part or all of the planning area is likely to be experiencing drought (Likely). Due to the anticipated impacts from climate change and future development, the future likelihood of drought events is very likely in the planning area.

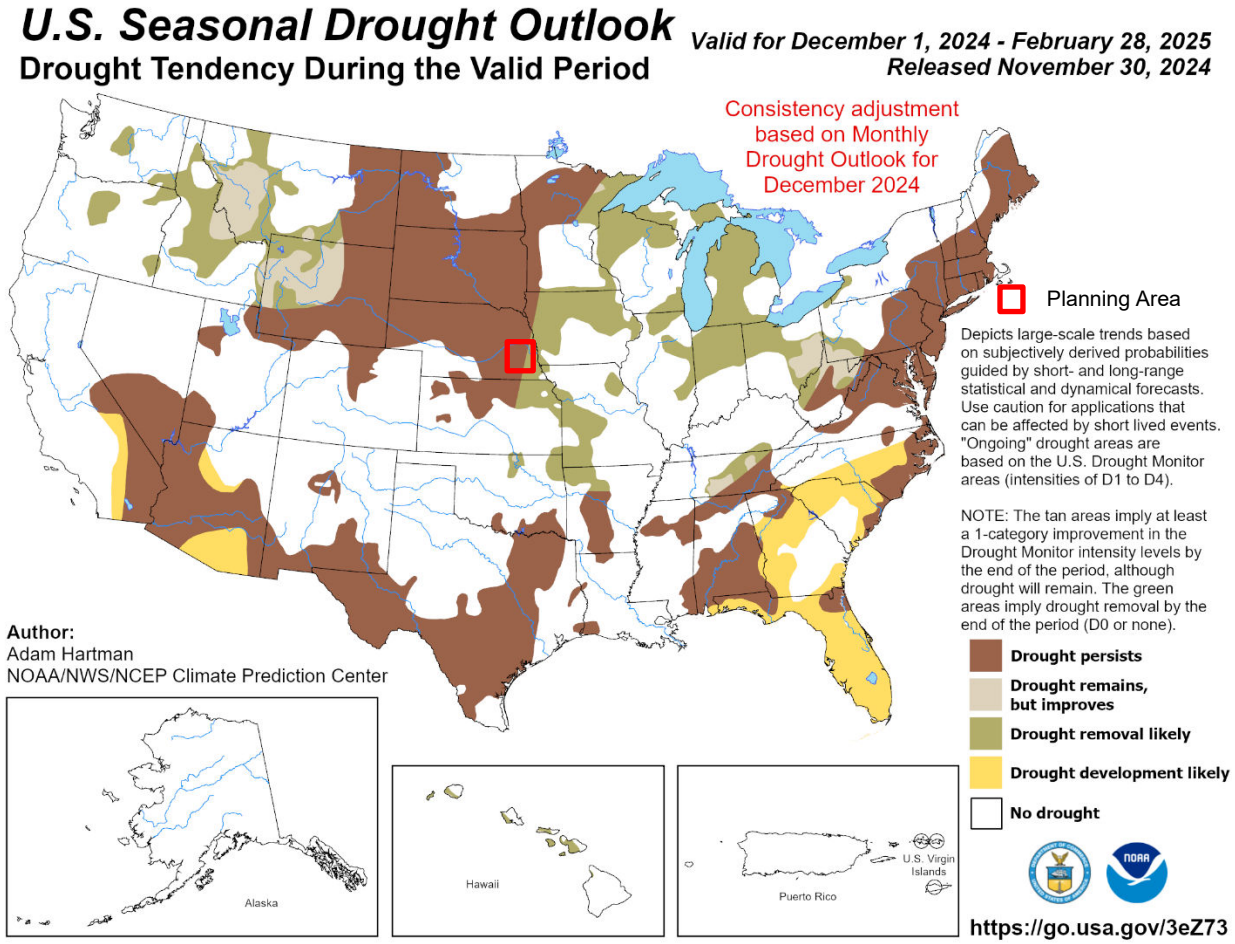
Table 44: Period of Record in Drought

PDSI Value	Magnitude	Drought Occurrences by Month	Monthly Probability
4 or more to -0.99	No Drought	1,107/1,550 months	71.4%
-1.0 to -1.99	Mild Drought	183/1,550 months	6.7%
-2.0 to -2.99	Moderate Drought	104/1,550 months	3.8%
-3.0 to -3.99	Severe Drought	59/1,550 months	6.3%
-4.0 or less	Extreme Drought	97/1,550 months	11.8%

Source: NCEI, Jan 1895-Feb 2024

The U.S. Seasonal Drought Outlook (Figure 19) provides a short-term drought forecast that can be utilized by local officials and residents to examine the likelihood of drought developing or continuing depending on the current situation. The following figure provides the drought outlook for December 1, 2024 through February 2025. As of December 2024, the planning area was experiencing persistent drought with some areas with anticipated drought removal likely.

Figure 19: U.S. Seasonal Drought Outlook



Source: NCEI, 2024

FUTURE DEVELOPMENT

Any future developments are likely to increase water demand, increase travel on local transportation routes, and influence continued growth on economic sectors at risk from the impacts of drought. Growing communities will need to adapt and account for increased water demands for residential, commercial, and industrial development.

CLIMATE CHANGE IMPACTS

An increase in average temperatures will contribute to the rise in the frequency and intensity of hazardous events like drought, which will cause significant economic, social, and environmental impacts on Nebraskans. Although drought is a natural part of the climate system, increasing temperatures will increase evaporation rates, decrease soil moisture, and lead to more intense droughts in the future, having negative impacts on dryland farming. This will cause significant economic, social, and environmental impacts on farming and community water systems in the planning area. The increase in droughts will also lead to an increased risk of wildfire events as vegetation become drier. [57] Increasing temperatures and drought may reduce the potential for aquifers to recharge, which has long-term implications for the viability of agriculture in Nebraska.

COMMUNITY TOP HAZARD STATUS

The following jurisdictions identified Drought as a top hazard of concern:

- Lower Platte South NRD
- Cass County
- Village of Murdock
- Village of Union
- Village of Bennet
- Village of Firth
- Village of Hallam
- City of Hickman
- Village of Malcolm
- Village of Sprague
- City of Ashland
- Cass County Rural Water District #1

REGIONAL VULNERABILITIES

Drought causes significant economic, environmental, and social impacts. Drought impacts several sectors including agriculture, rural and municipal water supplies, fish and wildlife, tourism, recreation, water quality, soil erosion, the incidence of wildfires or flash floods, electricity demand, and other sectors. Drought can also indirectly impact personal and business incomes, tax revenues, unemployment, and other social or economic areas as well.

The National Drought Mitigation Center's (NDMC) Drought Impact Reporter documents the impacts of drought throughout the United States. The following table summarizes, by category, the impacts within the ULNRD from January 2010 to December 2024. Many of these reported impacts have been in the agricultural sector. According to the Drought Impact Reporter, since 2010 there have been 44 impacts reported in the planning area. While a valuable means of recording some drought impacts, the Drought Impact Reporter does not account for every impact from drought. Therefore, while there were 44 *reported* impacts, the actual number of drought impacts since 2010 is likely much higher.

[57] NCEI. 2022. "State Climate Summaries – Nebraska". https://statesummaries.ncics.org/chapter/ne/#:~:text=The%20state%20is%20located%20far,(1895%E2%80%932020)%20averag.

Table 45: Drought Impacts in Planning Area

Area	Agricultural	Business & Industry	Energy	Fire	Plant & Wildlife	Relief, Response, & Restrictions	Society & Public Health	Tourism & Recreation	Water Supply & Quality
Lancaster County	11	2	0	6	6	15	2	6	12
Cass County	6	0	0	4	4	5	2	3	3

Source: NDMC, 2000-2024.[58]

The following table provides information related to regional vulnerabilities. For jurisdictional-specific vulnerabilities, refer to *Section Seven: Community Profiles*.

Table 46:Regional Drought Vulnerabilities

SECTOR	VULNERABILITY
PEOPLE	-Insufficient water supply -Loss of jobs in agricultural sector -Residents in poverty if food prices increase
ECONOMIC	-Closure of water intensive businesses (carwashes, pools, etc.) -Loss of tourism dollars -Decrease of land prices→ jeopardizes educational funds
BUILT ENVIRONMENT	-Cracking of foundations (residential and commercial structures) -Damages to landscapes
INFRASTRUCTURE	-Damages to waterlines below ground -Damages to roadways (prolonged extreme events) -Stressing of electrical systems (brownouts during peak usage)
CRITICAL FACILITIES	-None
CLIMATE	-Changes in annual precipitation can be detrimental to agriculture and energy production sectors -Changes in annual normal temperatures and weather patterns can exacerbate drought conditions

[58] National Drought Mitigation Center. 2018. "U.S. Drought Impact Reporter." http://droughtreporter.unl.edu/map/.

EXTREME TEMPERATURES

Extreme temperatures include durations of time at both the low and high ends of the thermometer. What constitutes extreme cold varies from region to region but is generally accepted as being temperatures that are significantly lower than the average low temperature. For the purposes of this plan, extreme cold is defined as temperatures being 10°F or below while extreme heat is defined as temperatures being 100°F or higher. Conditions for extreme heat are also defined by temperatures substantially hotter and/or more humid than average for a location at that time of year. This includes temperatures (including heat index) in excess of 100 degrees Fahrenheit or at least three successive days of 90-plus degrees Fahrenheit.

Extreme cold can be dangerous to the well-being of people and animals as prolonged exposure to cold causes the human body to lose heat faster than it can be produced and use up the body's stored energy. As a result, abnormally low body temperature can lead to hypothermia and frostbite. Cold can cause fuel to congeal in storage tanks and supply lines, stopping electric generators, overpower a building's heating system, and cause water and sewer pipes to freeze and rupture. Extreme cold also increases the likelihood of ice jams on flat rivers or streams. When combined with high winds from winter storms, extreme cold becomes extreme wind chill, which is extremely hazardous to health and safety.

Extreme heat is often associated with periods of drought but can also be characterized by long periods of high temperatures in combination with high humidity. During these conditions, the human body has difficulty cooling through the normal method of the evaporation of perspiration. Health risks including heatstroke, sunstroke, cramps, exhaustion, and fatigue may arise when a person is overexposed to heat.

Extreme temperatures can also cause people to overuse furnaces and air conditioners, which can lead to power failures. Power outages for prolonged periods increase the risk of health events such as heat stroke or hypothermia and subsequent fatalities. The planning area is includes both rural and metropolitan areas, which presents an added vulnerability to extreme events as the population of unhoused people is much higher in large cities.

Other secondary concerns connected to extreme temperatures hazards include water shortages brought on by drought-like conditions and high demand during heat spells or from interrupted utility services from broken pipes during extreme cold periods. Government authorities report that civil disturbances and riots are more likely to occur during heat waves or water shortages. In cities, pollution becomes a problem because the heat traps pollutants in densely populated urban areas. Adding pollution to the stresses associated with the heat magnifies the health threat to the urban population.

LOCATION

The entire planning area is subject to extreme temperatures – both heat and cold and all participating jurisdictions are affected.

HISTORICAL OCCURRENCES

According to the High Plains Regional Climate Center (HPRCC), on average, the planning area experiences five days above 100°F per year or four days with a high of 10°F or below. The planning area experienced the most days on record above 100°F in 1979 with 15 days while the most days below 10°F occurred in 1936 with 26 days. Two events recorded injuries associated with extreme cold and excessive heat in 2024. Descriptions of these events are included below:

- **Extreme Cold (1/12/2024) –** On the evening of January 12th, an arctic cold front associated with a powerful winter storm pushed south across eastern Nebraska and western Iowa. Behind this front, a strong cold-core high pressure system moved into the central and northern Plains. This ushered in a prolonged period of well below average temperatures characterized by extremely cold wind chills that lasted through the morning of January 17th. In advance of this cold air outbreak, long-fuse wind chill warnings were issued for the entire county warning area. Daytime high temperatures struggled to climb above zero degrees with wind chills remaining below minus 20 for the duration of the event. The coldest wind chills were observed region-wide on the night of January

13th into the morning of January 14th. Wind chills below minus 40 degrees were widespread with a few locations recording wind chills as low as minus 50 degrees. Strong winds that contributed to these extremely low wind chills also caused areas of blowing and drifting snow to persist one to three days after the winter storm that marked the start of this extreme cold event. Continued blowing and drifting of snow kept many county roads across eastern Nebraska and western Iowa closed for days after snow had stopped falling. Wind chills across the county dropped under 35 degrees below zero every night during the duration of this event. The coldest wind chills were felt on January 13th and 14th. The coldest recorded wind chill in the county was minus 40 degrees, observed in Hallam on the evening of the 13th and again in Firth on the morning of the 14th. A newspaper article reported 12 admissions into the CHI Health St. Elizabeth Regional Burn and Wound Center in Lincoln due to severe frostbite, and an additional 12 admissions to hospitals across the Omaha metro due to severe frostbite.

- **Excessive Heat (7/15/2024) –** Upper-level flow the evening of the 13th features a low-amplitude shortwave trough that had ejected out into the northern Great Plains. At the surface, a weakening stationary front was noted on WPC surface analysis to extend from northwest Nebraska into southeast Nebraska. Isolated strong thunderstorms that developed along this boundary brought a single severe wind gust in Knox County. However, the primary impact of this episode was the excessive heat that impacted much of southeast Nebraska and southwest Iowa. Heat indices the afternoon of the 15th in this area peaked between 110 and 115 degrees. The highest heat index was 117 degrees, observed by an AWOS station in Harlan, Iowa. A maximum heat index of 114 degrees was observed the afternoon of the 15th. There were 8 hospitalizations from heat-related illness reported in Lancaster County as well.

Estimated Loss of Electricity

According to the FEMA publication "What is a Benefit: Guidance on Benefit-Cost Analysis of Hazard Mitigation Project (June 2009)", if an extreme heat event occurred within the planning area, the following table assumes the event could potentially cause a loss of electricity for 10 percent of the population at a cost of $126 per person per day. In rural areas, the percentage of the population affected, and duration may increase during extreme events. The assumed damages do not consider physical damages to utility equipment and infrastructure.

Table 47: Extreme Heat Predictions for Days over 100F

County	2023 (est) Population	Population Affected (assumed 10%)	Electric Loss of Use Assumed Damage Per Day
Cass	27,446	2,745	$345,870
Lancaster	326,716	32,672	$4,116,672
Saunders*	23,463	2,346	$295,596
Butler*	8,459	846	$106,596
Seward*	17,671	1,767	$222,642
Otoe*	16,335	1,634	$205,884

**only portion of county included in the NRD planning area, full population data included here*

Extent

The National Weather Service (NWS) is responsible for issuing excessive heat or cold temperature outlooks, forecasts, watches, or warnings. The NWS' definitions are provided below.[59, 60]

- **Heat Advisories: Be Aware.** A Heat Advisory is issued within 12 hours of the onset of extremely dangerous heat conditions. The general rule of thumb for this advisory is when the maximum heat index temperature is expected to be 100° or higher for at least 2 days, and nighttime air temperatures will not drop below 75°; however, these criteria vary across the country, especially

[59] National Weather Service. 2024. "Understanding Cold Weather Alerts". https://www.weather.gov/safety/cold-ww.
[60] National Weather Service. 2024. "Heat Watch vs. Warning". https://www.weather.gov/safety/heat-ww.

for areas that are not used to dangerous heat conditions. Take precautions to avoid heat illness. If you don't take precautions, you may become seriously ill or even die.

- **Cold Weather Advisory: Be Aware.** A Cold Weather Advisory is issued when seasonably cold air temperatures or wind chill values, but not extremely cold values, are expected or occurring. Be sure you and your loved one's dress appropriately and cover exposed skin when venturing outdoors.

- **Excessive Heat Watches: Be Prepared.** Heat watches are issued when conditions are favorable for an excessive heat event in the next 24 to 72 hours. A Watch is used when the risk of a heat wave has increased but its occurrence and timing is still uncertain.

- **Extreme Cold Watch: Be Prepared.** An Extreme Cold Watch is issued when dangerously cold air temperatures or wind chill values are possible. As with a Warning, adjust your plans to avoid being outside during the coldest parts of the day. Make sure your car has at least half a tank of gas and update your winter survival kit.

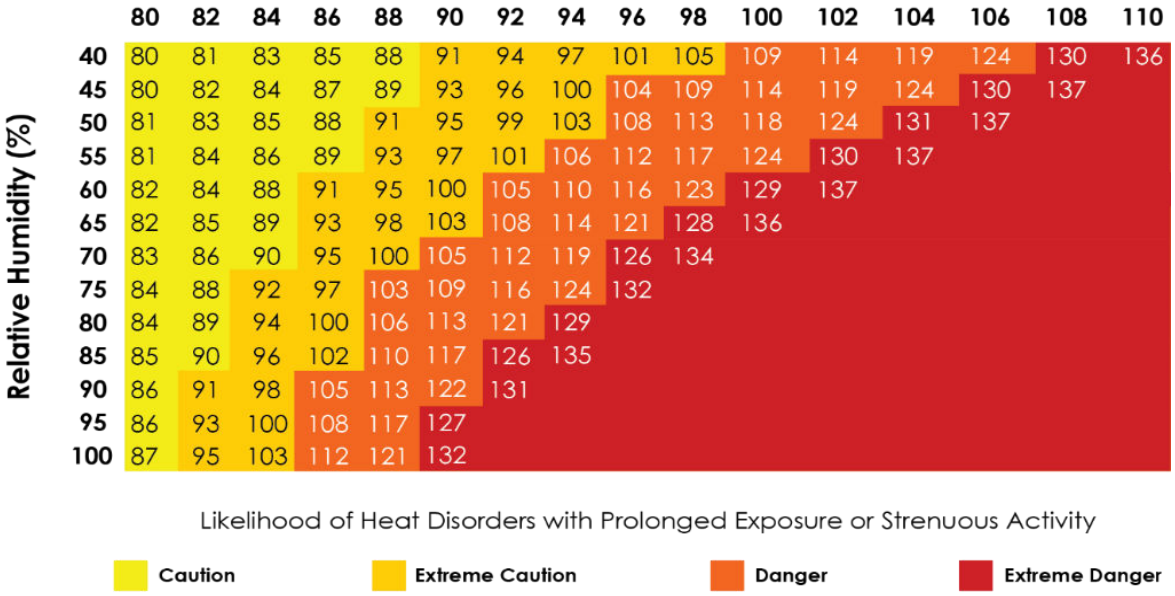
- **Excessive Heat Warnings: Take Action!** An Excessive Heat Warning is issued within 12 hours of the onset of extremely dangerous heat conditions. The general rule of thumb for this Warning is when the maximum heat index temperature is expected to be 105° or higher for at least 2 days and nighttime air temperatures will not drop below 75°; however, these criteria vary across the country, especially for areas not used to extreme heat conditions. If you don't take precautions immediately when conditions are extreme, you may become seriously ill or even die.

- **Extreme Cold Warning: Take Action!** An Extreme Cold Warning is issued when dangerously cold air temperatures or wind chill values are expected or occurring. If you are in an area with an Extreme Cold Warning, avoid going outside. If you have to go outside, dress in layers, cover exposed skin, and make sure at least one other person knows your whereabouts. Update them when you arrive safely at your destination.

A key factor to consider regarding extreme heat situations is the humidity level relative to the temperature. As is indicated in the following figure from the National Oceanic and Atmospheric Administration, as the relative humidity increases, the temperature needed to cause a dangerous situation decreases. For example, for 100% relative humidity, dangerous levels of heat begin at 86°F whereas a relative humidity of 50% starts at 94°F. The figure below is designed for shady and light wind conditions. Exposure to full sunshine or strong winds can increase hazardous conditions and raise heat index values by up to 15°F.

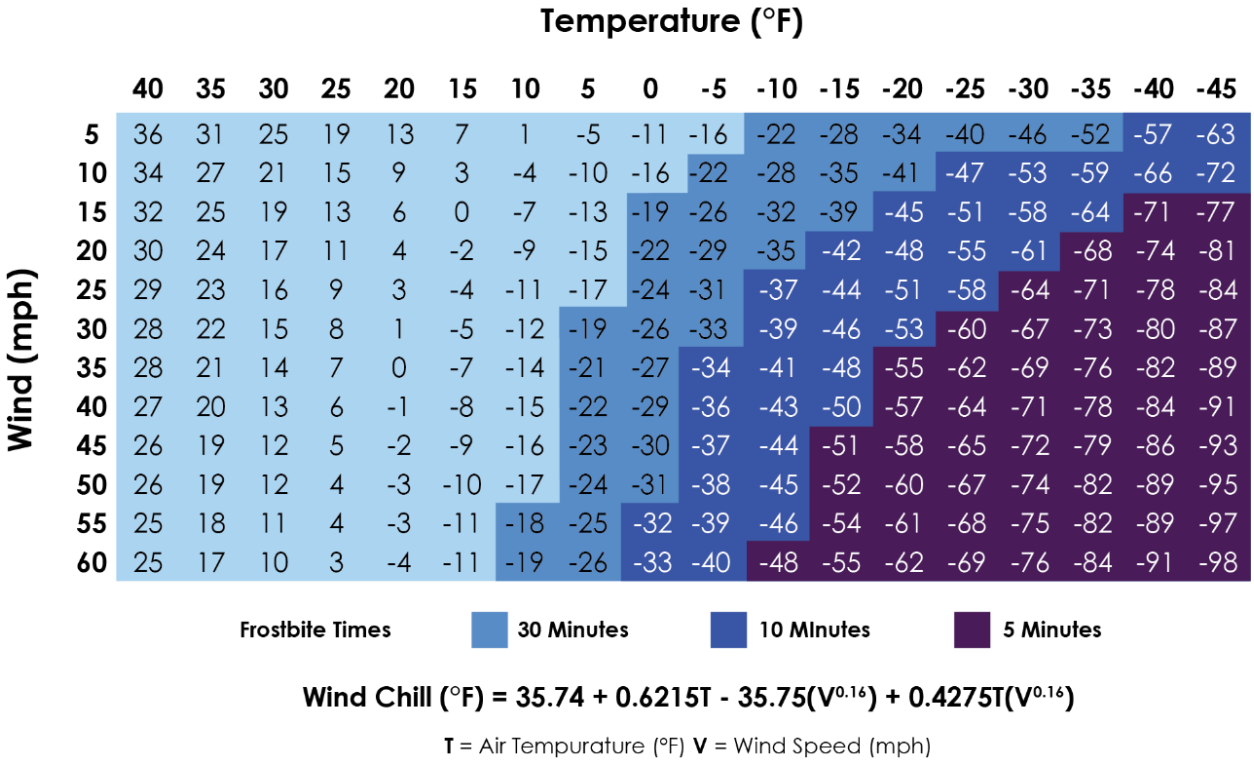
Wind chill is a key factor to consider regarding extreme cold situations. The Wind Chill Index was developed by the NWS to determine the decrease in air temperature felt by the body on exposed skin due to wind. The wind chill is always lower than the air temperature and can quicken the effects of hypothermia or frost bite as it gets lower. The figure on the next page shows the Wind Chill Index used by the NWS.

Figure 20: NOAA Heat Index



Source: NOAA[61]

Figure 21: NOAA Wind Chill Index Chart



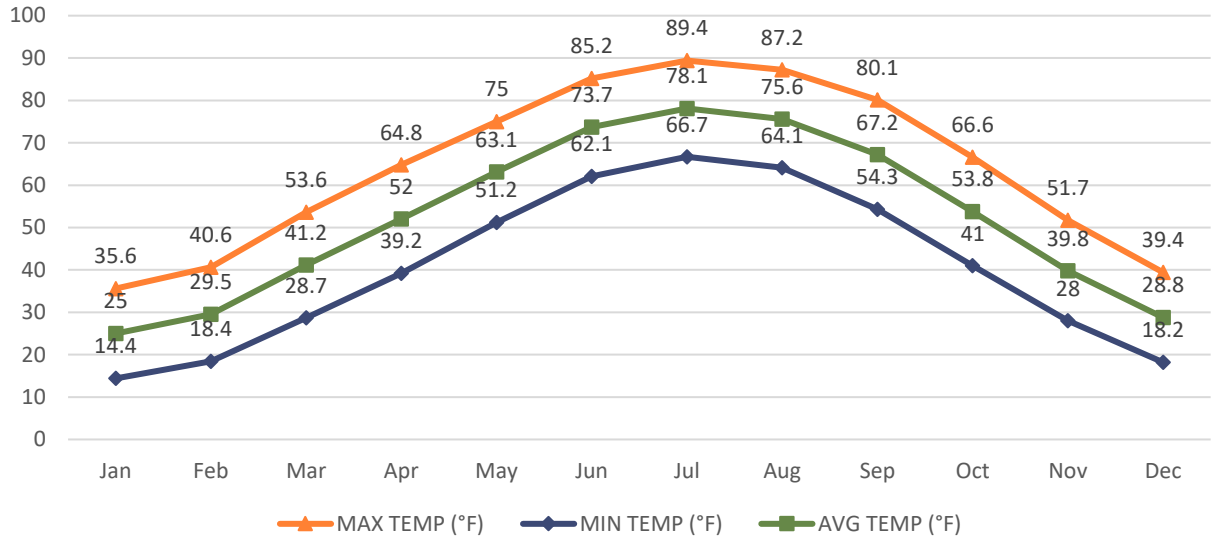
Source: NWS[62]

For the planning area, the coldest months of the year are December, January, and February. The average low temperatures for these months are all below freezing (average low for the three months 17.0°F). The

[61] National Oceanic and Atmospheric Administration, National Weather Service. 2020. "Heat Index". http://www.nws.noaa.gov/om/heat/heat_index.shtml.
[62] NOAA National Weather Service. 2001. "Wind Chill Chart". http://www.nws.noaa.gov/om/cold/wind_chill.shtml.

average high temperature for these months is 38.5°F. In the planning area, the months with the highest temperatures are June, July, and August. The average high temperature for these months is approximately 87.3°F while the average low temperature for these months is 64.3°F.

Figure 22: NCEI Climate Normal Temps (1991-2020)



The impacts of extreme temperatures, specifically extreme heat, are exacerbated by other risk factors such as diabetes, obesity, heart disease, or other health equity concerns. Many vulnerable communities and populations at-risk face greater exposure to heat or cold, have fewer resources to respond or escape conditions, and are more likely to suffer severe consequences if left unassisted. Populations at highest risk are those without shelter or who are stranded, or who live in a home that is poorly insulated or without adequate HVAC systems. Other impacts of extreme temperatures include asphyxiation (unconsciousness or death from a lack of oxygen) from toxic fumes from emergency heaters; household fires, which can be caused by fireplaces and emergency heaters; and frozen/burst pipes. Elderly populations are considered particularly vulnerable to the impacts of extreme temperatures events. Extreme temperatures can also cause people to overuse furnaces and air conditioners, which can lead to power failures. Power outages for prolonged periods increase the risk of health events such as heat stroke or hypothermia and subsequent fatalities.

Average Annual Damages

Average annual property and crop loss is available through the NCEI Storm Events Database and USDA RMA. The direct and indirect effects of extreme temperatures are difficult to fully quantify. Potential losses such as power outages could affect businesses, homes, and community lifelines. High demand and intense use of air conditioning, heaters, and water pumps can overload the electrical systems and damage infrastructure.

Table 48: Extreme Temperatures Loss Estimation

Hazard Type	Avg. # Days [1]	Total Property Loss[2]	Average Annual Property Loss	Total Crop Loss[3]	Average Annual Crop Loss
Extreme Heat	Avg. 5 days per year	$0	$0	$9,039,795	$376,658
Extreme Cold	Avg. 4 days per year	$100,000	$3,571	$359,455	$14,977

Source: 1 indicates the data is from HPRCC; 2 NCEI; 3 USDA RMA

Historical Probability and Future Likelihood

Extreme temperatures are a regular part of the climate for the planning area. Extreme heat events of over 100°F occur three days annually and extreme cold events occur on average four times a year. Extreme heat has been recorded in 51 out of the past 77 years indicated a 66% chance of occurring annually (Likely); while extreme cold has occurred in 47 out of the 77 years for the period of record (61%, Likely). Due to the anticipated impacts from climate change, the likelihood of future extreme temperature events will increase in frequency and magnitude.

Table 49: Historical Probability & Future Likelihood – Extreme Temperatures

Hazard	Historical Probability	Climate Change Impact	Future Development Impact	Future Likelihood
Extreme Heat	66%	Increase in Frequency and Extent	Increase in Frequency	Likely
Extreme Cold	61%	Increase in Frequency and Extent	Increase in Frequency	Likely

Future Development

Any increases in population and development will elevate exposure levels to extreme heat and extreme cold. There are several ways for communities to minimize the impacts of extreme heat. Communities can plant trees and other vegetation to provide more natural shade and make green infrastructure improvements. Many of these options can be required during new development but can also be added to areas that are already developed. Facilities such as nursing homes, hospitals, clinics, and day cares should be designed with access to back up power generation. Public cooling or warming centers should be established across the planning area for residents.

Climate Change Impacts

Climate change is anticipated to increase the number of extreme heat days. The Union for Concerned Scientists released a report in July 2019 titled *Killer Heat in the United States: Climate Choices and the Future of Dangerously Hot Days*[63] which included predictions for extreme heat events in the future dependent on future climate actions. The table below summarizes those findings for the planning area.

Table 50: Extreme Heat Predictions for Days over 100F

County	Where we are Now	Where we are currently headed	
	Historical 1971-2000 Avg	Mid-Century Anticipated 2036-2065 Avg	Late Century Anticipated 2070-2099 Avg
Cass	7 days/yr	39 days/yr	65 days/yr
Lancaster	7 days/yr	39 days/yr	66 days/yr
Saunders	6 days/yr	36 days/yr	62 days/yr
Butler	7 days/yr	35 days/yr	61 days/yr
Seward	7 days/yr	38 days/yr	65 days/yr
Otoe	8 days/yr	42 days/yr	68 days/yr

Source: Union of Concerned Scientists, 2024[64]

Impacts from climate change will significantly affect the prevalence and extent of extreme temperature conditions. The Fourth National Climate Assessment noted numerous impacts including increasing health risks from extreme heat conditions or increased severe wildfire events with hot dry conditions. Jurisdictions across the planning area may also experience more than one climate related impact simultaneously such

63 Union of Concerned Scientists. 2019. "Killer Heat in the United States: Climate Choices and the Future of Dangerously Hot Days". https://www.ucsusa.org/sites/default/files/attach/2019/07/killer-heat-analysis-full-report.pdf.

64 Union of Concerned Scientists. 2022. "Extreme Heat and Climate Change: Interactive Tool". https://www.ucsusa.org/resources/killer-heat-interactive-tool.

as drought and extreme heat. The season length of heat waves in many U.S. cities has increased by over 40 days since the 1960s.

Extreme heat and cold poses a significant risk to human health and labor productivity in the agricultural, construction, and other outdoor sectors. The elderly, pregnant women, and children are most vulnerable to negative health impacts during extreme temperature conditions. Heatwaves may also impact plant health, with negative effects on crops during essential growth stages. Increasing temperatures and drought may reduce the potential for aquifers to recharge, which has long-term implications for the viability of agriculture in Nebraska.

More frequent and severe temperature waves are also expected to increase stresses on the energy systems and local resources; rising temperatures are expected to reduce electricity generation capacity while increasing energy demands and costs, which can in turn lead to power outages and blackouts. Rising temperatures are leading to increased demand for water and energy. In parts of the region, this will constrain development, stress natural resources, and increase competition for water among communities, agriculture, energy production, and ecological needs.

Community Top Hazard Status

The following jurisdictions identified Drought as a top hazard of concern:

- Lancaster County

Regional Vulnerabilities

The nonprofit First Street Foundation has developed a Risk Factor tool to help understand risks from a changing climate at the county or community level. Risk Factor provides an overview for heat risk at the county level. The following table outlines each county's heat factor risk. Those at greatest risk for temperature-related illness include infants and children up to four years of age, people 65 years of age and older, people who are overweight, and people who are ill or on certain medications. Area elder care facilities, senior housing facilities, and childcare facilities are vulnerable to extreme temperatures. However, even young and healthy individuals are susceptible if they participate in strenuous physical activities during hot weather. In agricultural areas, the exposure of farm workers, as well as livestock, to extreme temperatures is a major concern.

Most notably, power failure during an extreme heat or cold event could shut down these facilities' HVAC systems if back-up power capabilities were not available. Additionally, infrastructure damage such as road damage can occur as a result of extreme heat. When asphalt is exposed to prolonged extreme heat, it can cause buckling of asphalt-paved roads, driveways, and parking lots.

Table 51: County Heat Factor Risk

		Cass	Lancaster	Butler	Otoe	Saunders	Seward
Overall Heat Factor Risk		Moderate Heat Factor	Moderate Heat Factor	Moderate Heat Factor	Moderate Heat Factor	Moderate Heat Factor	Moderate Heat Factor
# Properties at Risk	Minimal	0	0	0	0	0	0
	Minor	0	0	553	0	197	4
	Moderate	20,736	117,760	8,019	12,914	17,719	11,218
	Major	0	0	0	0	0	0
	Severe	0	0	0	0	0	0
	Extreme	0	0	0	0	0	0
Number of Days per Year >100°F	30 yrs ago	8 days	8 days	7 days	9 days	7 days	8 days
	Now	16 days	17 days	14 days	18 days	15 days	16 days
	In 30 yrs	30 days	30 days	26 days	33 days	28 days	30 days

Source: Risk Factor, 2024[65]

[65] First Street Foundation. "Risk Factor: Heat Factor." Accessed December 2024. https://riskfactor.com/.

Note: Health caution days = days where "feels like" temperature exceeds 90F; Dangerous days = days where "feels like" temperature exceeds 100F; Hot days = days where "feels like" temperature exceeds 101F.

The following tables provide information related to regional vulnerabilities and FEMA's National Risk Index values for Heat Waves and Cold Waves. For jurisdictional specific vulnerabilities, refer to *Section Seven: Community Profiles*.

Table 52:Regional Drought Vulnerabilities

SECTOR	VULNERABILITY
PEOPLE	-Human Health impacts including: Heat exhaustion, Heat stroke, Hypothermia, Heart Disease, Asthma -Elderly citizens are at higher risk to injury or death -Citizens without adequate heat or air conditioning at higher risk of injury or death -Workers required to be outside for extended periods of time
ECONOMIC	-Short-term interruption of business -Loss of power -Agricultural losses
BUILT ENVIRONMENT	-Damage to HVAC systems if overworked
INFRASTRUCTURE	-Damages to roadways (prolonged extreme events) -Stressing electrical systems (brownouts during peak usage) -Stressing water systems
CRITICAL FACILITIES	-Loss of power
CLIMATE	-Increased risk of wildfire events -Increases in extreme temperature conditions are likely, adding stress on livestock, crops, people, and infrastructure

FLOODING

Flooding can occur on a local level, sometimes affecting only a few streets, but it can also extend throughout an entire district, affecting whole drainage basins and impacting property in multiple states. Heavy accumulations of ice or snow can also cause flooding during the melting stage. These events are complicated by the freeze/thaw cycles characterized by moisture thawing during the day and freezing at night. There are four main types of flooding in the planning area: riverine flooding, flash flooding, sheet flooding, and ice jam flooding.

RIVERINE FLOODING

Riverine flooding, slower in nature, is defined as the overflow of rivers, streams, drains, and lakes due to excessive rainfall, rapid snowmelt or ice melt. The areas adjacent to rivers and stream banks that carry excess floodwater during rapid runoff are called floodplains. A floodplain or flood risk area is defined as the lowland and relatively flat area adjoining a river or stream. The terms “base flood” and “100-year flood” refer to the area in the floodplain that is subject to a one percent or greater chance of flooding in any given year. Floodplains are part of a larger entity called a basin or watershed, which is defined as all the land drained by a river and its tributaries.

FLASH FLOODING

Flash floods, faster in nature than the other types of floods, result from convective precipitation usually due to intense thunderstorms or sudden releases from an upstream impoundment created behind a dam, landslide, or levee. Flash floods are distinguished from regular floods by a timescale of fewer than six hours. Flash floods cause the most flood-related deaths because of this shorter timescale. Flooding from excessive rainfall in Nebraska usually occurs between late spring and early fall.

SHEET FLOODING

In some cases, flooding may not be directly attributable to a river, stream, or lake overflowing its banks. Rather, it may simply be the combination of excessive rainfall or snowmelt, saturated ground, and inadequate drainage. With no place to go, the water will find the lowest elevations – areas that are often not in a floodplain. This type of flooding, often referred to as sheet flooding, is becoming increasingly prevalent as development exceeds the capacity of the drainage infrastructure, therefore limiting its ability to properly carry and disperse the water flow. Flooding also occurs due to combined storm and sanitary sewers being overwhelmed by the tremendous flow of water that often accompanies storm events. Typically, the result is water backing into basements, which damages mechanical systems and can create serious public health and safety concerns.

ICE JAM FLOODING

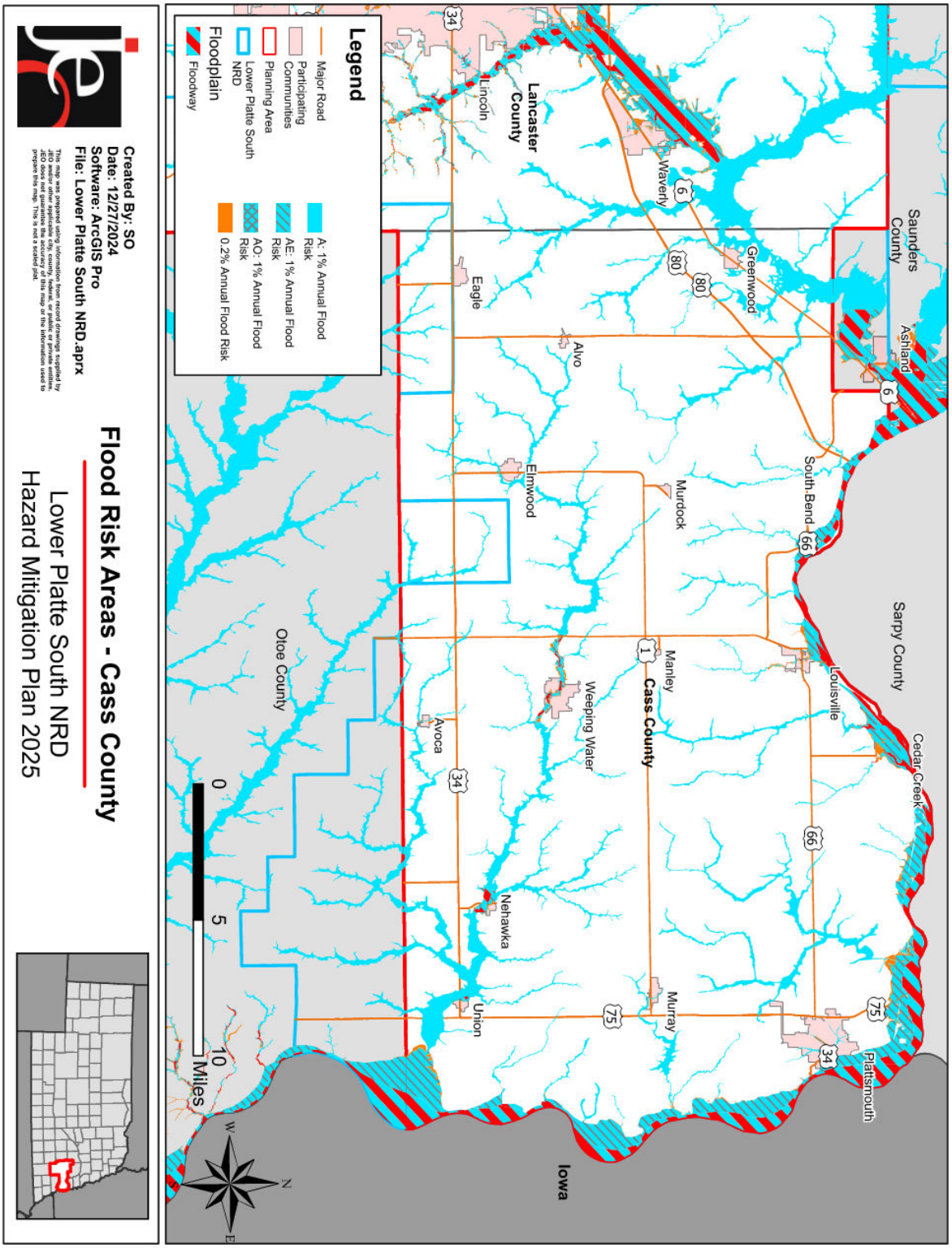
Ice jams occur when ice breaks up in moving waterways and then stacks on itself where channels narrow or human-made obstructions constrict the channel. This creates an ice dam, often causing flooding within minutes of the dam formation. Ice formation in streams occurs during periods of cold weather when finely divided colloidal particles called “frazil ice” form. These particles combine to form what is commonly known as “sheet ice.” This type of ice covers the entire river. The thickness of this ice sheet depends upon the degree and duration of cold weather in the area. This ice sheet can freeze to the bottom of the channel in places. During spring thaw, rivers frequently become clogged with this winter accumulation of ice. Because of relatively low stream banks and channels blocked with ice, rivers overtop existing banks and flow overland.

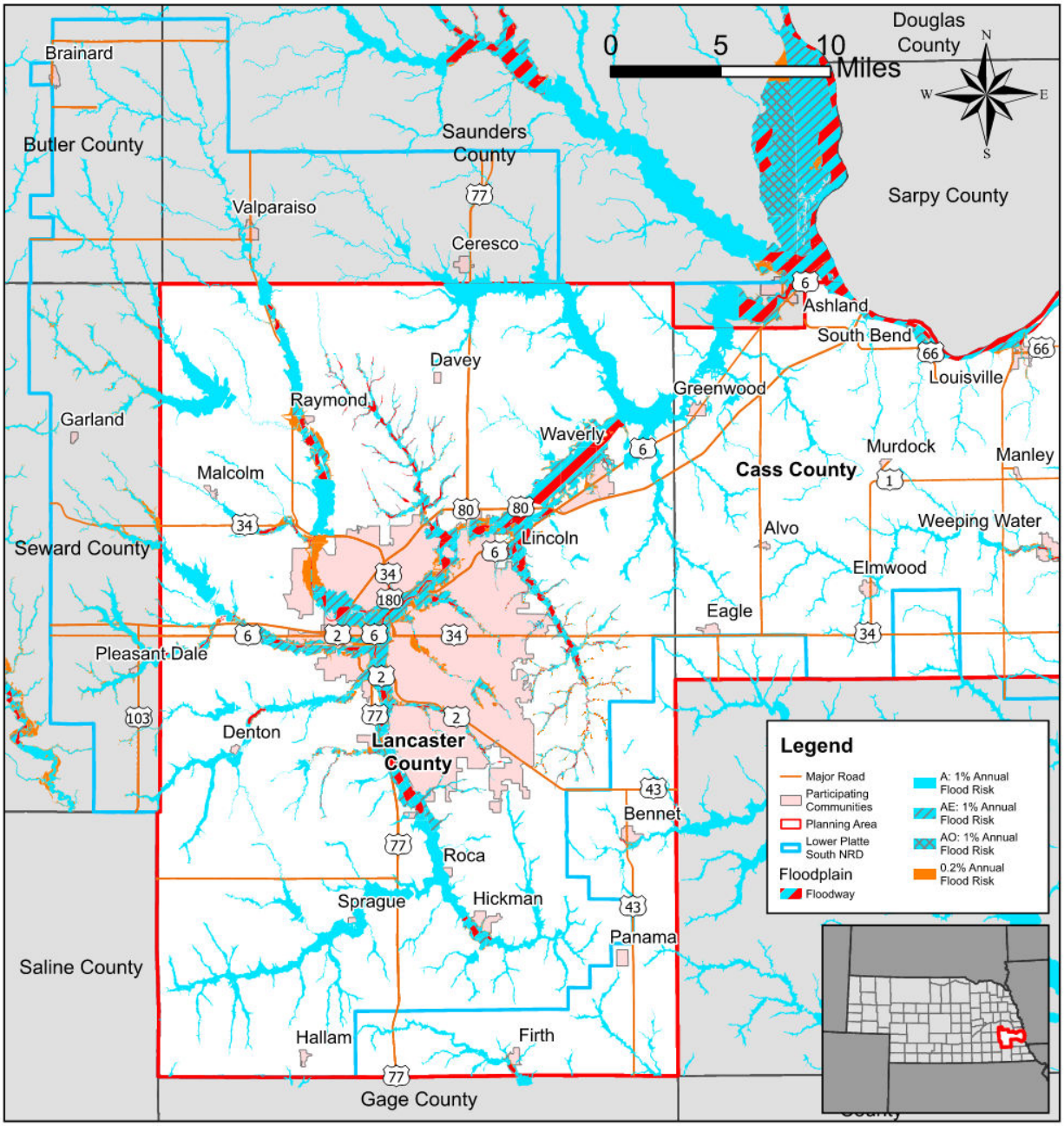
LOCATION

Major waterways in the planning area include the Missouri River, Platte River, Salt Creek, Oak Creek, Weeping Water Creek, Branched Oak Lake, Pawnee Lake, Wagon Train Lake, and Beaver Lake. These rivers and creeks are potential locations for flooding to occur. Flooding is most likely to occur in communities or areas directly near waterways including floodways, floodplain, and other flood risk hazard areas. Flooding in this section is primarily addressing riverine or fluvial flooding, whereas flooding from heavy rain events (pluvial), which commonly overwhelm stormwater management systems, is most likely to occur with Severe Thunderstorms.

The map below shows mapped flood risk hazard areas including the 100-yr and 500-yr floodplains across the planning area. For jurisdictional specific flood risk hazard areas, please see individual profiles in *Section Seven.*

Figure 23: 1% Annual Flood Risk Hazard Area





Created By: JR
Date: 01/09/2025
Software: ArcGIS Pro
File: Lower Platte South NRD.aprx

This map was prepared using information from record drawings supplied by JEO and/or other applicable city, county, federal, or public or private entities. JEO does not guarantee the accuracy of this map or the information used to prepare this map. This is not a scaled plat.

Flood Risk Areas - Lancaster County

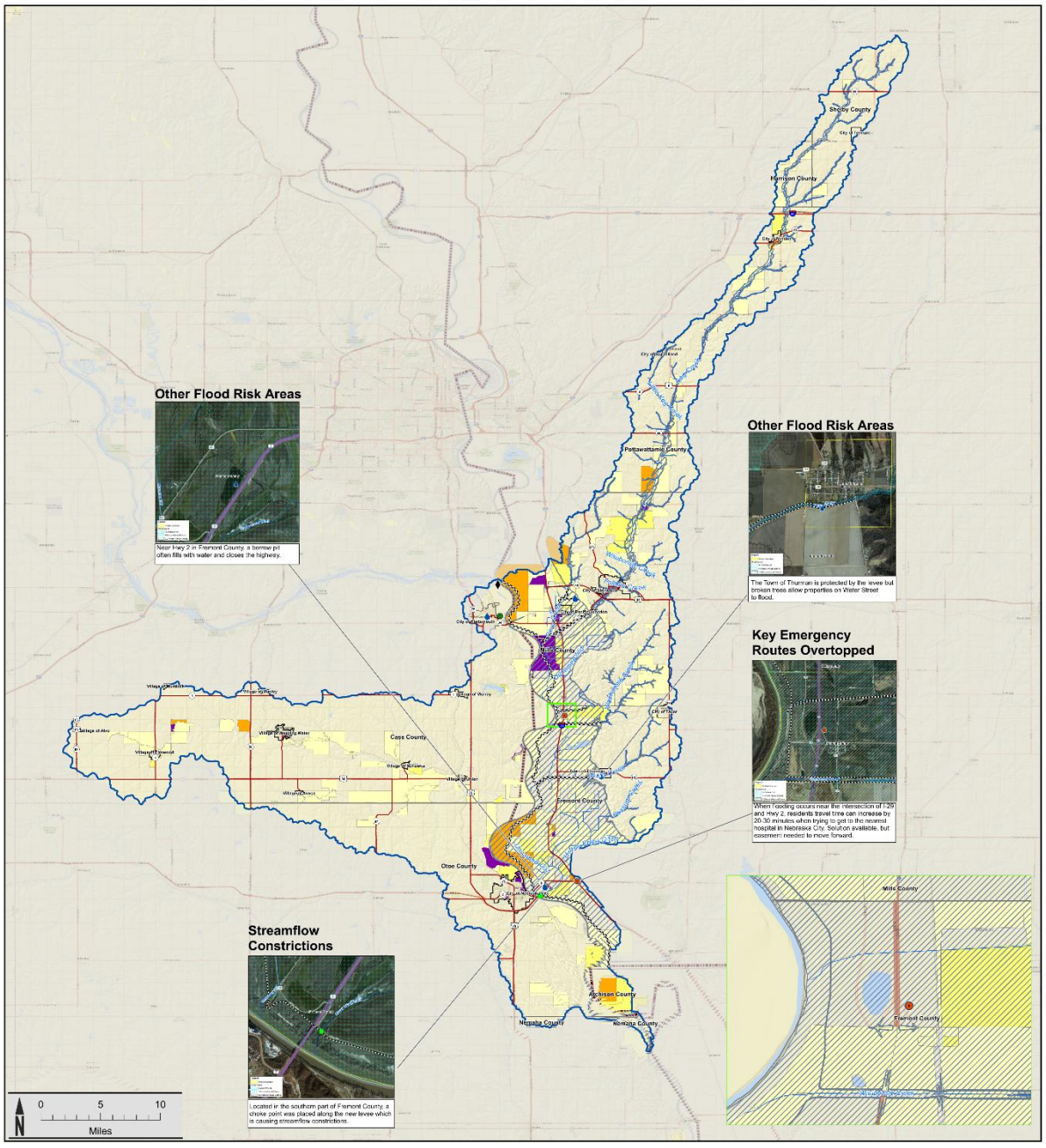
Lower Platte South NRD
Hazard Mitigation Plan 2025

RISK MAP PRODUCTS

Risk Mapping, Assessment, and Planning (Risk MAP) is a FEMA program that provides communities with flood information and additional flood risk data (e.g., flood depth grids, percent chance grids, areas of mitigation interest, etc.) that can be used to better protect their citizens. The Keg-Weeping Water Watershed has gone through the Risk MAP process, which included areas of Cass County (Plattsmouth, Murray, Nehawka, Weeping Water, Avoca, Manley, Murdock, Elmwood, and Alvo). The majority of analysis done during the Risk Map is along the Missouri River and tributaries on the Iowa side of the river.

As part of that process, a HAZUS analysis was performed for the Risk MAP areas. HAZUS is a risk model that estimates the physical, economic, and social impacts from flooding. The figures below show the HAZUS analysis results and boundary of the Risk MAP project. There are currently no additional planned Risk MAP projects in the planning area. NeDNR hosts the Risk MAP products on an interactive web map, which can be viewed on their webpage: https://dnr.nebraska.gov/floodplain.

Flood Risk Map: *Keg-Weeping Water Watershed*



MAP SYMBOLOGY

Base Data
- Corporate Limits
- Major Roads
- State Boundary
- Watershed Boundary
- Levees

Flood Data
- Rivers and Streams
- Restudy Area
- New SFHA

Flood Risk Avg. Annualized Loss
- Very Low
- Low
- Medium
- High
- Very High

Areas of Mitigation Interest Data
- Stream Flow Constrictions
- At-Risk Essential Facilities
- Other
- Non-Accredited Levees
- Significant Land Use Changes (within the past 5 years and looking forward 5 years)
- Other Flood Risk Areas
- Areas of Mitigation Success
- Key Emergency Routes Overtopped

PROJECT LOCATOR

Risk Mapping, Assessment, and Planning (Risk MAP)

FRM FLOOD RISK MAP

Keg-Weeping Water Watershed, Iowa

FEMA

HUC-8 Code 10240001

Version ID 2.1.2.1

RELEASE DATE 8/29/2014

For more information of data used for this non-regulatory map, please consult the Watershed USA Flood Risk Database and Flood Risk Report.

NATIONAL FLOOD INSURANCE PROGRAM (NFIP)

The NFIP was established in 1968 to reduce flood losses and disaster relief costs by guiding future development away from flood hazard areas where feasible; by requiring flood resistant design and construction practices; and by transferring the costs of flood losses to the residents of floodplains through flood insurance premiums.

In return for availability of federally-backed flood insurance, jurisdictions participating in the NFIP must agree to adopt and enforce floodplain management standards to regulate development in special flood hazard areas (SFHA) as defined by FEMA's flood maps. The following tables summarize NFIP participation and active policies within the planning area.

Table 53: NFIP Participants

Jurisdiction	Eligible-Regular Program	Date Current Map	Sanction	Suspension	Rescinded	Participation in NFIP
Butler County	08/16/11	08/16/11	No	No	No	Yes
Brainard	-	08/16/11	-	-	-	No
Cass County	09/02/82	08/26/10	No	No	No	Yes
Alvo	-	11/26/10	-	-	-	No
Avoca	08/03/79	11/26/10	No	Yes	No	Yes
Cedar Creek	09/15/78	11/26/10	No	No	No	Yes
Eagle	08/26/77	11/26/10	No	No	No	Yes
Elmwood	-	11/26/10	-	-	-	No
Greenwood	06/03/80	11/26/10	No	No	No	Yes
Louisville	03/04/80	11/26/10	No	No	No	Yes
Manley	-	11/26/10	-	-	-	No
Murdock	-	11/26/10	-	-	-	No
Murray	01/05/78	11/26/10	No	No	No	Yes
Nehawka	02/15/78	11/26/10	No	No	No	Yes
Plattsmouth	03/01/78	08/14/24	No	No	No	Yes
South Bend	07/20/84	11/26/10	No	No	No	Yes
Union	04/03/78	11/26/10	No	No	No	Yes
Weeping Water	12/01/77	11/26/10	No	No	No	Yes
Lancaster County	02/03/82	04/16/13	No	No	No	Yes
Bennet	03/02/81	04/16/13	No	No	No	Yes
Davey	-	04/16/13	-	-	-	No
Denton	09/21/01	04/16/13	No	Yes	No	Yes
Firth	04/15/81	04/16/13	No	No	No	Yes
Hallam	-	04/16/13	-	-	-	No
Hickman	02/03/82	04/16/13	No	No	No	Yes
Lincoln	04/23/71	04/16/13	No	No	No	Yes
Malcolm	03/30/09	04/16/13(M)	No	No	No	Yes
Panama	-	04/16/13	-	-	-	No
Raymond	04/18/85	04/16/13	No	No	No	Yes

Jurisdiction	Eligible-Regular Program	Date Current Map	Sanction	Suspension	Rescinded	Participation in NFIP
Roca	01/28/14	04/16/13(M)*	No	No	No	Yes
Sprague	09/21/01	04/16/13(M)*	No	No	No	Yes
Waverly	04/15/82	04/16/13	No	No	No	Yes
Saunders County	12/01/78	08/03/16	No	No	No	Yes
Ashland	11/03/82	04/05/10	No	No	No	Yes
Ceresco	07/03/86	04/16/13	No	No	No	Yes
Valparaiso	06/03/86	04/05/10(M)*	No	No	No	Yes
Seward County	09/01/90	05/01/20	No	No	No	Yes

Source: Federal Emergency Management Agency, National Flood Insurance Program, 2024
**(M) indicates No Elevation Determined – All Zone A, C, and X.*

This plan highly recommends and strongly encourages plan participants to enroll, participate, and remain in good standing with the NFIP. Compliance with the NFIP should remain a top priority for each participant, regardless of whether or not a flooding hazard area map has been delineated for the jurisdiction. Jurisdictions are encouraged to initiate activities above the minimum participation requirements, which are described in the Community Rating System (CRS) Coordinator's Manual (FIA-15/2017).[66] Currently the City of Lincoln and the City of Waverly participate in the CRS program. Since the prior plan, City of Waverly joined the CRS program and is now a Class 9 community. Lincoln is currently a Class 5 jurisdiction within the CRS program.

NFIP Repetitive Loss Structures

NeDNR and FEMA Region VII were contacted to determine if any existing buildings, infrastructure, or critical facilities are classified as NFIP Repetitive Loss Structures. The table below describes Repetitive Loss or Severe Repetitive Loss properties located in the planning area.

Table 54: Repetitive Loss and Severe Repetitive Loss Properties

Jurisdiction	# of Repetitive Loss Properties	Repetitive Loss Type	# of Severe Repetitive Loss Properties	Severe Repetitive Loss Type
Cass County	28	27 Single Family; 1 Other non-residence	3	2 Single Family; 1 Other non-residence
City of Ashland	3	3 Single Family	1	1 Other non-residence
City of Lincoln	7	4 Single Family; 2 Other non-residence	1	1 Business
City of Louisville	2			
City of Weeping Water	2	2 Single Family		
City of Plattsmouth	1	-	1	1 Single Family
Lancaster County	1	1 Single Family		
Saunders County	18		2	

[66]

Jurisdiction	# of Repetitive Loss Properties	Repetitive Loss Type	# of Severe Repetitive Loss Properties	Severe Repetitive Loss Type
Village of Cedar Creek	6	7 Single Family		
Village of Nehawka	5	4 Single Family; 1 Other non-residence		
Village of Roca	1	1 Single Family		

Source: NeDNR, 2024 – Personal Correspondence

As of December 2024, several properties throughout the planning area were in the discussion and planning phase of flood mitigation. NeDNR provided outreach to all communities with RL/SRL properties to notify them of opportunities available through Flood Mitigation Assistance. Properties in Nehawka, Plattsmouth, and South Bend were in the discussion phase to elevate or remove RL properties from the floodplain.

HISTORICAL OCCURRENCES

The NCEI reports events as they occur in each community. A single flooding event can affect multiple communities and counties at a time; the NCEI reports these large scale, multi-county events as separate events. The result is a single flood event covering a large portion of the planning area could be reported by the NCEI as several events.

According to the NCEI, 70 flash flooding events resulted in $5,067,000 in property damage, while 59 riverine flooding events caused $122,051,000 in property damage. USDA RMA data does not distinguish the difference between riverine flooding damages and flash flooding damages. The total crop loss according to the RMA is $2,778,045.

The events summarized below were significant in loss of life, injuries, or the amount of damages.

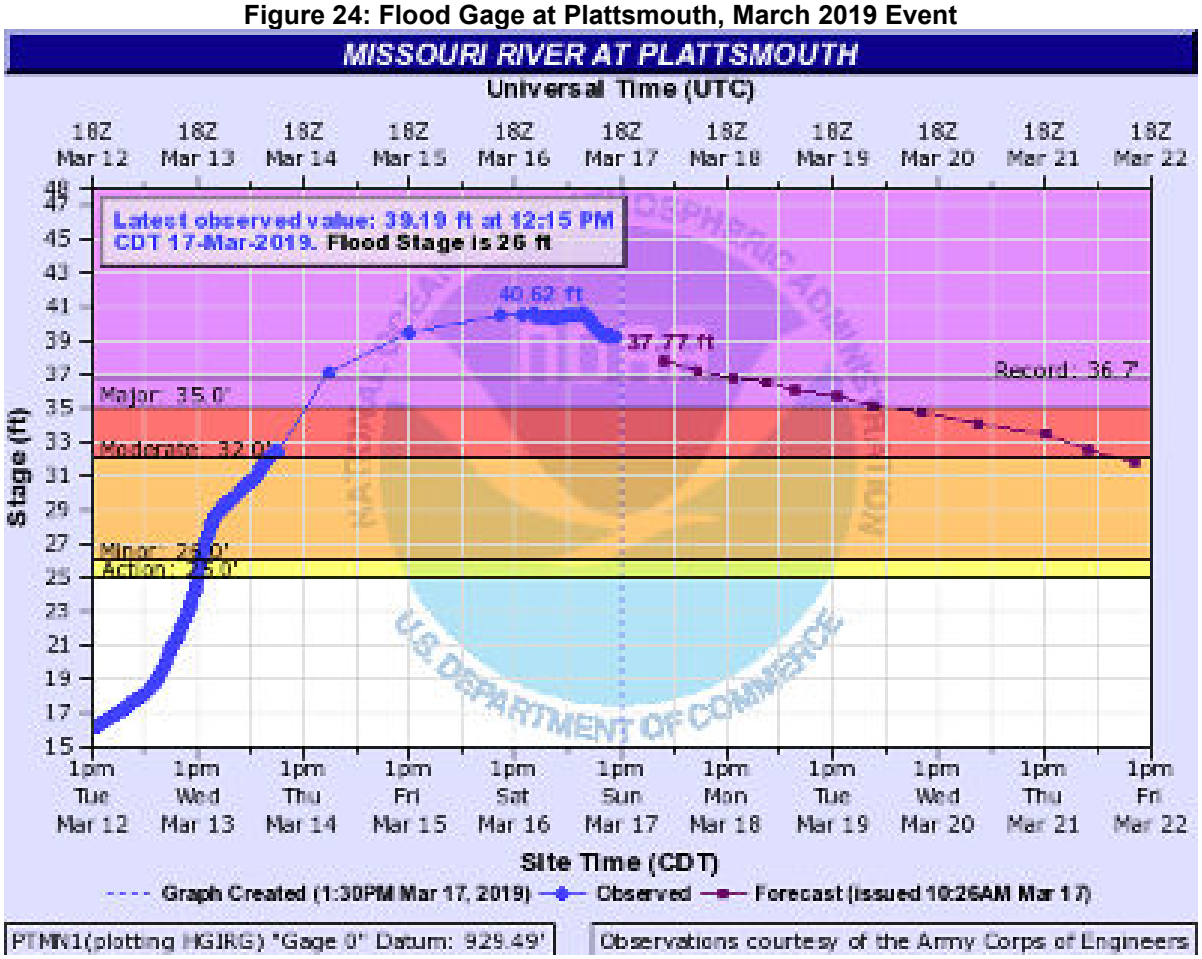
- September 2010: In the City of Weeping Water the campgrounds and its amenities and park facilities flooded.
- June-July 2011: Flooding along the Missouri and Platte Rivers caused property damage to residents on lots in Buccaneer Bay along the Platte River and Four Mile Creek. No damage was caused to the water and wastewater infrastructure, though a number of preventative steps were required, such as plugs in manhole covers.
- May 29, 2013: In the Village of Ceresco, a flooding event occurred that flooded the bridges and highways and disturbed traffic for several hours.
- May 6, 2015: Record rainfall of 5 to 10 inches fell across Lancaster County, and the Salt Creek basin on the evening of the 6th into the early morning of the 7th. This led to significant flooding along the creek, from near Roca north through the Lincoln metro area. The flooding resulted in numerous road closures, water rescues, and some mandatory evacuations. The flooding was largely contained within the levee system within Lincoln, but many parks and low-lying areas were flooded.
- June 12, 2017: Thunderstorms developed in the early morning along a front that extended from southwest Nebraska to northwest Iowa. Some of these thunderstorms produced large hail and also created heavy rain and flooding in the Lincoln area. Portions of Rokeby Road and South 14th Street were closed due to flooding due to heavy rain.
- May 9, 2016: Numerous reports from a variety of sources of flash flooding in the southeast part of the city of Lincoln. Rainfall reports of 3.5 to over 5 inches of rainfall were received. This along with areas of several inches accumulation of hail led to widespread street flooding in the area. Small streams and creeks in the area also overflowed including Stevens Creek. Water was flowing over the bridge where Holdredge Street crosses Stevens Creek. Severe water rescues were performed from stranded motorists.

MARCH 2019 FLOOD EVENT

The March 2019 flood event significantly impacted the entire planning area and most of the eastern side of the State of Nebraska. Winter Storm Ulmer developed on March 12th and slowly moved across the Midwest including Nebraska. Due to heavy precipitation on frozen ground and melting snowpack, numerous water systems were overwhelmed and failed. In other areas, the storm released ice jams, destroyed roads, bridges, and levees. Several stream gauges in the planning area reached all-time record levels including Louisville and Plattsmouth. The Missouri River at Plattsmouth recorded a crest of 40.62 feet of water, nearly seven feet above the previous record. In total, 104 cities, 81 counties, and 5 tribal nations in Nebraska received State or Federal Disaster Declarations due to the flood events.

The NeDNR has collected and reviewed extensive data records from the flood event. An event-wide storymap has been developed and provides an excellent resource to understand the cause, duration, impacts, and recovery efforts from this event. The storymap can be viewed at: https://storymaps.arcgis.com/stories/9ce70c78f5a44813a326d20035cab95a.

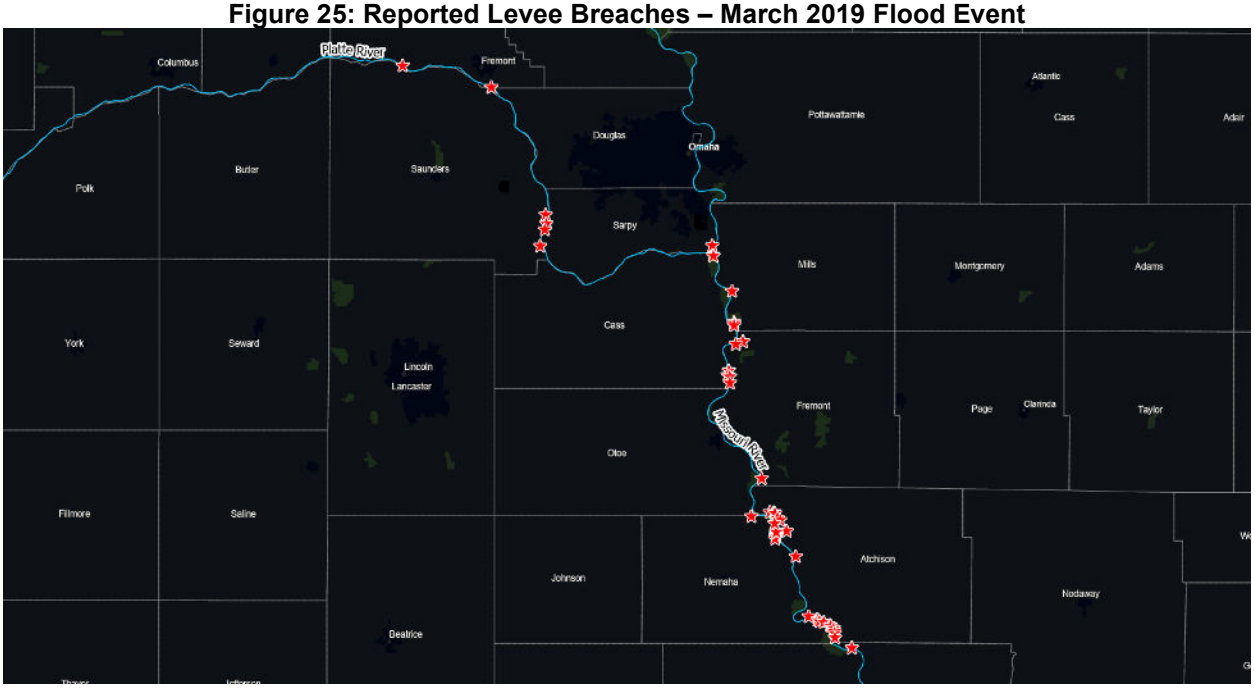
Figure 24: Flood Gage at Plattsmouth, March 2019 Event



Impacts from this event included significant damage to homes, commercial buildings, agriculture, bridges, and roads. Agriculturally, hundreds of acres of pastureland and fields were destroyed by several inches to feet of sand and silt left behind by receding flood waters. The flooding event also occurred in the midst of calving season, resulting in the loss of hundreds of calves for ranchers across the state. Roads and critical transportation routes across the state were blocked by flood waters or washed out entirely. At least three fatalities occurred during the flood event while the Nebraska National Guard performed dozens of rescues in inundated areas. No fatalities were reported within the LPSNRD and two-county planning area during this event.

In total, the U.S. Army Corps of Engineers reported 41 breaches to federal and non-federal levees across the state of Nebraska. The failure of these structures significantly impacted subsequent flooding in neighboring communities.

Figure 25: Reported Levee Breaches – March 2019 Flood Event



Source: USACE

Several communities in the planning area enforced evacuations including South Bend, Louisville, Cedar Creek, and Plattsmouth. Additional specific impacts felt within the planning area include:

- City of Lincoln: wellfields located along the Platte River were inundated with flood waters and ice jams causing power loss and intermittent drops in water production capacity.
- Camp Ashland: the Nebraska National Guard base was severely flooded with extensive damages to administrative buildings, classrooms, barracks, trails, and roads. A breach on the Clear Creek Levee led to floodwaters five feet deep across the camp and uprooted power poles and wellheads.
- City of Plattsmouth: significant damage occurred to city infrastructure during the flood event as the confluence of the Platte and Missouri Rivers occurs directly northeast of the City. Heavy flows cut through a portion of the City approximately one mile west of the confluence; prevented access to the water treatment plant; destroyed a local municipal well; flooded and destroyed numerous residential homes; and severely damaged the other city wells, the boat ramp, city park, and other infrastructure.
- Cedar Creek: heightened water levels on the Platte River reached the top of the berm around the Village and caused damage to a local primary road. Sandbagging efforts prevented significant damage to roads, water systems, and infrastructure.

Additional community specific impacts reported by affected communities are included in *Section Seven: Community Profiles* as appropriate.

EXTENT

The Federal Emergency Management Agency and state agencies such as the Nebraska Department of Natural Resources develop mapped floodplain maps which identify the areas at greatest risk to flooding in Nebraska. These maps are called Flood Insurance Rate Map (FIRM) panels. Most of the jurisdictions throughout the planning area also have FIRMs at the municipal level. Extent of flooding varies greatly by location in the planning area depending on identified flood risk hazard areas as identified by FEMA's Flood Insurance Rate Maps. Refer to community specific FIRMs for extent of identified 1% or 0.2% annual flood

chance. For jurisdictional-specific maps as well as an inventory of structures in the floodplain, please refer to *Section Seven.*

Table 55: FEMA FIRM Panel Status

Jurisdiction	Panel Number	Effective Date
Butler County	31023C0015C, 31023C0020C, 31023C0040C, 31023C0045C, 31023C0065C, 31023C0070C, 31023C0080C, 31023C0085C, 31023C0090C, 31023C0095C, 31023C0125C, 31023C0130C, 31023C0135C, 31023C0140C, 31023C0145C, 31023C0155C, 31023C0160C, 31023C0165C, 31023C0170C, 31023C0180C, 31023C0190C, 31023C0200C, 31023C0210C, 31023C0225C, 31023C0235C, 31023C0245C, 31023C0250C, 31023C0255C, 31023C0260C, 31023C0265C, 31023C0270C, 31023C0290C, 31023C0300C, 31023C0305C, 31023C0310C, 31023C0325C, 31023C0330C, 31023C0350C, 31023C0360C, 31023C0375C, 31023C0400C, 31023CIND0A	08/16/2011
Brainard	31023CIN0A, 31023C0260C, 31023C0270C, 31023C0290C	08/16/2011
Cass County	31025C0025D, 31025C0050D, 31025C0065D, 31025C0070D, 31025C0090D, 31025C0095E, 31025C0100D, 31025C0115E, 31025C0120E, 31025C0155D, 31025C0160D, 31025C0175D, 31025C0200D, 31025C0205D, 31025C0210D, 31025C0215D, 31025C0220D, 31025C0250D, 31025C0255D, 31025C0260D, 31025C0275D, 31025C0300D, 31025C0325D, 31025C0350D, 31025C0360D, 31025C0375D, 31025C0380D, 31025C0385D, 31025C0390D, 31025C0395D, 31025C0405D, 31025C0410D, 31025C0415D, 31025C0420D, 31025C0450D	11/26/2010 & 8/14/2024
Alvo	31025C0175D, 31025C0200D, 31025C0325D, 31025C0350D	8/14/2024 & 11/26/2010
Avoca	31025C0360D, 31025C0375D, 31025C0380D, 31025C0390D	8/14/2024 & 11/26/2010
Cedar Creek	31025C0070D, 31025C0090D	8/14/2024 & 11/26/2010
Eagle	31025C0325D	8/14/2024 & 11/26/2010
Elmwood	31025C0350D	8/14/2024 & 11/26/2010
Greenwood	31025C0155D, 31025C0160D	8/14/2024 & 11/26/2010
Louisville	31025C0070D, 31025C0205D, 31025C0210D	8/14/2024 & 11/26/2010
Manley	31025C0220D	8/14/2024 & 11/26/2010
Murdock	31025C0200D	8/14/2024 & 11/26/2010
Murray	31025C0275D	8/14/2024 & 11/26/2010
Nehawka	31025C0385D, 31025C0405D, 31025C0415D	8/14/2024 & 11/26/2010
Plattsmouth	31025C0115E, 31025C0120E, 31025C0140D, 31025C0255D, 31025C0260D, 31025C0300D	8/14/2024 & 11/26/2010
South Bend	31025C0050D, 31025C0065D	8/14/2024 & 11/26/2010
Union	31025C0410D, 31025C0420D	8/14/2024 & 11/26/2010

Jurisdiction	Panel Number	Effective Date
Weeping Water	31025C0220D, 31025C0250D, 31025C0360D, 31025C0380D	8/14/2024 & 11/26/2010
Lancaster County	31109C0020G, 31109C0040G, 31109C0045G, 31109C0065G, 31109C0070G, 31109C0090G, 31109C0095G, 31109C0115G, 31109C0135G, 31109C0145G, 31109C0155G, 31109C0156G, 31109C0157G, 31109C0158G, 31109C0159G, 31109C0165G, 31109C0170G, 31109C0176G, 31109C0177G, 31109C0178G, 31109C0179G, 31109C0183G, 31109C0184G, 31109C0185G 31109C0186G, 31109C0187G, 31109C0188G, 31109C0191G, 31109C0194G, 31109C0205G, 31109C0210G, 31109C0215G, 31109C0216F, 31109C0217G, 31109C0218G, 31109C0219G, 31109C0230G, 31109C0240G, 31109C0260G, 31109C0270G, 31109C0280G, 31109C0290G, 31109C0295G, 31109C0331G, 31109C0332G, 31109C0334F, 31109C0341F, 31109C0342F, 31109C0343F, 31109C0344F, 31109C0355G, 31109C0365G, 31109C0385G, 31109C0395G, 31109C0405G, 31109C0409G, 31109C0410G, 31109C0415G, 31109C0420G, 31109C0435G, 31109C0440G, 31109C0444G, 31109C0445G, 31109C0454G, 31109C0456F, 31109C0457F, 31109C0458G, 31109C0459G, 31109C0463G, 31109C0465G, 31109C0467G, 31109C0470G, 31109C0478G, 31109C0480G, 31109C0486G, 31109C0490G, 31109C0525G, 31109C0535G, 31109C0550G, 31109C0555G, 31109C0557G, 31109C0575G, 31109C0576G, 31109C0586G, 31109C0600G, 31109C0625G	02/18/2011 & 04/16/2013
Bennet	3109C0459G, 31109C0467G, 31109C0478G, 31109C0486G	04/16/2013
Davey	31109C0070G, 31109C0177G, 31109C0183G, 31109C0184G, 31109C0185G	04/16/2013
Denton	31109C0290G, 31109C0405G	04/16/2013
Firth	31109C0575G, 31109C0586G, 31109C0588G, 31109C0600G	04/16/2013
Hallam	31109C0550G	04/16/2013
Hickman	31109C0444G, 31109C0445G, 31109C0463G, 31109C0557G, 31109C0575G, 31109C0576G	04/16/2013
Lincoln	31109C0165G 31109C0170G, 31109C0183G, 31109C0184G, 31109C0186G, 31109C0187G, 31109C0188G, 31109C0189G, 31109C0191G, 31109C0192G, 31109C0193G, 31109C0194G, 31109C0205G, 31109C0215G, 31109C0216F, 31109C0218G, 31109C0280G, 31109C0285F, 31109C0290G, 31109C0295G, 31109C0305F, 31109C0310F, 31109C0315F, 31109C0316F, 31109C0317F, 31109C0318F, 31109C0319F, 31109C0326F, 31109C0327G, 31109C0328F, 31109C0329F, 31109C0331G, 31109C0332G, 31109C0333F, 31109C0334F, 31109C0336F, 31109C0337F, 31109C0338F, 31109C0339F, 31109C0341F, 31109C0342F, 31109C0343F, 31109C0344F, 31109C0407G, 31109C0409G, 31109C0410G, 31109C0420G, 31109C0430G, 31109C0431F, 31109C0432F, 31109C0435G, 31109C0440G, 31109C0445G, 31109C0451F, 31109C0452F, 31109C0453G, 31109C0454G, 31109C0456F, 31109C0457F, 31109C0458G, 31109C0459G, 31109C0465G	4/16/2013, 2/18/2011
Malcolm	31109C0145G, 31109C0165G	04/16/2013
Panama	31109C0600G, 31109C0625G	04/16/2013
Raymond	31109C0156, 31109C0157G, 31109C0158G, 31109C0159G	04/16/2013
Roca	31109C0444G, 31109C0445G	04/16/2013
Sprague	31109C0420G, 31109C0440G, 31109C0535G, 31109C0555G	04/16/2013

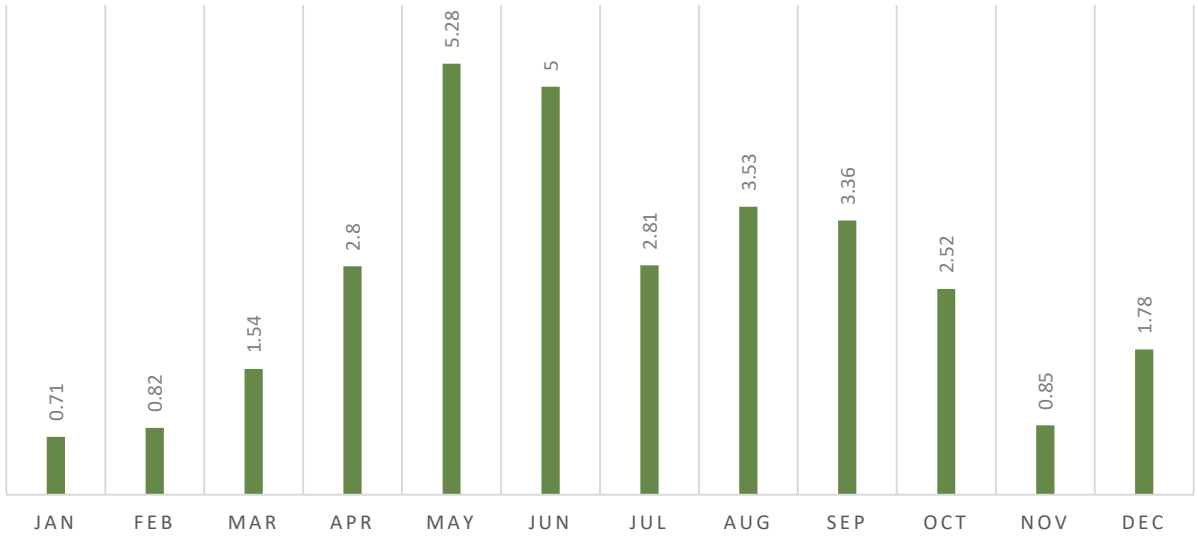
Jurisdiction	Panel Number	Effective Date
Waverly	31109C0210G. 31109C0215G, 31109C0216F, 31109C0217G, 31109C0218G, 31109C0219G, 31109C0240G	04/19/2013, 02/18/2011
Otoe County	31131C0025C, 31131C0050C, 31131C0075C, 31131C0100C, 31131C0120D, 31131C0125C, 31131C0140D, 31131C0160C, 31131C0175C, 31131C0195C, 31131C0200C, 31131C0205C, 31131C0210C, 31131C0215C, 31131C0220C, 31131C0230C, 31131C0235C, 31131C0240C, 31131C0245C, 31131C0256D, 31131C0257D, 31131C0258D, 31131C0259D, 31131C0266D, 31131C0268D, 31131C0269D, 31131C0275C, 31131C0288D, 31131C0289D, 31131C0291D, 31131C0293D, 31131C0295D, 31131C0310C, 31131C0325C, 31131C0345C, 31131C0350C, 31131C0375C, 31131C0385D, 31131C0391D, 31131C0392D, 31131C0393D, 31131C0394D, 31131C0400C, 31131C0425D, 31131C0435D, 31131C0445D, 31131C0450D, 31131C0455D, 31131C0465D	08/04/2004 & 02/18/2011
Saunders County	31155C0025D, 31155C0045D, 31155C0050D, 31155C0075D, 31155C0090D, 31155C0100D, 31155C0125D, 31155C0150D, 31155C0155D, 31155C0160D, 31155C0165D, 31155C0170D, 31155C0200D, 31155C0225E, 31155C0235D, 31155C0250D, 31155C0275D, 31155C0300D, 31155C0325D, 31155C0335E, 31155C0350E, 31155C0355E, 31155C0375E, 31155C0400D, 31155C0425D, 31155C0450D, 31155C0475D, 31155C0500D, 31155C0525D, 31155C0535D, 31155C0545D, 31155C0550D, 31155C0555D, 31155C0565D, 31155C0575D	04/05/2016 & 08/03/2016
Ashland	31155C0535D, 31155C0545D, 31155C0555D, 31155C0565D	08/03/2016, 04/05/2010
Ceresco	31109C0070G, 31109C0090G, 3155C0500D, 31155C0525D	04/16/2013, 08/03/2016, 04/05/2010
Valparaiso	31155CIND08, 31155C0475D	08/03/2016, 04/05/2010
Seward County	31159C0025D, 31159C0050D, 31159C0075D, 31159C0100D, 31159C0125D, 31159C0150D, 31159C0175D, 31159C0200D, 31159C0225D, 31159C0250D, 31159C0268D, 31159C0270D, 31159C0275D, 31159C0300D, 31159C0350D, 31159C0375D 31159C0400D, 31159C0425D, 31159CIND0A	05/01/2020

Source: FEMA, 2024.[67]

Figure 26 shows the normal average monthly precipitation for the planning area, which is helpful in determining whether any given month is above, below, or near normal in precipitation. As indicated in Figure 26, the most common month for flooding within the planning area is in the springtime (May and June).

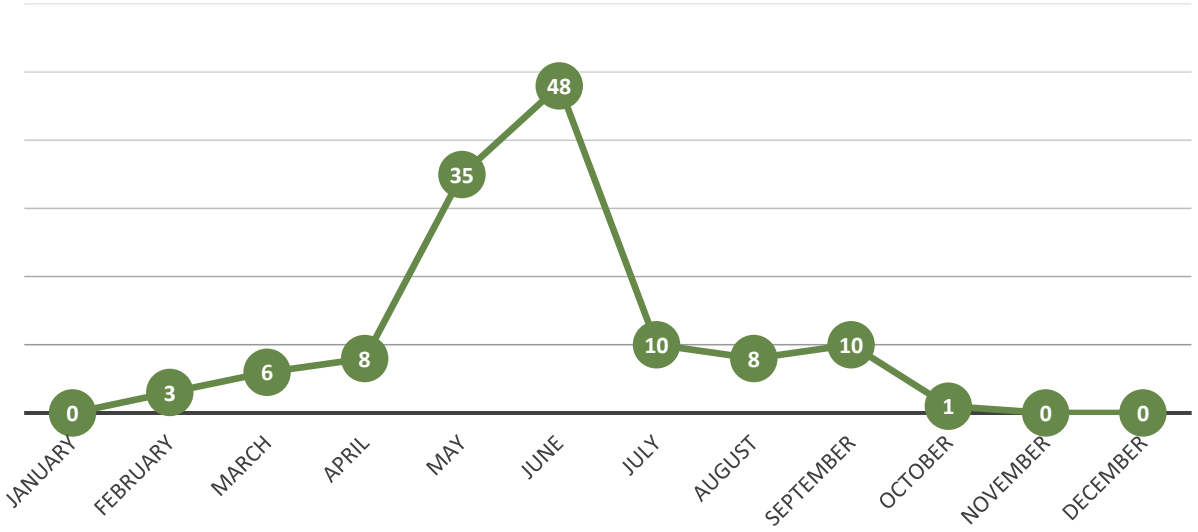
[67] Federal Emergency Management Agency. 2024. "FEMA Flood Map Service Center." http://msc.fema.gov/portal/advanceSearch.

Figure 26: LPSNRD Average Monthly Precipitation



Source: NCEI

Figure 27: Monthly Events for Floods/Flash Flood in the LPSNRD



Source: NCEI, 1996-2023

Average Annual Damages

The average damage per event estimate was determined based upon NCEI Storm Events Database since 1996 and the number of historical occurrences. This does not include losses from displacement, functional downtime, economic loss, injury, or loss of life.

Table 56: Flood Loss Estimate

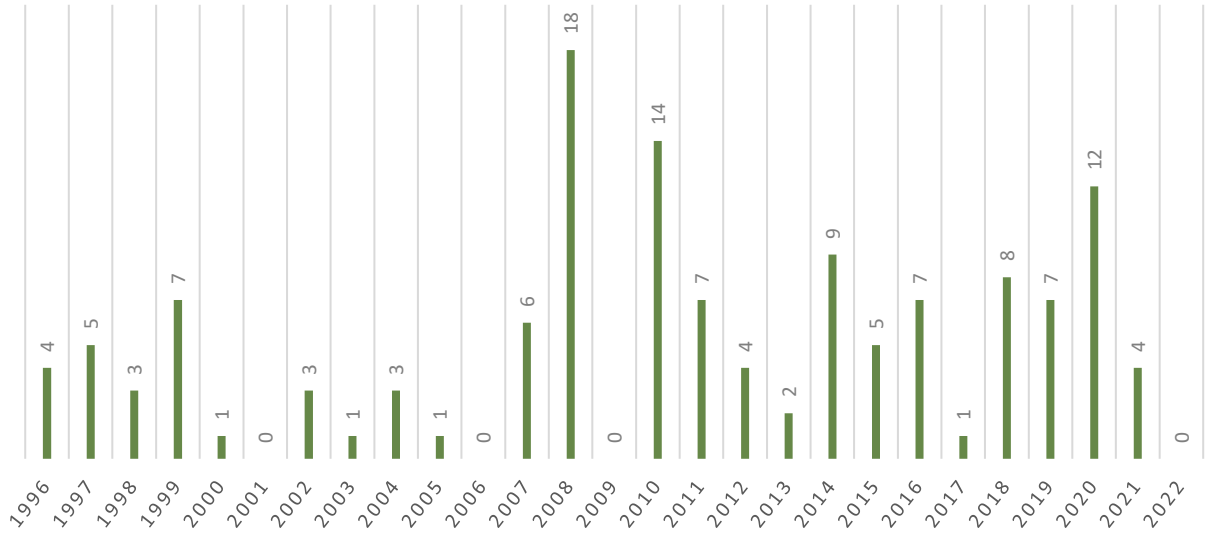
Hazard Type	Number of Events[1]	Average Events Per Year	Total Property Loss[1]	Average Annual Property Loss [1]	Total Crop Loss[2]	Average Annual Crop Loss [2]
Flood Events	129	4.6	$122,051,000	$4,358,964	$2,778,045	$115,752

Source: 1 Indicates data is from NCEI (Jan 1996 to Dec 2018); 2 Indicates data is from USDA RMA (2000 to 2023)

HISTORICAL PROBABILITY AND FUTURE LIKELIHOOD

The NCEI reports 59 flooding and 70 flash flooding events from 1996 to 2023. Some years had multiple flooding events. The following figure shows the events broken down by year. Based on the historic record and reported incidents by participating communities with nine out of 28 years with a reported flood event, there is a 32 percent probability that flooding will occur annually in the planning area (Likely).

Figure 28: Flood Events by Year



Source: NCEI, 2023

Table 57: Historical Probability & Future Likelihood – Flooding

Historical Probability	Climate Change Impact	Future Development Impact	Future Likelihood
86%	Increase in Frequency and Intensity	Increase in Frequency. Increase Exposure	**Likely**

FUTURE DEVELOPMENT

Any future development in floodplains should be evaluated to ensure it minimizes risk to future assets. Land-use regulations should be used to limit development in floodplains and other flood prone areas as well as protecting natural flood mitigation features. Communities can also consider incorporating "Green Infrastructure" to address flooding concerns. Examples of this would include using permeable surfaces for parking areas, using rainwater retention swales, developing rain gardens, developing green roofs, and establishing greenways. To further reduce future risk to flooding, communities can implement stormwater management plans, participate in the National Pollutant Discharge Elimination System program, or participate in the NFIP or Community Rating System programs.

Nebraska's minimum standards for floodplain management require that all new construction and substantial improvements of residential structures shall have the lowest floor (including basements) elevated at least one foot above the base flood elevation. Nebraska standards prohibit new structures for human habitation in the floodway.[68] These requirements will help reduce flood impacts and damages by requiring a one foot "freeboard" to allow for known flood hazards and result in lower premiums for those participating in the NFIP.

[68] Nebraska Department of Natural Resources. June 27, 2008. "Rules and regulations Concerning Minimum Standards for Floodplain Management Programs". https://dnr.nebraska.gov/sites/dnr.nebraska.gov/files/doc/desk-reference/legal-authority/Title_455_0708.pdf.

CLIMATE CHANGE IMPACTS

In the warmer months, convective storms are common and include flash flood-producing rainstorms. As temperatures continue to rise, more water vapor evaporates into the atmosphere, creating increased humidity, which can increase the frequency and intensity of these storms. An increase in heavy rain events will lead to more flooding and larger magnitude flood events. NOAA has created the Climate Mapping for Resilience and Adaptation tool that looks at how different emission scenarios affect climatological hazards. Table 58 shows that the annual total precipitation is expected to increase in both low emissions and high emission scenarios. Changes will likely occur in timing and intensity. Winter and spring will be 15-25% wetter, summer will be 5-15% drier, and fall will be 5% wetter.[69]

Table 58: Average Annual Total Precipitation

County	Emission Scenario	Early Century (2015-2044)	Mid Century (2035-2064)	Late Century (2070-2099)
Cass	Lower Emissions	31.5	31.7	31.7
	Higher Emissions	31.3	31.9	32.5
Lancaster	Lower Emissions	30.2	30.3	30.3
	Higher Emissions	29.9	30.5	30.9
Butler	Lower Emissions	28.6	28.7	28.9
	Higher Emissions	28.3	28.9	29.4
Otoe	Lower Emissions	32.3	32.4	32.5
	Higher Emissions	32.1	32.6	33.3
Saunders	Lower Emissions	30.3	30.4	30.4
	Higher Emissions	30.0	30.4	30.9
Seward	Lower Emissions	28.5	28.6	28.6
	Higher Emissions	28.1	28.6	29.1

Source: NOAA[70]

COMMUNITY TOP HAZARD STATUS

The following jurisdictions identified Flooding as a top hazard of concern.

- Lower Platte South NRD
- Cass County
- Avoca, Village of
- Cedar Creek, Village of
- Eagle, Village of
- Louisville, City of
- Nehawka, Village of
- South Bend, Village of
- Weeping Water, City of
- Lancaster County
- Bennet, Village of
- Denton, Village of
- Firth, Village of
- Hickman, City of
- Lincoln, City of
- Malcolm, Village of
- Raymond, Village of
- Roca, Village of
- Sprague, Village of
- Waverly, City of
- Ashland, City of

[69] NCEI. 2022. "State Climate Summaries – Nebraska". https://statesummaries.ncics.org/chapter/ne/#:~:text=The%20state%20is%20located%20far,(1895%E2%80%932020)%20averag.
[70] NOAA. August 2022. "Climate Mapping for Resilience and Adaptation". https://livingatlas.arcgis.com/assessment-tool/explore/details.

- Valparaiso, Village of
- Cass County Rural Water District #1
- Norris Public School District

REGIONAL VULNERABILITIES

A 2008 national study examining social vulnerability as it relates to flood events found that low-income and minority populations are disproportionately vulnerable to flood events. These groups may lack needed resources to mitigate potential flood events as well as resources that are necessary for evacuation and response. In addition, low-income residents are more likely to live in areas vulnerable to the threat of flooding, but lack the resources necessary to purchase flood insurance. The study found that flash floods are more often responsible for injuries and fatalities than prolonged flood events.

Other groups that may be more vulnerable to floods, specifically flash floods, include the elderly, those outdoors during rain events, and those in low-lying areas. Elderly residents may suffer from a decrease or complete lack of mobility and as a result, be caught in flood-prone areas. Residents in campgrounds or public parks may be more vulnerable to flooding events. Many of these areas exist in natural floodplains and can experience rapid rise in water levels resulting in injury or death.

On a state level, the Nebraska's State National Flood Insurance Coordinator's office has done some interesting work, studying who lives in special flood hazard areas. According to the NeDNR, floodplain areas have a few unique characteristics which differ from non-floodplain areas:

- Higher vacancy rates within floodplain
- Far higher percentage of renters within floodplain
- Higher percentage of non-family households in floodplain
- More diverse population in floodplain
- Much higher percentage of Hispanic/Latino populations in the floodplain

The following table is a summary of regional vulnerabilities. For jurisdictional-specific vulnerabilities, refer to *Section Seven: Community Profiles.*

Table 59:Regional Flooding Vulnerabilities

SECTOR	VULNERABILITY
PEOPLE	-Low income and minority populations may lack the resources needed for evacuation, response, or to mitigate the potential for flooding -Elderly or residents with decreased mobility may have trouble evacuating -Residents in low-lying areas, especially campgrounds, are vulnerable during flash flood events -Residents living in the floodplain may need to evacuate for extended periods
ECONOMIC	-Business closures or damages may have significant impacts -Agricultural losses from flooded fields or cattle loss -Closed roads and railways would impact commercial transportation of goods
BUILT ENVIRONMENT	-Building may be damaged
INFRASTRUCTURE	-Damages to roadways and railways
CRITICAL FACILITIES	-Wastewater facilities are at risk, particularly those in the floodplain -Critical facilities, especially those in the floodplain, are at risk to damage (critical facilities are noted within individual community profiles)
CLIMATE	-Changes in seasonal and annual precipitation normals will likely increase frequency and magnitude of flood events

GRASS/WILDFIRE

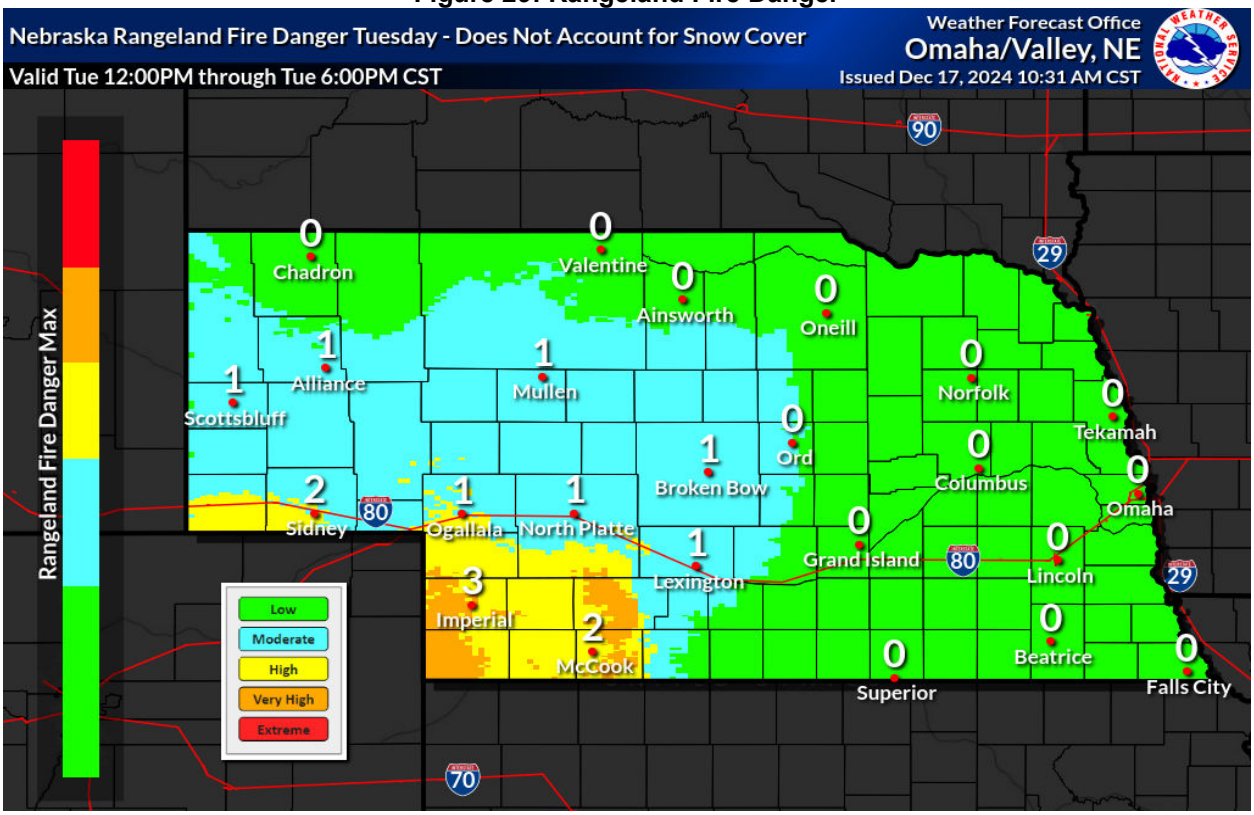
Wildfires, also known as brushfires, forest fires, or wildland fires, are any uncontrolled fire that occurs in the countryside or wildland. Wildland areas may include, but are not limited to: grasslands; forests; woodlands; agricultural fields; pastures; and other vegetated areas. Wildfires differ from other fires by their extensive size, the speed at which they can spread from the original source, their ability to change direction unexpectedly, and to jump gaps (such as roads, rivers, and fire breaks). While some wildfires burn in remote forested regions, others can cause extensive destruction of homes and other property located in the wildland-urban interface (WUI), the zone of transition between developed areas and undeveloped wilderness.

Wildfires are a growing hazard in most regions of the United States, posing a threat to life and property, particularly where rural lands meet developed areas or where local economies are heavily dependent on open agricultural land. Fire is a natural and often beneficial process; fire suppression can lead to more severe fires due to the buildup of vegetation, which creates more fuel and increases the intensity and devastation of future fires.

> Lightning starts approximately 10,000 forest fires each year, yet ninety percent of forest fires are started by humans.
>
> ~National Park Service

Wildfire behavior is often complex and variably dependent on factors such as fuel type, moisture content in the fuel, humidity, wind speed, topography, geographic location, ambient temperature, and weather. Most mitigation efforts target fuels reduction and structure hardening. The NWS monitors the risk factors including high temperature, high wind speed, fuel moisture (greenness of vegetation), low humidity, and cloud cover in the state on a daily basis. Fire danger predictions are updated regularly and should be reviewed frequently by community leaders and fire department officials (Figure 29).

Figure 29: Rangeland Fire Danger



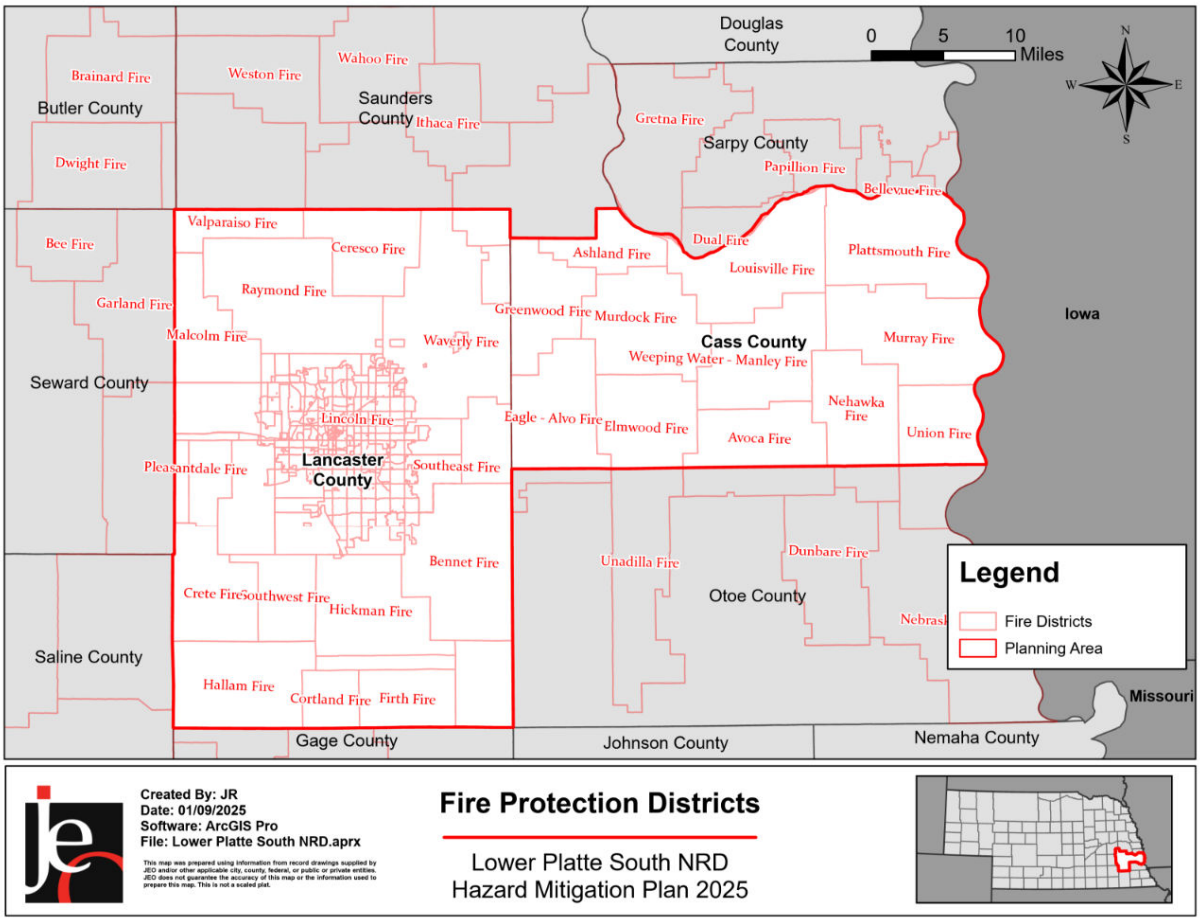
Source: NWS, 2024.[71]

[71] National Weather Service. January 2019. "Nebraska Fire Danger Map." https://www.weather.gov/oax/fire . Accessed April 2019.

FIRE PROTECTION

There are 24 local volunteer or rural fire districts identified in the planning area. The following is a list of fire districts located in the planning area.

- ALVO VOL FIRE DEPT
- AVOCA RURAL FIRE DIST 5
- BENNET RURAL FIRE DEPT
- CEDAR CREEK VOL FIRE DEPT
- EAGLE FIRE & RESCUE
- ELMWOOD VOL FIRE DEPT
- FIRTH RURAL FIRE DIST
- GREENWOOD VOL FIRE & RESCUE
- HALLAM RURAL FIRE & RESCUE
- HICKMAN RURAL FIRE & RESCUE
- LINCOLN FIRE & RESCUE
- LOUISVILLE VOL FIRE & RESCUE
- MALCOLM FIRE AND RESCUE
- MANLEY FIRE DEPT
- MURDOCK VOL FIRE DEPT
- MURRAY FIRE & RESCUE
- NEHAWKA RURAL VOL FIRE DEPT
- PLATTSMOUTH VOL FIRE DEPT
- RAYMOND VOL FIRE DEPT
- SOUTHEAST RURAL FIRE DIST
- SOUTHWEST RURAL FIRE DEPT
- UNION VOL FIRE DEPT
- WAVERLY FIRE & RESCUE DEPT
- WEEPING WATER VOL FIRE DEPT



LOCATION

Wildfire events can occur throughout the planning area. As the number of reported wildfires by the county indicates, Lancaster County has both reported the greatest number of fires and had the greatest amount of acres burned.

Table 60: Reported Wildfires by County

County	Reported Wildfires	Acres Burned
Cass County	449	2,634
Lancaster County	846	6,445
Total	**1,295**	**9,079**

Source: Nebraska Forest Service, 2000- 2024.[72]

The United States Department of Agriculture Forest Service created the interactive web resource *Wildfire Risk to Communities* to help communities and jurisdictions understand, explore, and reduce wildfire risk. Low, Medium, High, or Very High Risk is determined by the Risk to Homes national percentile rank of the selected community, county, tribal area, or state. Low is less than 40th percentile, Medium is 40th-70th percentile, High is 70th-90th percentile, and Very High is equal to or greater than 90th percentile.

- Risk to Homes – The relative risk to a house for every location on the landscape, whether a house currently exists there or not
- Wildfire Likelihood – The probability of a wildfire burning in any given year
- Exposure – Wheater homes may be subjected to wildfire directly or indirectly (such as from embers)

[72] Nebraska Forest Service. 2000-2014. "Fire Incident Type Summary." Data Files 2000-2024.

- Vulnerable Populations – People that may be disproportionately impacted by wildfire because of social and economic factors

The following tables describe other specific risks and vulnerabilities seen across the planning area.

Table 61: Wildfire Vulnerabilities by County

County	Risk To Homes	Wildfire Likelihood	Vulnerable Populations	Overall Risk
Lancaster	Medium	Medium	Medium	Medium
Cass	Medium	Medium	Medium	Medium
Otoe	Medium	Medium	High	Medium
Butler	Medium	Medium	High	Medium
Saunders	Medium	Medium	High	Medium
Seward	Medium	Medium	Low	Medium

Source: Wildfire Risk to Communities, 2024.[73]

Table 62: Wildfire Vulnerable Populations by County

County	Families in Poverty	People with Disabilities	People over 65	Difficulty with English	Households with no Vehicle	Mobile Homes
Lancaster	5,120 (6.7%)	35,733 (11.3%)	46,984 (14.6%)	6,486 (2.1%)	6,560 (5.1%)	1,877 (1.4%)
Cass	213 (2.8%)	3,341 (12.6%)	4,827 (18%)	55 (0.2%)	359 (3.5%)	403 (3.9%)
Otoe	421 (102%)	2,306 (14.6%)	3,240 (20.3%)	339 (2.2%)	245 (3.8%)	170 (2.7%)
Butler	133 (5.9%)	964 (11.7%)	1,719 (5.6%)	178 (2.3%)	93 (2.7%)	155 (44%)
Saunders	267 (4.3%)	2,725 (12.4%)	4,085 (18.3%)	85 (0.4%)	310 (3.5%)	228 (2.6%)
Seward	197 (4.2%)	2,029 (11.7%)	3,090 (17.5%)	22 (0.1%)	301 (4.6%)	124 (1.9%)

Source: Wildfire Risk to Communities, 2024

COMMUNITY WILDFIRE PROTECTION PLANS

In recent decades, as the population of the United States has decentralized and residents have moved farther away from the center of villages and cities, the area known as the wildland urban interface (WUI) has developed significantly, in both terms of population and building stock. The Nebraska Forest Service (NFS) develops Community Wildfire Protection Plans for regions across the state. Lancaster and Cass Counties are within the Southwest Community Wildfire Protection Plan..[74]

The purpose of the CWPPs is to help effectively manage wildfires and increase collaboration and communication among organizations who manage fire. The CWPPs discuss county-specific historical wildfire occurrences and impacts, identify areas most at risk from wildfires, discuss protection capabilities, and identify wildfire mitigation strategies. The CWPPs which encompass the planning area define the WUI as the entirety of the counties. The expansion of the WUI increases the likelihood that wildfires will threaten people and homes, making it the focus of the majority of wildfire mitigation efforts.

The Southwest CWPP noted the following areas of concern:

- Cass County - There are no federal lands within Cass County. State lands include 3,787 acres in five NGPC WMAs, 1,289 acres in four NGPC state parks, trails and recreation areas, 235 acres at the NFS Horning State Farm, and approximately 80 acres in school lands. There is a 113-acre property managed by the Lower Platte South NRD. The lands most at-risk from wildfire are in the northern and eastern parts of the county, along the Missouri and Platte Rivers, where topography

[73] United States Department of Agriculture, United States Forest Service. Accessed January 2024. "Wildfire Risk to Communities." https://wildfirerisk.org/ .
[74] Nebraska Forest Service. 2022. "Community Wildfire Protection Plans." https://nfs.unl.edu/publications/community-wildfire-protection-plans.

is rough and woody fuels are dense in some areas, creating high fire hazard. The Ashland Fire Department listed lake communities with high home density, infrastructure or other resources at high risk, or populated areas with one way in/out as areas of primary concern in their district.

- Lancaster County - Public lands in Lancaster County include 15,262 acres in 15 state WMAs and seven SRAs; 2,158 acres in 24 NRD properties; 178 Department of Defense acres; and 534 acres of state school lands. There are 1,402 acres in five large municipally-owned or managed areas, plus many smaller municipal and county-owned parks. Locations of special concern include population centers adjacent to wildlands and wooded areas along the rivers and streams. The Bennet fire chief expressed concern about "acreage subdivisions" and said that most developments, including one in the Village of Bennet, only have one way in and out. The Crete VFD said there is a lot of subdivision moving out from Lincoln. Many have only one-way in/out and have wildland conditions within 20 feet of structures. They have mapped these. The Hickman VFD identified several subdivisions in their district with a WUI between CRP grassland and acreage developments (Meadowlark Hills Addition-Blocks 1 & 2, Whitetail Ridge Addition, Poe Estates-Blocks 1 & 2, Cedar Woods Estates Addition); CRP surrounded by cropland and wooded drainageways vulnerable to harvest season ignition; rural acreages bordering wooded state recreation areas; and suburban subdivisions which directly abut cropland susceptible to harvest season ignitions. The Ashland Fire Department listed lake communities with high home density, infrastructure or other resources at high risk, or populated areas with one way in/out as areas of primary concern in their district. Lincoln Fire and Rescue stated that they are experiencing an increasing problem with urban/wildland interface due to "common areas" in new neighborhoods. They have experienced structural damage due to fire originating in these vegetation areas. LFR lacks wildland equipment and PPE for wildland firefighting. LSR must mutual aid these resources from mutual aid departments. This delay increases risk. Issues in these areas include multiple structures, difficult access, rough terrain, one way in/out, heavy fuels, lack of water within effective distance, and lack of wildland firefighting equipment. The Southwest Rural Fire Protection District is concerned about Wilderness Park, on the west edge of Lincoln, due to multiple structures, difficult access, rough terrain, one way in/out, and heavy fuels. The US Army Corps of Engineers, Missouri River Project staff noted that Holmes Lake in Lincoln is surrounded by dense urban housing. It has better access than the Omaha Lakes but still has a high risk. The Lower Platte South NRD noted some of their saline wetlands adjacent to residential areas.

- Saunders County - Besides municipal lands, public lands in Saunders County include 559 acres in six NGPC WMAs and two SRAs; 2,419 acres in four NRD properties; and 1,830 US Department of Defense acres. There are no state school lands. Locations of special concern include population centers adjacent to wildlands, croplands, and wooded areas along the rivers and streams. The Saunders County section of the 2015 Lower Platte North NRD plan states that "Wildfire has become more of a concern recently in agricultural areas as a result of crop residue." The plan also listed wildfire as a top concern for the Village of Cedar Bluffs. The Lower Platte North NRD has concerns about the campgrounds at their Czechland Lake and Wanahoo Lake campgrounds and the bluff homes neighboring Wanahoo Lake on the west side. The Mead VFD identified several locations in and near the Village of Mead as having multiple structures, difficult access, and many residents. These include the National Guard training facility, Joyce Circle, and the ethanol plant south of Mead. The Weston fire chief identified the village of Weston as at-risk due to multiple structures, high home density, and infrastructure. The Yutan fire department listed several developments in their district that have multiple structures, difficult access, rough terrain, one way in/out, heavy fuels, and/or lack of water within an effective distance. The Ashland VFD said that area lake communities with high home density, infrastructure or other resources at high risk, some with one way in/out are concerns.

- Otoe County - Besides municipal lands, public lands include 2,335 acres in five NGPC WMAs, one SRA and one State Historical Park; 39 acres in one NRD property; and 240 acres in state school lands. There is one 14-acre non-profit conservation property managed by Audubon. Locations of special concern include population centers adjacent to wildlands and wooded areas along the rivers and streams. In the 2015 Nemaha NRD plan, participants listing wildfire as a top concern included

Otoe County and the municipalities of Douglas, Nebraska City, Palmyra, Syracuse, and Unadilla. The Douglas VFD identified an area southwest of Douglas with difficult access, rough terrain, one way in and out, heavy fuels, and lack of water within an effective distance. The Bennet fire chief expressed concern about "acreage subdivisions" and said that most developments only have one way in and out. The Talmage fire chief said that in the village of Lorton there are several dead end streets.

- Seward County - Public lands in Seward County include 187 acres in one USFWS Waterfowl Production Area; 2,870 acres in eight NGPC WMAs and one SRA; 791 acres in three NRD properties; and 399 acres of state school lands. Locations of special concern include population centers adjacent to wildlands and wooded areas along the rivers and streams. The Seward section of the 2019 Upper Big Blue NRD plan suggested and gave high priority to the following mitigation for the Village of Bee: "Participate in the Nebraska Forest Service Wildland Fire Protection Program which provides services in wildfire suppression training, equipment, pre-suppression planning, wildfire preventions, and aerial fire suppression." The plan said Village of Garland identified wildfire as a top hazard, but did not recommend specific mitigations. The Tamora VFD noted that the Village of Tamora is a concern because multiple structures on its south side lie adjacent to 140 acres of grassland with heavy fuels and lack of water within an effective distance. A fire with a south wind would push it into town. The Crete VFD (abuts the southeast corner of the county and responds to fires in the area) said there is a lot of subdivision moving out from Lincoln. Many have only one-way in or out and have wildland conditions within 20 feet of structures.

- Butler County - There are no federal lands within the county. State lands include 324 acres in three NGPC WMAs, and approximately 480 acres in school lands. There are 437 acres in three properties managed by three NRDs. Nonprofit conservation lands include 166 acres in two Ducks Unlimited properties. The areas most at-risk from wildfire are the lands surrounding municipalities and recreational and residential areas along the rivers where there are heavy fuels and limited access. The Rising City Fire Department identified Summit Township, Adamy Addition and all along the south bluffs of the Platte River Valley east of Adamy Addition as areas of particular concern due to multiple structures, difficult access, rough terrain, one way in/out, heavy fuels, and lack of water within effective distance.

HISTORICAL OCCURRENCES

It is important to note that there is no comprehensive fire event database. Fire events, magnitude, and local responses were reported voluntarily by local fire departments and local reporting standards can vary between departments. Actual fire events and their impacts are likely underreported in the available data. Updated wildfire data was requested and provided by the Nebraska Forest Service from January 2000 to November 2023. Unofficial reports from a fire near Lake Waconda in April 2023 is also included. As the number of reported wildfires by county indicates, wildfire events can occur in any county within the planning area.

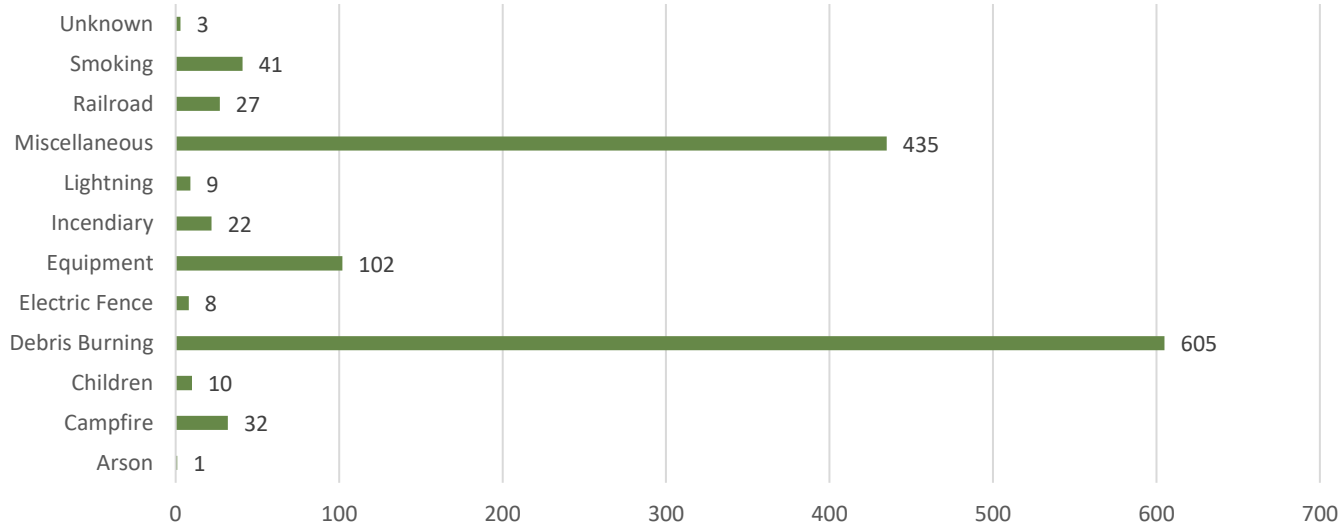
Of note two recent fires occurred in the planning area and are described below:

- October 2022 – A wildfire in southern Lancaster County and northern Gage County destroyed homes, closed roads, and prompted evacuations. The fire was fueled by southern high winds (up to 55mph) and dry conditions. Two firefighters were injured fighting the fire and three houses were destroyed.
- April 2023 – A wildfire in Cass County burned 697 acres near the Village of Union and Lake Waconda. Fires had started in Iowa early April with sparks blown by high winds across the river to ignite in Nebraska. The fast moving fire event quickly grew and required response from numerous fire protection districts. Water was pulled from Lake Waconda via helicopter to drop on the blaze.

For the planning area, 20 different fire departments reported a total of 1,295 wildfires, according to the National Forest Service (NFS), from January 2000 to November 2023. Most fires occurred in 2005 (Figure 31). While the RMA lists no damages from fire in the planning area, the NFS reported $31,023 in crop loss.

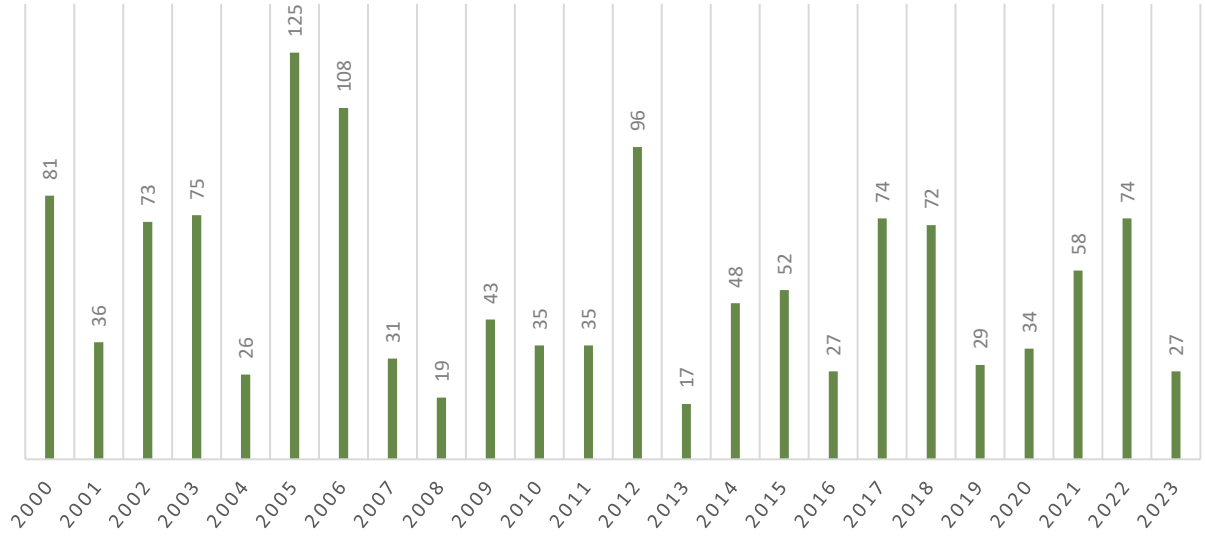
The majority of wildfires in the planning area were caused by debris burning (Figure 30). Wildfires in the planning area have ranged from zero to 2,000 acres, with an average event burning 8 acres.

Figure 30:Wildfires by Cause in the Planning Area



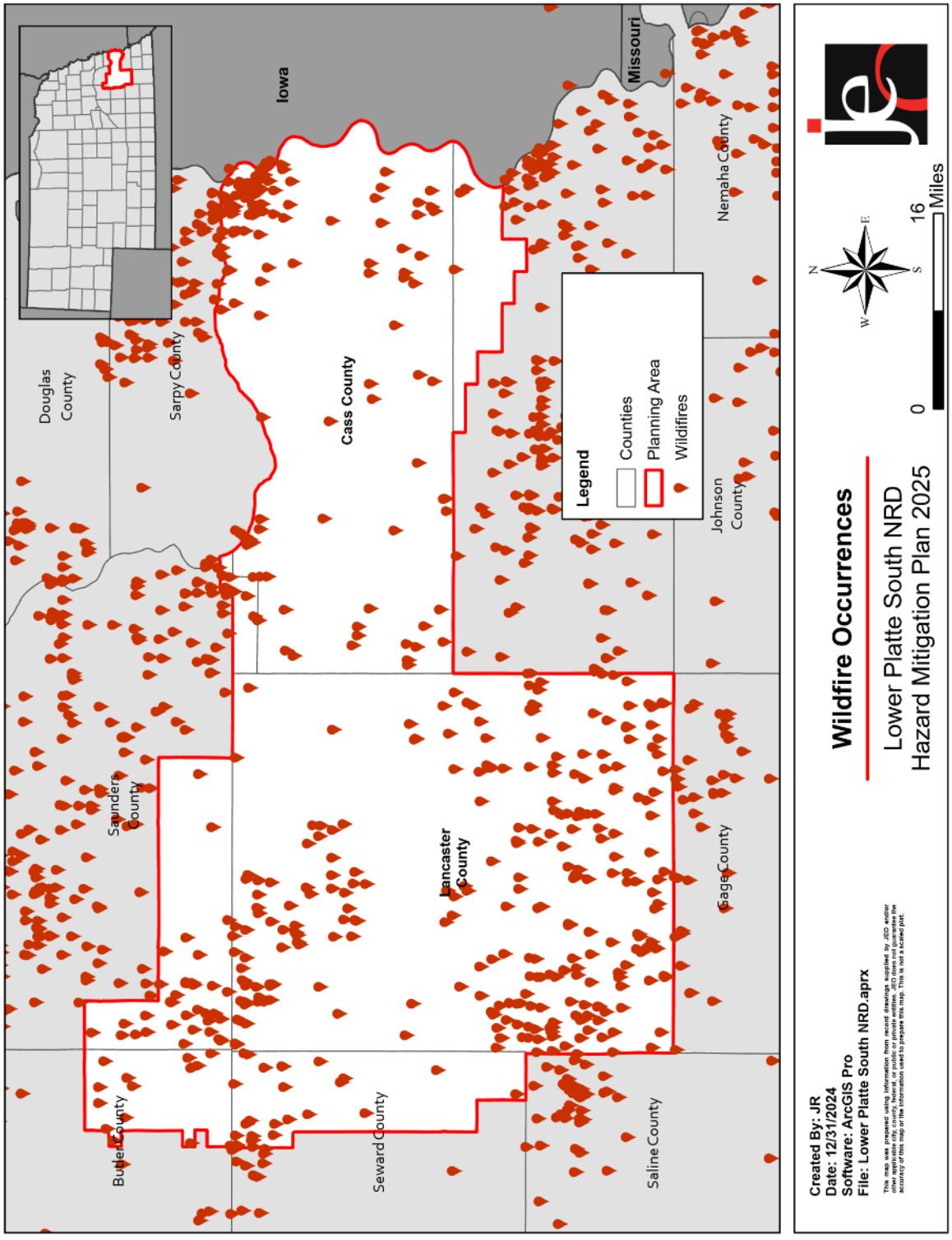
Source: Nebraska Forest Service, 2000-2023

Figure 31: Number of Wildfires by Year in the Planning Area



Source: Nebraska Forest Service, Jan 2000- Nov 2023

Figure 32: Wildfire Occurrence in the Planning Area



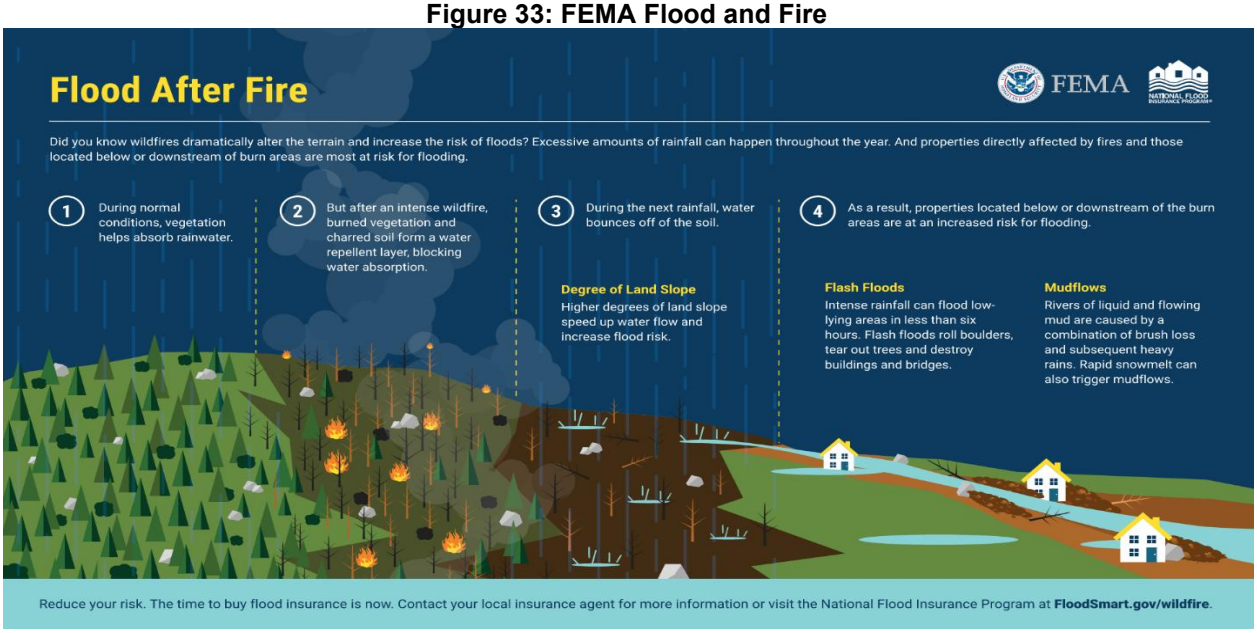
Note that numerous fires are reported as occurring in the same location (i.e. on top of communities), however, these locations are likely placeholders of the nearest location, rather than the actual location of the fire event. More specific fire location data was not available during this analysis.

EXTENT

Overall, 1,295 wildfires were reported in the planning area and burned 9,079 acres in total. Of these, 15 fires burned more than 100 acres, with the largest wildfire burning 2,000 acres in Lancaster County in March of 2014.

Wildfire also contributes to an increased risk from other hazard events, compounding damage and straining resources. FEMA has provided additional information in recent years detailing the relationship between wildfire and flooding (Figure 33). Wildfire events remove vegetation and harden soil, reducing infiltration capabilities during heavy rain events. Subsequent severe storms that bring heavy precipitation can then escalate into flash flooding, dealing additional damage to jurisdictions.

Figure 33: FEMA Flood and Fire



Source: FEMA, 2020.[75]

AVERAGE ANNUAL DAMAGES

The average damage per event estimate was determined based upon records from the Nebraska Forest Service Wildfires Database from January 2000 to November 2023 and number of historical occurrences. This does not include losses from displacement, functional downtime, economic loss, injury, or loss of life. During the 24-year period, 1,295 wildfires burned 9,079 acres and caused $31,023 in crop damages and $483,559 in property damages according to NFS.

Table 63: Wildfire Loss Estimation

Hazard Type	Number of Events	Average Acres Per Fire	Total Property Loss	Total Crop Loss	Injuries	Fatalities	Structures Threatened/ Destroyed
Grass/Wildfires	1,295	8	$483,559	$31,023	1	2	111/1,013

Source: Nebraska Forest Service, Jan 2000- Nov 2023

[75] FEMA and NFIP. 2020. "Flood After Fire." Accessed September 2020. https://www.fema.gov/media-library-data/1573670012259-3908ab0344ff8fbf5d537ee0c6fb531d/101844-019_FEMA_FAF_Infographic-ENG-web_v8_508.pdf.

HISTORICAL PROBABILITY AND FUTURE LIKELIHOOD

The probability of wildfire occurrence is based on the historic record provided by the Nebraska Forest Service and reported potential by participating jurisdictions. With a wildfire event occurring at least once in each reported year (2000-2023) there is a 100 percent annual probability of wildfires occurring in the planning area in any given year (Highly Likely).

Table 64: Historical Probability & Future Likelihood – Wildfire

Historical Probability	Climate Change Impact	Future Development Impact	Future Likelihood
100%	Increase in Frequency and Intensity	Neither Increase nor Decrease in Frequency. Increase Exposure	Highly Likely

FUTURE DEVELOPMENT

Development across the planning area would be located within the WUI. Of most concern would be development on the edges of communities or other areas that encroach on wildland or natural areas. Local officials can adopt codes and ordinances that can guide growth in ways to mitigate potential losses from wildfires, but more likely for the planning area the onus falls on private landowners to ensure their properties mitigate fuels and minimize wildfire risk. Problems can arise if new development increases without coordinated fuels reduction and the creation of defensible space around homes. Other notable vulnerabilities exist for fire departments which service rural areas, as many fire districts lack adequate staff to respond to multi-fire complexes or multiple fire events occurring simultaneously in separate areas. The utilization and development of mutual aid agreements or memoranda of understanding are an important tool for districts to share resources and/or coverage.

CLIMATE CHANGE IMPACTS

Rising temperatures will likely increase the frequency and intensity of grass/wildfires. Warmer temperatures cause snow to melt sooner and create drier soils and forests, which can ignite fires quickly and cause them to spread rapidly. Additionally, warmer nighttime temperatures contribute to the continued spread of wildfires over multiple days.[76]

As mentioned in the drought section, climate change will likely contribute to the increase in the frequency and intensity of drought, especially during the summer months.[77] Periods of drought can occur throughout the year, while extreme heat conditions during summer months greatly increases the potential for and magnitude of wildland fires. Drought has a high probability of occurring in the planning area and the planning area sees, on average, five days above 100°F each year. With increased drought conditions, wildfires will also likely increase due to dry vegetation and less access to water. Additionally, changes in climate can lead to the spread of invasive species, increasing potential fuel loads in wildland areas.

COMMUNITY TOP HAZARD STATUS

The following jurisdictions identified Grass/Wildfire as a top hazard of concern:

- Village of Hallam
- Raymond Central Public Schools

REGIONAL VULNERABILITIES

Wildfire poses a threat to a range of demographic groups. Wildfire and urban fire could result in major evacuations of residents in impacted and threatened areas. Groups and individuals lacking reliable transportation could be trapped in dangerous locations. Lack of transportation is common among the elderly, low-income individuals, and racial minorities. Wildfires can cause extensive damage to buildings and improvements, including community lifelines. Wildfires also impact agricultural producers who support

[76] NASA Global Climate Change. September 2019. "Satellite Data Record Shows Climate Change's Impact on Fires." Accessed 2022. https://climate.nasa.gov/news/2912/satellite-data-record-shows-climate-changes-impact-on-fires/.

[77] NCEI. 2022. "State Climate Summaries – Nebraska". https://statesummaries.ncics.org/chapter/ne/#:~:text=The%20state%20is%20located%20far,(1895%E2%80%932020)%20averag.

the local economy. Damaged homes can reduce available housing stock for residents, causing them to leave the area. Additionally, fire events threaten the health and safety of residents and emergency response personnel. Recreation areas, timber and grazing land, wildlife habitat, and scenic views can also be threatened by wildfires.

The following tables provide information related to regional vulnerabilities and FEMA's National Risk Index values for Wildfire. It is important to note that while FEMA's National Risk Index indicates an overall lower risk to wildfire events, and this data contradicts Wildfire specific risk indices from the *Wildfire Risk to Communities* dataset provided by the United States Department of Agriculture Forest Service. In this circumstance, the data utilized by the USDA Forest Service is tailored specifically for wildfire risk factors and provides a more fine-scale analysis for the counties. Local planning team members also noted significant limiting factors to adequately respond and mitigate wildfire events in the area including aging or inadequate equipment, and extremely limited staff capacity as volunteer rosters continue to decline.

Table 65: Risk Index Wildfire Vulnerabilities

Source	Risk Factor	Lancaster	Cass	Otoe	Butler	Saunders	Seward
FEMA National Risk Index	Risk Index	Relatively Moderate	Very Low	Very Low	Very Low	Very Low	Very Low
	Expected Annual Loss	Relatively Moderate	Very Low	Very Low	Very Low	Very Low	Very Low
USDA Forest Service Wildfire Risk to Communities	Overall Risk	Medium	Medium	Medium	Medium	Medium	Medium

Source: FEMA National Risk Index, 2024

Table 66: Regional Wildfire Vulnerabilities

Sector	Vulnerability
People	-Risk of injury or death for residents and firefighting personnel -Displacement of people and loss of homes -Lack of transportation poses risk to low-income individuals, families, and elderly -Transportation routes may be blocked by fire, preventing evacuation efforts
Economic	-Damages to buildings and property can cause significant losses to business owners -Loss of businesses
Built Environment	-Property damages
Infrastructure	-Damage to power lines and utility structures
Critical Facilities	-Risk of damages
Climate	-Changes in seasonal temperature and precipitation normal can increase frequency and severity of wildfire events -Changes in climate can help spread invasive species, changing potential fuel loads in wildland areas
Other	-Increase chance of landslides, erosion, and land subsidence -May lead to poor water quality -Post fire, flash flooding events may be exacerbated

HAZARDOUS MATERIALS RELEASE

The following description for hazardous materials is provided by FEMA:

> Chemicals are found everywhere. They purify drinking water, increase crop production and simplify household chores. But chemicals also can be hazardous to humans or the environment if used or released improperly. Hazards can occur during production, storage, transportation, use or disposal. You and your community are at risk if a chemical is used unsafely or released in harmful amounts into the environment where you live, work or play..[78]

Hazardous materials in various forms can cause fatalities, serious injury, long-lasting health effects, and damage to buildings, homes, and other property. Many products containing hazardous chemicals are used and stored in homes routinely. Chemicals posing a health hazard include carcinogens, toxic agents, reproductive toxins, irritants, and many other substances that can harm human organs or vital biological processes.

Chemical manufacturers are one source of hazardous materials, but there are many others, including service stations, hospitals, and hazardous materials waste sites. Varying quantities of hazardous materials are manufactured, used, or stored at an estimated 4.5 million facilities in the United States—from major industrial plants to local dry-cleaning establishments or gardening supply stores.

Hazardous materials come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials. Hazardous material incidents are technological (meaning non-natural hazards created or influenced by humans) events that involve large-scale releases of chemical, biological or radiological materials. Hazardous materials incidents generally involve releases at fixed-site facilities that manufacture, store, process or otherwise handle hazardous materials or along transportation routes such as major highways, railways, navigable waterways and pipelines. A large number of spills also occur during the loading and unloading of chemicals.

Fixed sites are those that involve chemical manufacturing sites and stationary storage facilities. The Environmental Protection Agency (EPA) requires the submission of the types and locations of hazardous chemicals being stored at any facility within the state over the previous calendar year. This is completed by submitting a Tier II form to the EPA as a requirement of the Emergency Planning and Community Right-to-Know Act of 1986.

Likewise, the U.S. Department of Transportation, through the U.S. Pipeline and Hazardous Materials Safety Administration (PHMSA), has broad jurisdiction to regulate the transportation of hazardous materials, including the discretion to decide which materials shall be classified as hazardous. The transportation of hazardous materials is defined by PHMSA as "…a substance that has been determined to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce…" These materials are placed into one of nine hazard classes based on their chemical and physical properties. The hazard schedules may be further subdivided into divisions based on their characteristics. Because the properties and characteristics of materials are crucial in understanding the dynamics of a spill during a transportation incident, it is important for response personnel to understand the hazard classes and their divisions.

According to PHMSA, hazardous materials traffic in the U.S. now exceeds 1,000,000 shipments per day. Nationally, the U.S. has had 108 fatalities associated with the transport of hazardous materials between 2007 through 2016. While such fatalities are a low probability risk, even one event can harm many people. For example, a train derailment in Crete, Nebraska in 1969 allowed anhydrous ammonia to leak from a ruptured tanker. The resulting poisonous fog killed nine people and injured 53.

[78] Federal Emergency Management Agency. 2017. "Hazardous Materials Incidents." https://www.ready.gov/hazardous-materials-incidents.

Table 67: Hazardous Material Classes

CLASS	TYPE OF MATERIAL	DIVISIONS
1	Explosives	Division 1.1 – Explosives with a mass explosion hazard Division 1.2 – Explosives with a projection hazard but not a mass explosion hazard Division 1.3 – Explosives which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard Division 1.4 – Explosives which present no significant blast hazard Division 1.5 – Very insensitive explosives with a mass explosion hazard Division 1.6 – Extremely insensitive articles which do not have a mass explosion hazard
2	Gases	Division 2.1 – Flammable gases Division 2.2 – Non-flammable, non-toxic gases Division 2.3 – Toxic gases
3	Flammable liquids (and Combustible liquids)	
4	Flammable solids; Spontaneously combustible materials	Division 4.1 – Flammable solids, self-reactive substances and solid desensitized explosives Division 4.2 – Substances liable to spontaneous combustion Division 4.3 – Substances which in contact with water emit flammable gases
5	Oxidizing substances and Organic peroxides	Division 5.1 – Oxidizing substances Division 5.2 – Organic peroxides
6	Toxic substances and infections substances	Division 6.1 – Toxic substances Division 6.2 – Infectious substances
7	Radioactive materials	
8	Corrosive materials	
9	Miscellaneous hazardous materials/products, substances, or organisms	

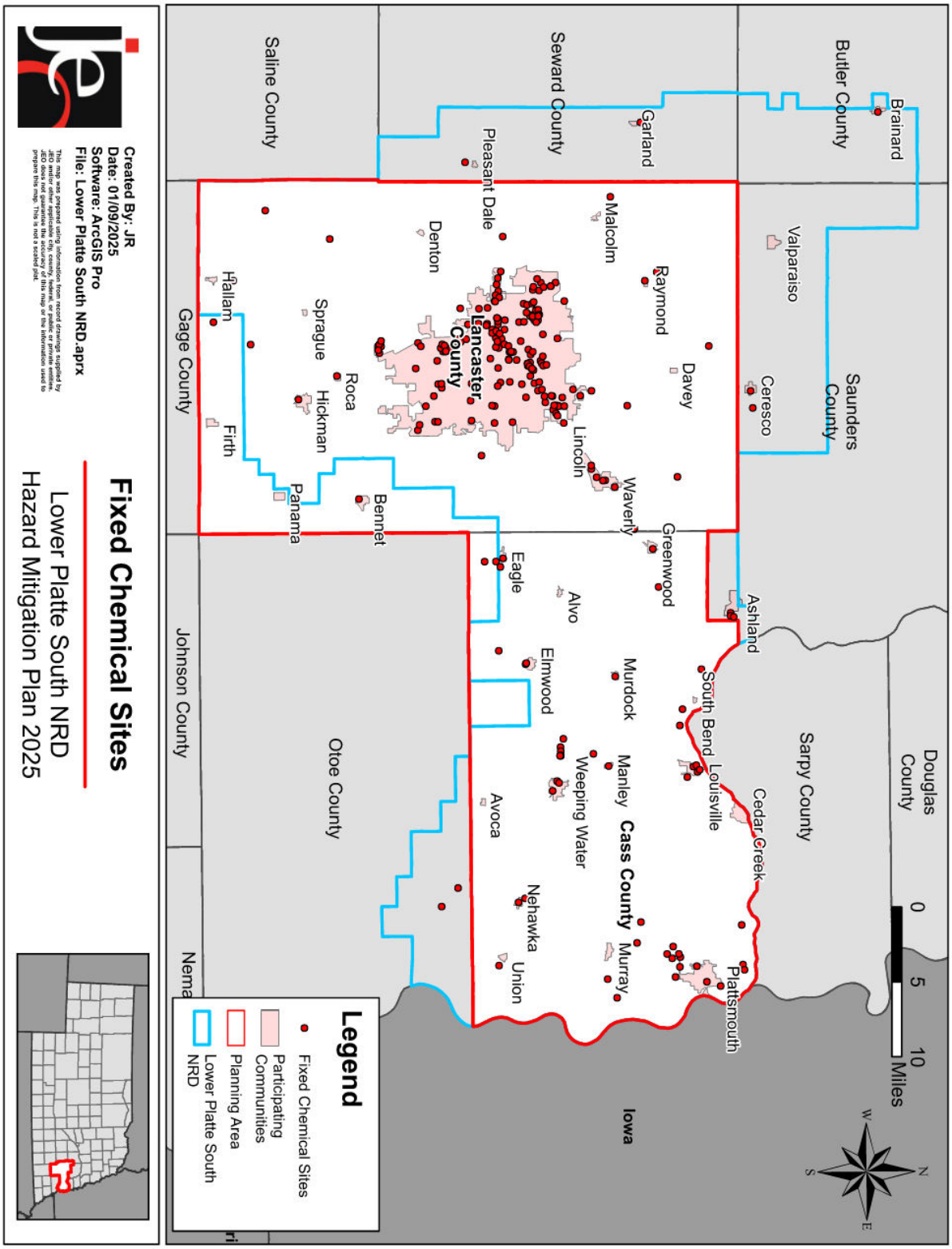
Source: Emergency Response Guidebook, 2016.[79]

LOCATION

Nebraska has nearly 3,000 facilities across the state that house hazardous materials according to the Tier II reports submitted to the Nebraska Department of Environment and Energy (NDEE) annually. There are 235 locations across the planning area that house hazardous materials, according to the Tier II reports submitted to the Nebraska Department of Environment and Energy (NDEE) in 2023.

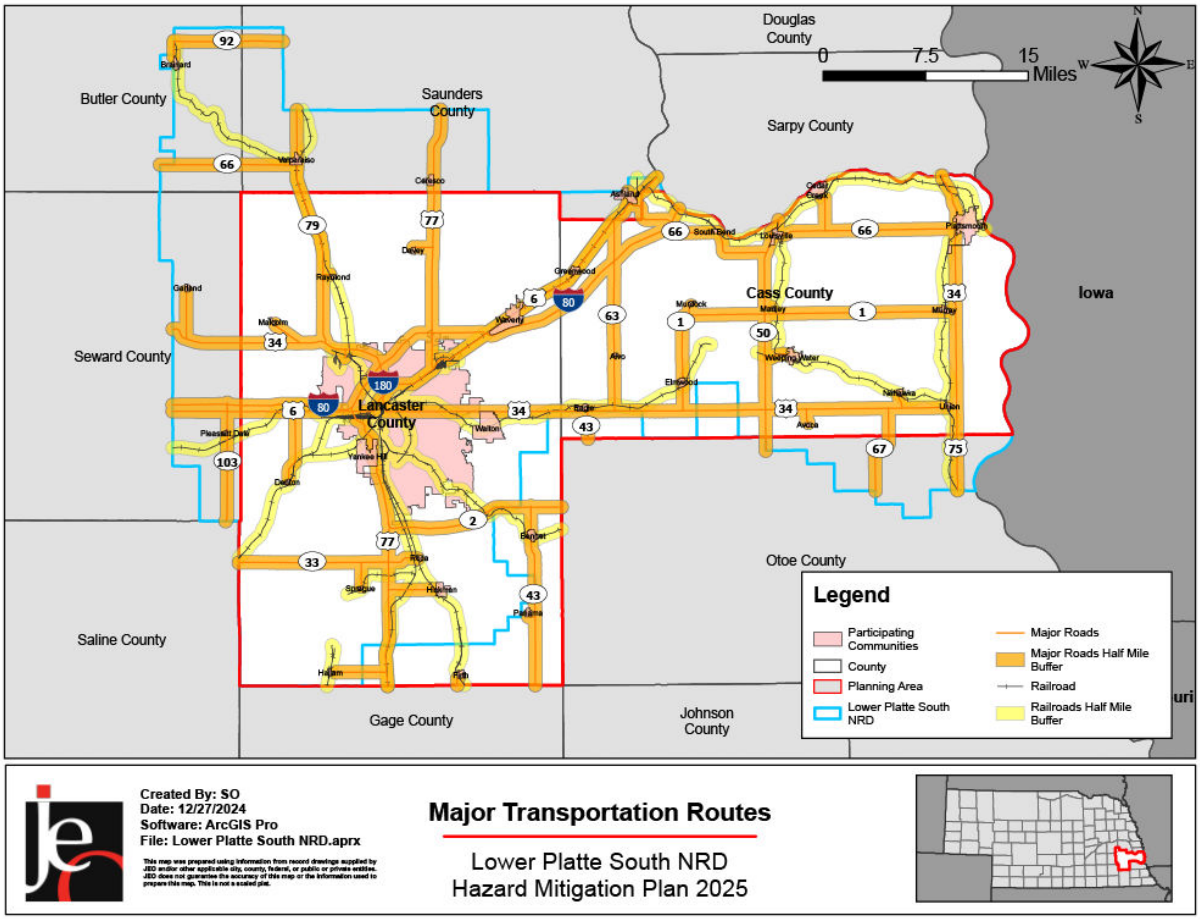
[79] U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration. 2016. "2016 Emergency Response Guidebook." https://www.phmsa.dot.gov/hazmat/outreach-training/erg.

Figure 34: Fixed Chemical Sites in the Planning Area



Hazardous material releases during transportation primarily occur on major transportation routes as identified in the figure below. Railroads providing service through the planning area have developed plans to respond to chemical releases along rail routes. Many spills occur during the loading and unloading of chemicals for highway and pipeline chemical transport. Major transportation corridors in the planning area include County Highways and Interstate routes. According to PHMSA, there are several gas transmission and hazardous liquid pipelines located in the planning area.[80]

Figure 35: Major Transportation Routes



[80] Pipeline and Hazardous Materials Safety Administration. 2020. "National Pipeline Mapping System." https://www.npms.phmsa.dot.gov/ .

Figure 36: Gas and Transmission Lines – Cass County

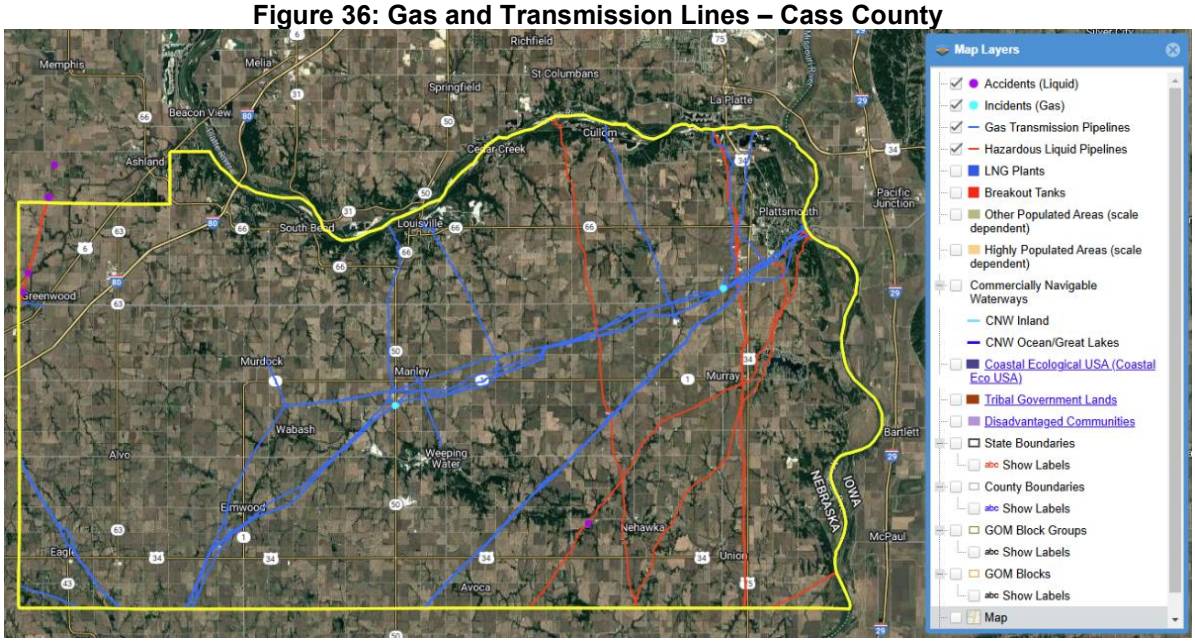
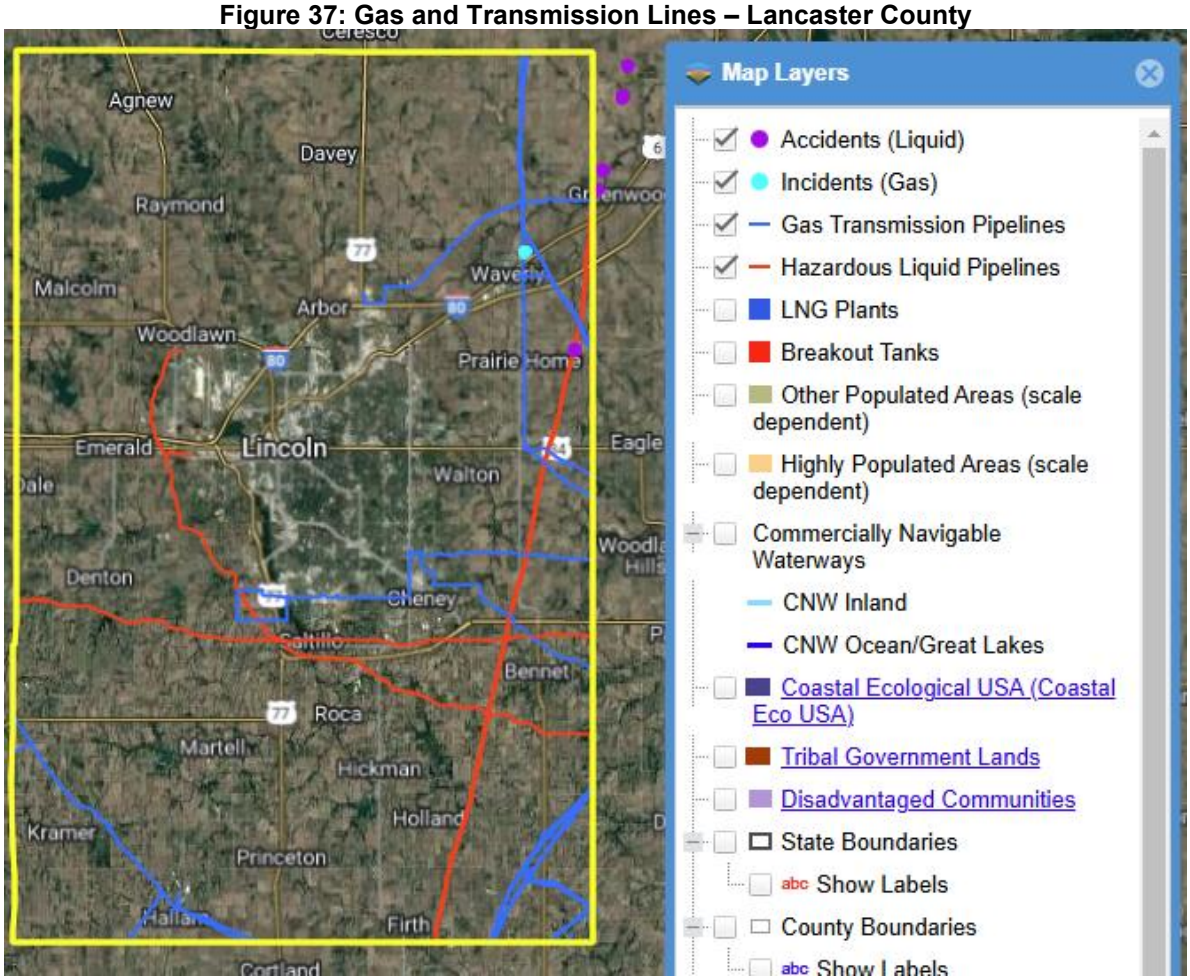
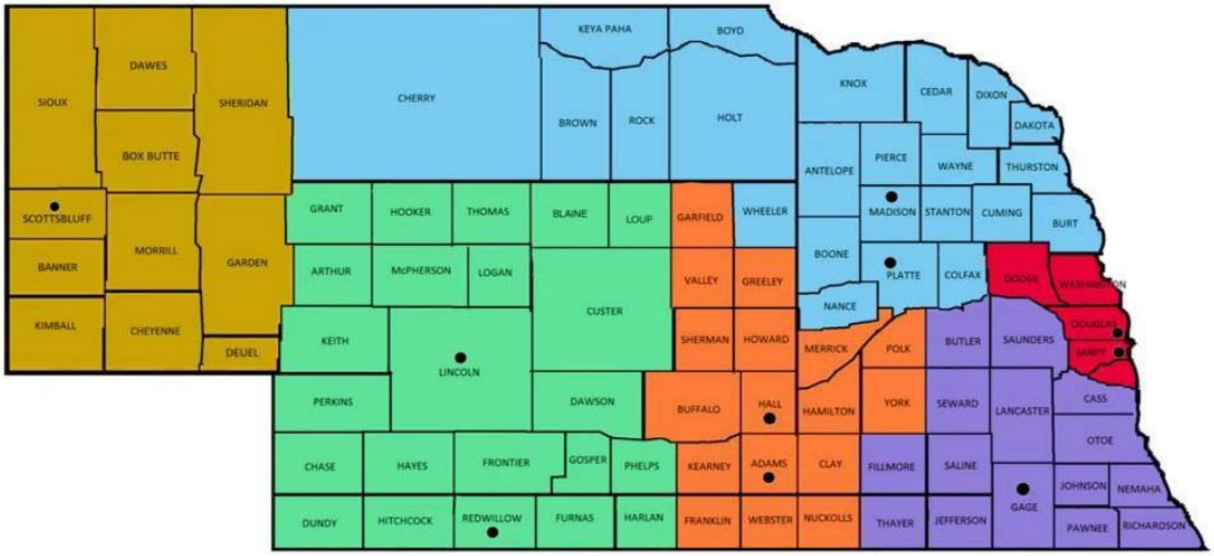


Figure 37: Gas and Transmission Lines – Lancaster County



There are ten State Emergency Response Teams (SERTs) stationed across the State of Nebraska which are trained to respond to large scale hazardous material incidents. Each department includes personnel at the technical, incident commander, and safety officer levels. There are SERT district which covers the entire planning area with the nearest team located in Sarpy or Gage County.[81]

Figure 38: Nebraska SERTs Map



HISTORICAL OCCURRENCES

According to the NRC database, there have been 210 fixed site chemical spills between January 1990 – December 2023 in the planning area. The following table lists only those events with the largest quantity of material released, incidents with injuries or evacuations involved, and largest property damages.

Table 68: Chemical Fixed Site Incidents

Year of Event	Location of Release	Quantity Spilled	Material Involved	Number of Injuries	Number Evacuated	Property Damage
1992	Lincoln	0	Anhydrous Ammonia	0	3	$0
1994	Greenwood	50 gals	Anhydrous Ammonia	0	1	$0
1995	Lincoln	3,000 lbs	Anhydrous Ammonia	2	50	$0
1996	Lincoln	10,000 gals	Oil	0	0	$0
1998	Lincoln	100,000 gals	Oil	0	0	$0
1999	Murdock	Unknown	Anhydrous Ammonia	1	0	$0
2000	Lincoln	Unknown	Foam, Mineral Spirits	0	300	Unknown
2003	Lincoln	55 gals and 12 lbs	Pesticides and Water-Soluble Powder	0	0	$750,000
2005	Lincoln	3 gals	Gasoline	1	0	$0

[81] NEMA. June 2020. "Nebraska: Emergency Assistance to a Hazardous Materials Incident." https://nema.nebraska.gov/sites/nema.nebraska.gov/files/doc/hazmat-blue-book.pdf.

Year of Event	Location of Release	Quantity Spilled	Material Involved	Number of Injuries	Number Evacuated	Property Damage
2015	Lincoln	Unknown	Anhydrous Ammonia	0	150	$0
2022	Lincoln	2,575 gals	Heptane	0	200	Unknown
2019	Lincoln	2,500 gals	Hexane	0	0	Unknown

Source: National Response Center, 1990-2023

PHMSA reports that 238 chemical spills have occurred during transportation in the planning area between 1990 and 2024. During these events, there were no fatalities, one injury, and $1,376,640 in damages. The following table provides a list of the most significant historical chemical spills during transportation in the planning area.

Table 69: Historical Chemical Spills 1990-2024

Date of Event	Location of Release	Failure Description	Material Involved	Method of Transportation	Amount in Gallons	Total Damage	Injuries (Yes/No)
1994	Lincoln	Derailment; Rollover Accident	Denatured Alcohol	Rail	23,000	$101,050	No
1996	Ashland	Fire Temperature or Heat	Sodium Hydroxide Solid	Highway	2	$173,000	No
1996	Ashland	Fire Temperature or Heat	Potassium Hydroxide Solution	Highway	1	$173,000	No
1996	Ashland	Fire Temperature or Heat	Hydrochloric Acid Solution	Highway	<1	$173,000	No
1996	Ashland	Fire Temperature or Heat	Corrosive Liquids N.O.S.	Highway	<1	$173,000	No
1998	Lincoln	Equipment Malfunction	Caustic Alkali Liquids N.O.S.	Highway	2	$0	Yes - 1
1998	South Bend	Derailment	Elevated Temperature Liquid N.O.S. at or above 100 C and below its flash point	Rail	18,000	$23,000	No
2004	Waverly	Equipment Malfunction	Environmentally Hazardous Substances Solid N.O.S.	Highway	15,650	$3,531	No
2004	Lincoln	Derailment; Vehicular Crash or Accident Damage	Flammable Liquids Toxic N.O.S.	Rail	10,200	$500,000	No
2011	Lincoln	Vehicular Crash or Accident Damage	Corrosive Liquids N.O.S.	Highway	250	$231,000	No
2012	Lincoln	Vehicular Crash or Accident Damage	RADIOACTIVE MATERIAL	Highway	0	$86,371	No
2012	Roca	Equipment Malfunction	ALCOHOLS, N.O.S.	Highway	767	$1,726	No
2017	Roca	Vehicular Crash or Accident Damage	GASOLINE	Highway	100	$88,330	No
2024	Lincoln	Equipment Malfunction	ALCOHOLS, N.O.S.	Rail	500	$64,500	No

Source: PHMSA, 1990-2024.[82]

[82] Pipeline and Hazardous Materials Safety Administration. 2018. "Office of Hazardous Materials Safety: Incident Reports Database Search." Accessed December 6, 2018. https://www.phmsa.dot.gov/hazmat/library/data-stats/incidents.

Extent

Transportation spills ranged from no material released to 23,000 liquid gallons of material with an average quantity spilled of 343 liquid gallons. Based on historic records, it is likely that any spill involving hazardous materials will not affect an area larger than a half mile from the spill location. The extent scale for this hazard will vary depending on the community, with greatest possible extent applying to those with either railroads through or near town or communities with a major highway bisecting the area. The probable extent of chemical spills during transportation is difficult to anticipate and depends on the type and quantity of chemical released.

The extent of chemical spills at fixed sites varies and depends on the type of chemical that is released. According to the U.S. Coast Guard's National Response Center (NRC) database, there have been 210 fixed site releases in the planning area and the total amount spilled ranged from 0 gallons or pounds to 100,000 gallons of pollutant. On average, approximately 800 gallons of pollutant are spilled per occurrence. Of the 210 chemical spills, one spill led to the evacuation of 300 individuals in 2000, a spill in 2022 led to an evacuation of 200 people, two spills led to one injury each in 1999 and 2005, and one spill in 1995 injured two individuals. Based on historic records, it is likely that any spill involving hazardous materials will not affect an area larger than a quarter mile from the spill location.

Average Annual Damages

The following table estimates average annual damage from hazardous material spills.

Table 70: Chemical Fixed Site Losses

Hazard Type	Number of Events	Total Injuries	Total Evacuated	Total Damages	Average Annual Damages
Fixed Site	210	3	704	$1,500,000	
Transportation	238	1	25	$1,376,640	

Source: NRC, 1990-2023, PHMSA 1990-2024

Historical Probability and Future Likelihood

Given the historic record of occurrence for hazardous material spill events (one event occurring in all years for fixed sites and transportation spills), for the purposes of this plan, the annual probability of hazardous material spill occurrence is 100% (Very Likely).

Table 71: Historical Probability & Future Likelihood – Hazardous Materials

Hazard	Historical Probability	Climate Change Impact	Future Development Impact	Future Likelihood
Fixed Spills	100%	Neither Increase nor Decrease in Frequency	Increase in Frequency and Exposure	Very Likely
Transportation Spills	100%	Neither Increase nor Decrease in Frequency	Increase in Frequency and Exposure	Very Likely

Future Development

To reduce the risk to people and property damage, future development should encourage chemical storage and manufacturing facilities to be built away from community lifelines such as schools, daycares, nursing homes, and other residential areas. Likewise, residential development and locations that house vulnerable populations should be built away from major transportation corridors used for chemical transportation.

Climate Change Impacts

Climate trends are not anticipated to have a direct impact on hazardous materials releases. However, as events continue to impact infrastructure used by and for hazardous materials, future spills will likely occur.

For example, flooding is likely to increase,[83] which could damage roadways and pipelines causing more spills to occur.

COMMUNITY TOP HAZARD STATUS

The following jurisdictions identified Hazardous Materials as a top hazard of concern:

- Alvo, Village of
- Bennet, Village of
- Cass County
- Cedar Creek, Village of
- Ceresco, Village of
- Conestoga Public Schools
- Denton, Village of
- Eagle, Village of
- Elmwood, Village of
- Firth, Village of
- Greenwood, Village of
- Hallam, Village of
- Hickman, City of
- Lincoln, City of
- Manley, Village of
- Murdock, Village of
- Murray, Village of
- Plattsmouth, City of
- Roca, Village of
- South Bend, Village of
- Waverly, City of
- Valparaiso, Village of

REGIONAL VULNERABILITIES

The following table provides information related to regional vulnerabilities; for jurisdictional-specific vulnerabilities, refer to *Section Seven: Community Profiles*.

Table 72: Regional Chemical Fixed Site Vulnerabilities

SECTOR	VULNERABILITY
PEOPLE	-Those in close proximity could have minor to moderate health impacts -Those in close proximity to transportation corridors -Possible evacuation -Hospitals, nursing homes, and the elderly at greater risk due to low mobility
ECONOMIC	-Evacuations and closed transportation routes could impact businesses near spill -A chemical plant shutdown in smaller communities would have significant impacts to the local economy -A long-term evacuation of the emergency planning zone (EPZ) would have a negative effect on the economy in the area
BUILT ENVIRONMENT	-Risk of fire or explosion
INFRASTRUCTURE	-Transportation routes can be closed during evacuations
CRITICAL FACILITIES	-Critical facilities are at risk of evacuation -Critical facilities near major transportation corridors are at risk
CLIMATE	-None

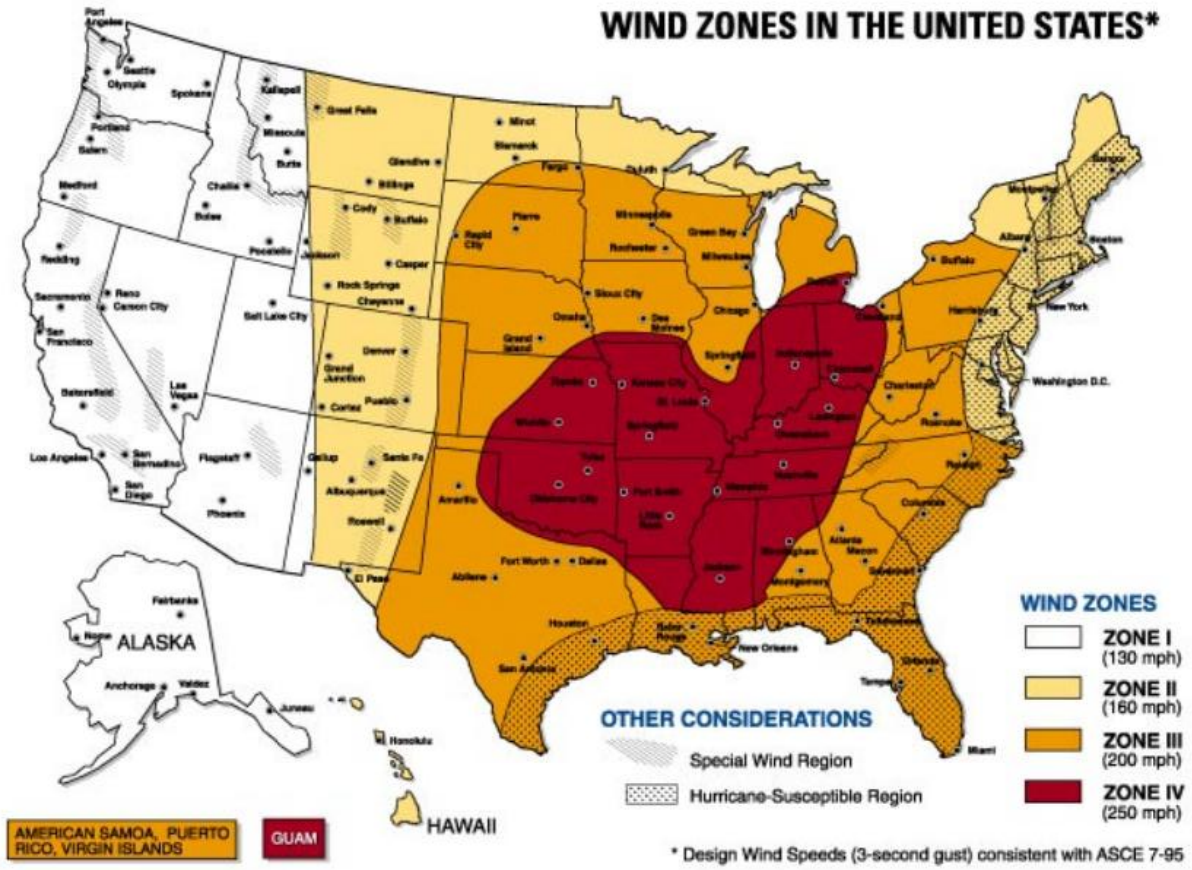
[83] NOAA. August 2022. "Climate Mapping for Resilience and Adaptation". https://livingatlas.arcgis.com/assessment-tool/explore/details.

HIGH WINDS & TORNADOES

High winds typically accompany severe thunderstorms, severe winter storms, tornadoes, and other large low-pressure systems, which can cause significant crop damage, downed power lines, loss of electricity, traffic flow obstructions, and significant property damage including to trees and center-pivot irrigation systems.

The National Weather Service (NWS) defines high winds as sustained wind speeds of 40 mph or greater lasting for 1 hour or longer, or winds of 58 mph or greater for any duration.[84] The NWS issues High Wind Advisories when there are sustained winds of 25 to 39 miles per hour and/or gusts to 57 mph. The figure below shows the wind zones in the United States. The wind zones are based on the maximum wind speeds that can occur from a tornado or hurricane event. The planning area is located in Zone III which has maximum winds of 200 mph equivalent to an EF4/5 tornado.

Figure 39: Wind Zones in the U.S.



Source: FEMA

High winds are a critical component of tornado formation. A tornado is typically associated with a supercell thunderstorm. For a rotation to be classified as a tornado, three characteristics must be met:

- There must be a microscale rotating area of wind, ranging in size from a few feet to a few miles wide;
- The rotating wind, or vortex, must be attached to a convective cloud base and must be in contact with the ground; and,

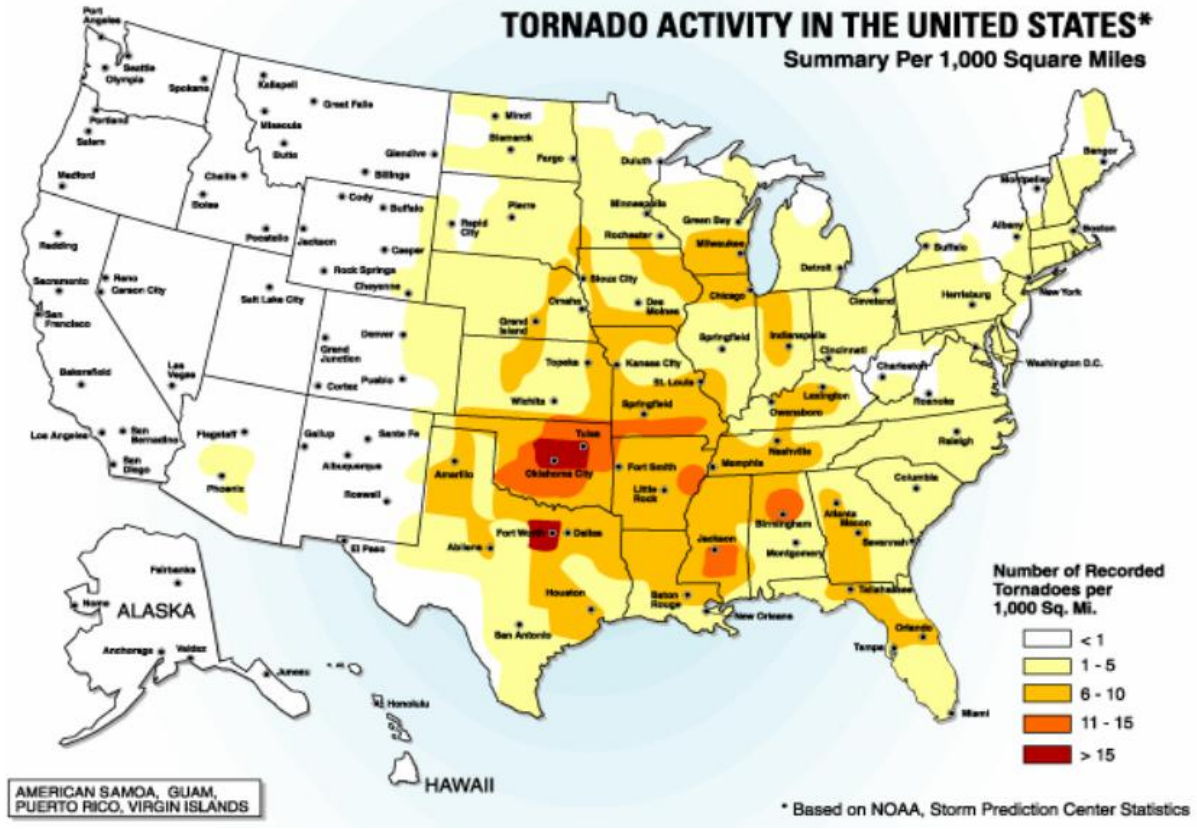
[84] National Weather Service. 2017. "Glossary." http://w1.weather.gov/glossary/index.php?letter=h.

- The spinning vortex of air must have caused enough damage to be classified by the Fujita Scale as a tornado.

Once tornadoes are formed, they can be extremely violent and destructive. They have been recorded all over the world but are most prevalent in the American Midwest and South, in an area known as "Tornado Alley." Approximately 1,250 tornadoes are reported annually in the contiguous United States. Tornadoes can travel distances of over 100 miles and reach over 11 miles above ground. Tornadoes usually stay on the ground for no more than 20 minutes. Nationally, the tornado season typically occurs between April and July. On average, 80 percent of tornadoes occur between noon and midnight. In Nebraska, 77 percent of all tornadoes occur in the months of May, June, and July.

Nebraska is ranked fifth in the nation for tornado frequency with an annual average of 57 tornadoes between 1991 and 2010.[85]

Figure 40: Tornado Activity in the United States



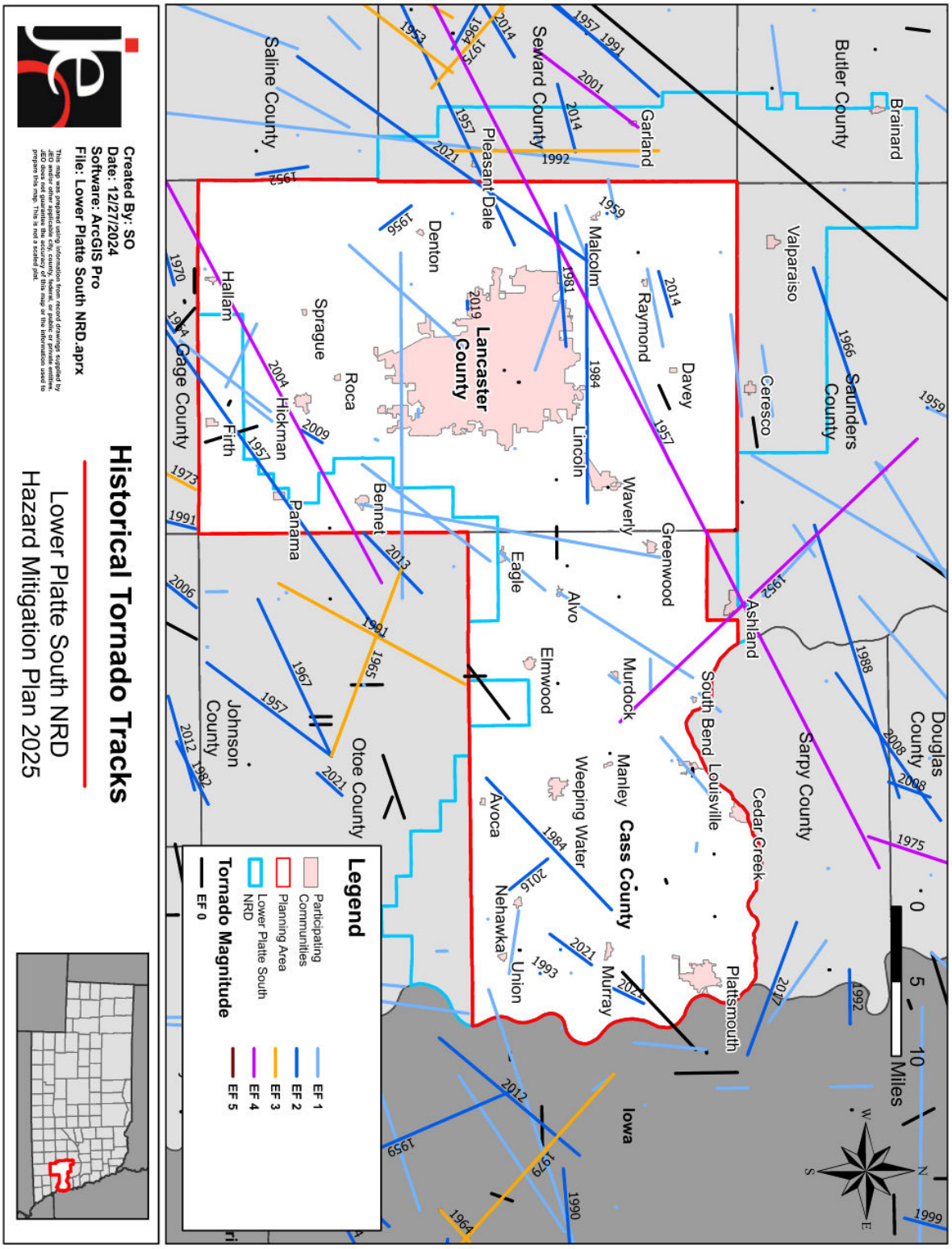
Source: FEMA

LOCATION

High winds and tornadoes can occur throughout the planning area. The impacts on residents would be greater in more densely populated areas with the greatest impacts to the local economy occurring in communities and major transportation routes. The following map shows the historical track locations across the region according to the Midwestern Regional Climate Center. Several significant tornado events have directly impacted communities located in the planning area, but touchdowns and tornado events can occur anywhere within the planning area. Note that this map shows tornado tracks both within or that cross into the boundaries of the Lower Platte South NRD.

[85] National Centers for Environmental Information. 2013. "U.S. Tornado Climatology." https://www.ncdc.noaa.gov/climate-information/extreme-events/us-tornadoclimatology.

Figure 41: Tornado Tracks in the Planning Area



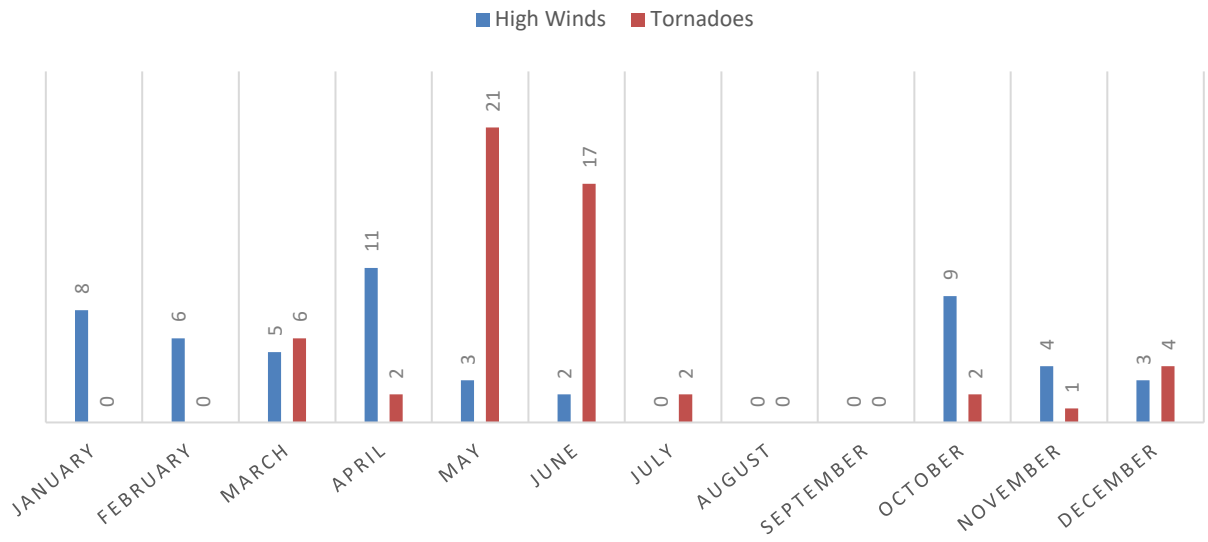
HISTORICAL OCCURRENCES

Due to the regional scale of high winds, the NCEI reports events as they occur in each county. While a single event can affect two or more counties at a time, the NCEI reports them as separate events. There were 51 high wind events and 55 tornadic events ranging from magnitude of E/EF0 to EF4 that occurred between January 1996 and November 2023.

These events were responsible for $101,337,000 in property damages and $1,108,865 in crop damages. These events reported two deaths and 39 injuries. The most damaging tornado occurred in Hallam in 2004, leading to 30 injuries, one death, and $100,000,000 in damages.

As seen in the following figures, the majority of high wind events occur in the spring and winter months, while most tornado events occur in the summer. Significant hazard events with direct impacts to communities are discussed in more detail in the applicable *Community Profiles.*

Figure 42: Events by Month



Source: NCEI, 1996-2023

Event descriptions from NCEI for the most damaging events (those including injuries, fatalities, or greatest property damage estimates) are provided below.

- **F4 Tornado 2024- $100,000,000 in property damages**
  This long tracked tornado is often referred to as the Hallam tornado. It initially touched down 3 miles west of Daykin in northern Jefferson County. The tornado was rated an f0 or f1 in Jefferson County damaging farm outbuildings, grain bins and trees. From there the tornado crossed into Saline County southwest of Western and remained an f0 or f1 until it struck the southern portion of Wilber where it strengthened to f2. Roofs were blown off of homes just southeast of Wilber. The tornado traveled from Wilber into Gage County, crossing the county line west of Clatonia where it grew to its most intense stage, f4. The tornado remained nearly at this strength as it crossed into Lancaster County near Hallam with a damage path of around 2 1/2 miles. Many well-built homes were demolished from Clatonia to Hallam, along with grain bins, farm sheds, and outbuildings. Many trees were destroyed or uprooted. Although Hallam itself escaped the strongest winds from the storm, which occurred just south of town, 95 percent of the buildings in town were either destroyed or severely damaged. The lone fatality from the tornado occurred in Hallam. The storm also toppled several hopper cars from a freight train on the west edge of town. In total 55 railroad cars were derailed.
  From Hallam the tornado traveled east for several miles prior to turning northeast again just north of Cortland. The storm then tracked 2 miles north of Firth, severely damaging the Firth-Norris high

school and a nearby middle school. School buses were tossed in this area. Several homes northeast of the schools were flattened as the tornado regained its f4 strength.

The damage path continued northeast to Holland and then to 2 miles north of Panama where the tornado weakened to around an f2 and the damage path began to narrow. The track then curved more toward the north, passing just south of Bennet where a few homes sustained f3 damage. After passing south of Bennet, the storm moved back to the northeast and began to weaken to f0 or f1 strength as it crossed into Otoe county southwest of Palmyra. The tornado finally dissipated 1 miles west southwest of Palmyra.

In total the tornado was on the ground for around 54 miles with a maximum intensity of f4. Besides the fatality, 38 people sustained injuries, 158 homes were leveled and 57 others were seriously damaged. The dollar amount of damage was estimated at 160 million, with 60 million of that agricultural including 100 cattle and 50 hogs lost. Some 150,000 acres of crop land sustained significant damage. The 5 counties were declared national disaster areas by FEMA.

- **EF1 Tornado 2009- 8 injuries**
  An intense upper-level low pressure system tracked from eastern Colorado into southeast South Dakota from March 23rd into March 24th. This caused a surface low pressure system to move from western Nebraska into southeast South Dakota during that time. As the low tracked northeast, a dry-line moved into eastern Nebraska during the afternoon of March 23rd. With surface temperatures in the 60s and 70s, and dewpoint temperatures in the 50s, ample instability was in place to allow a line of severe thunderstorms to develop as the dry-line punched eastward. Several fast moving low-topped supercell thunderstorms were embedded in the line, and one cell produced cyclic tornadoes from southeast of Lincoln into western Iowa. The storms in the line were moving north northeast at 50 to 60 mph. In addition to the severe weather, strong southerly gradient winds prevailed ahead of the low pressure. In some cases the winds gusted between 50 and 65 mph for several hours across parts of eastern Nebraska.

- **Tornado Outbreak of April 2024 – Summary from NWS**
  A tornado outbreak occurred across Nebraska and Iowa during the afternoon and evening hours of Friday, April 26, 2024. Several significant, long-tracked tornadoes damaged or destroyed hundreds, if not thousands, of homes and businesses across the region. People across the region were deeply impacted, several were injured, and there was one fatality.

  Historically speaking, these are the strongest tornadoes in eastern Nebraska or western Iowa (the NWS Omaha/Valley coverage area) in nearly 10 years, when four EF-4 tornadoes impacted northeast Nebraska (including Pilger) on June 16, 2014.

- **Widespread Damaging Winds of July 2024 – Summary from NWS**
  A line of intense thunderstorms brought 70-90+ mph winds and widespread damage to portions of southeast Nebraska and southwest Iowa including the Omaha and Lincoln areas. Despite the widespread wind damage, this line of storms did not meet the criteria to be classified as a derecho. A derecho wind damage swath must extend either continuously or intermittently more than 400 miles (about 650 km) with a width of at least 60 miles (about 100 km). This criterion is used to eliminate more common, shorter-lived, and generally less-organized wind-producing convective systems. This particular line of storms produced damage for about 230 miles.

Figure 43: Photos of Tornado Outbreak – April 2024

EXTENT

The Beaufort Wind Scale can be used to classify wind strength while the magnitude of tornadoes is measured by the Enhanced Fujita Scale. The following table outlines the Beaufort scale including wind speed ranking, range of wind speeds per ranking, and a brief description of conditions for each.

Table 73: Beaufort Wind Ranking

BEAUFORT WIND FORCE RANKING	RANGE OF WIND	CONDITIONS
0	<1 mph	Smoke rises vertically
1	1 – 3 mph	Direction shown by smoke but not wind vanes
2	4 – 7 mph	Wind felt on face; leaves rustle; wind vanes move
3	8 – 12 mph	Leaves and small twigs in constant motion
4	13 – 18 mph	Raises dust and loose paper; small branches move
5	19 – 24 mph	Small trees in leaf begin to move
6	25 – 31 mph	Large branches in motion; umbrellas used with difficulty
7	32 – 38 mph	Whole trees in motion; inconvenience felt when walking against the wind
8	39 – 46 mph	Breaks twigs off tree; generally, impedes progress
9	47 – 54 mph	Slight structural damage; chimneypots and slates removed
10	55 – 63 mph	Trees uprooted; considerable structural damages; improperly or mobiles homes with no anchors turned over
11	64 – 72 mph	Widespread damages; very rarely experienced
12 - 17	72 - > 200 mph	Hurricane; devastation

Source: Storm Prediction Center, 2017[86]

The Enhanced Fujita Scale replaced the Fujita Scale in 2007. The Enhanced Fujita Scale does not measure tornadoes by their size or width, but rather the amount of damage caused to human-built structures and trees after the event. The official rating category provides a common benchmark that allows comparisons to be made between different tornadoes. The enhanced scale classifies EF0-EF5 damage as determined by engineers and meteorologists across 28 different types of damage indicators, including different types of building and tree damage. To establish a rating, engineers and meteorologists examine the damage, analyze the ground-swirl patterns, review damage imagery, collect media reports, and sometimes utilize photogrammetry and videogrammetry. Based on the most severe damage to any well-built frame house, or any comparable damage as determined by an engineer, an EF-Scale number is assigned to the tornado.

The following tables summarize the Enhanced Fujita Scale and damage indicators. According to a recent report from the National Institute of Science and Technology on the Joplin Tornado, tornadoes rated EF3 or lower account for around 96 percent of all tornado damages.[87]

Table 74: Enhanced Fujita Scale

Storm Category	3 Second Gust (mph)	Damage Level	Damage Description
EF0	65-85	Gale	Some damages to chimneys; break branches off trees; pushes over shallow-rooted trees; damages to sign board
EF1	86-110	Weak	The lower limit is the beginning of hurricane wind speed; peels surface off rooms; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages might be destroyed
EF2	110-135	Strong	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.
EF3	136-165	Severe	Roof and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted.
EF4	166-200	Devastating	Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown, and large missiles generated.
EF5	200+	Incredible	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles fly through the air in excess of 100 meters; trees debarked; steel re-enforced concrete structures badly damaged.
EF No Rating	--	Inconceivable	Should a tornado with the maximum wind speed in excess of EF5 occur, the extent and types of damage may not be conceived. A number of missiles such as iceboxes, water heaters, storage tanks, automobiles, etc. will create serious secondary damage on structures.

Table 75: Enhanced Fujita Scale Damage Indicator

Number	Damage Indicator	Number	Damage Indicator
1	Small barns, farm outbuildings	15	School – 1 story elementary (interior or exterior halls)
2	One- or two-family residences	16	School – Junior or Senior high school
3	Single-wide mobile homes (MHSW)	17	Low-rise (1-4 story) buildings
4	Double-wide mobile homes (MHDW)	18	Mid-rise (5-20 story) buildings

[86] Storm Prediction Center: National Oceanic and Atmospheric Administration. 1805. "Beaufort Wind Scale." http://www.spc.noaa.gov/faq/tornado/beaufort.html.
[87] Kuligowski, E.D., Lombardo, F.T., Phan, L.T., Levitan, M.L., & Jorgensen, D.P. March 2014. "Final Report National Institute of Standards and Technology(NIST) Technical Investigation of the May 22, 2011, Tornado in Joplin, Missouri."

Number	Damage Indicator	Number	Damage Indicator
5	Apartment, condo, townhouse (3 stories or less)	19	High-rise (over 20 stories)
6	Motel	20	Institutional buildings (hospital, government, or university)
7	Masonry apartment or motel	21	Metal building systems
8	Small retail buildings (fast food)	22	Service station canopy
9	Small professional (doctor office, branch bank)	23	Warehouse (tilt-up walls or heavy timber)
10	Strip mall	24	Transmission line tower
11	Large shopping mall	25	Free-standing tower
12	Large, isolated (“big box”) retail building	26	Free standing pole (light, flag, luminary)
13	Automobile showroom	27	Tree- hardwood
14	Automotive service building	28	Tree -softwood

Using the NCEI reported events, the most common high wind event in the planning area is a level 9 on the Beaufort Wind Ranking scale. The reported high wind events ranged from 35 mph to 68 mph, with an average speed of 48.9 mph. High wind events near the 35 mph likely caused whole trees to sway and slight discomfort while walking outdoors. Events that recorded 68 mph wind speeds rank at level 11 on the scale and likely caused significant and widespread damage. While NCEI data does not report data on a local level for high wind speeds, the reported wind speeds for Cass County ranged from 35 to 55 mph, with an average of 48.1 mph. This ranks the County at a level 9 on the Beaufort Wind Scale. Lancaster County wind speeds ranged from 35 to 68 mph, with an average of 50 mph, or at level 9 on the scale. This level can cause slight damage to structures.

Based on the historical record, it is most likely that tornadoes that occur within the planning area will be of F0 strength. Of the 55 reported tornado events, 25 were EF/F0, 19 were EF/F1, 9 was EF/F2, one was F4, and one was EFU. The extent of damage felt by high wind or tornado events will vary depending on the severity of event and the amount of infrastructure and development within a community. Due to the nature of how tornadic events are categorized, significant tornado events will occur in areas with more infrastructure.

The extent of damage felt by high wind or tornado events will vary depending on the severity of the event and amount of infrastructure and development within a community or area. Due to the nature of how tornadic events are categorized, significant tornado events will occur in areas with more infrastructure. Small communities with limited staff and fiscal capability are more likely to have a prolonged recovery period and the extent of damages would be felt more severely.

Average Annual Damages

The average damage per event estimate was determined based upon NCEI Storm Events Database number of historical occurrences. This does not include losses from displacement, functional downtime, economic loss, injury or loss of life. Damages from high winds and tornadoes vary greatly depending on the severity or magnitude of each event.

Table 76: High Wind and Tornado Loss Estimate

Hazard Type	Number of Events[1]	Average Events Per Year	Total Property Loss[1]	Average Annual Property Loss[1]	Total Crop Loss[2]	Average Annual Crop Loss[2]
High Winds	52	1.9	$28,000	$1,000	$1,108,865	$46,203
Tornado	55	2.0	$101,309,000	$3,618,179		

Source: 1 Indicates data is from NCEI (January 1996 to November 2023); 2 Indicates data is from USDA RMA (2000 to 2023)

HISTORICAL PROBABILITY AND FUTURE LIKELIHOOD

Based on historical records and reported events, it is likely that high winds and tornadic events will occur within the planning area regularly. Given the historic record of occurrence for high wind events (17 out of 28 years with reported events), for the purposes of this plan, the annual probability of wind event occurrence is 59 percent (Likely). However, high wind events may be more common than presented here but have simply not been reported in past years. Given the historic record of occurrence for tornado events (21 out of 28 years with reported events), for the purposes of this plan, the annual probability of tornado occurrence is 75 percent (Likely).

Table 77: Historical Probability & Future Likelihood – Tornadoes and High Winds

Hazard	Historical Probability	Climate Change Impact	Future Development Impact	Future Likelihood
High Winds	**59%**	Uncertain	Neither Increase nor Decrease in Frequency. Increase in Exposure	**Likely**
Tornadoes	**75%**	Uncertain	Neither Increase nor Decrease in Frequency. Increase in Exposure	**Likely**

FUTURE DEVELOPMENT

Any future development and population growth elevates exposure of property and people to the impacts of tornadoes and high wind. Future development should take steps to reduce potential damage from tornadoes and high winds. Building codes for new structures can be strengthened, requiring increased rebar in foundations, enhanced nailing patterns for wall sheathing, the use of Simpson Strong Ties and Straps, and require the use of anchors and tie-downs of mobile homes. Additionally, individuals can choose to build to an option Code Plus Standard, such as Fortified for Safer Living. The installation of public shelters to protect residents caught outside or in vulnerable areas, such as mobile home parks, can increase safety of residents in those areas. Development regulations that require safe rooms, basements, warning sirens, or other structures that reduce risk to people would also help decrease vulnerability.

CLIMATE CHANGE IMPACTS

For extreme events like tornadoes and high winds there is "considerable uncertainty about how projected changes in the climate will affect these events". However, "tornadoes and severe storms will continue to be a normal feature for Nebraska."[88]

COMMUNITY TOP HAZARD STATUS

The following jurisdictions identified High Winds and Tornadoes as a top hazard of concern:

- Cass County
- Alvo, Village of
- Cedar Creek, Village of
- Conestoga Public Schools
- Eagle, Village of
- Elmwood, Village of
- Greenwood, Village of
- Louisville, City of
- Manley, Village of
- Murdock, Village of
- Murray, Village of
- Nehawka, Village of
- Lancaster County
- Bennet, Village of
- Davey, Village of
- Denton, Village of
- Firth, Village of
- Hallam, Village of
- Hickman, City of
- Lincoln, City of
- Panama, Village of
- Raymond, Village of
- Roca, Village of
- Waverly, City of
- Ashland, City of
- Ceresco, Village of
- Lincoln Public Schools
- Norris Public Schools
- Raymond Central Public Schools
- Weeping Water Public Schools

[88] University of Nebraska-Lincoln. 2014. "Understanding and Assessing Climate Change: Implications for Nebraska". http://snr.unl.edu/download/research/projects/climateimpacts/2014ClimateChange.pdf.

REGIONAL VULNERABILITIES

The following table provides information related to regional vulnerabilities; for jurisdictional-specific vulnerabilities, refer to *Section Seven: Community Profiles*.

Table 78: Regional High Wind Vulnerabilities

SECTOR	VULNERABILITY
PEOPLE	-Vulnerable populations include those living in mobile homes (especially if improperly anchored), nursing homes, schools, or in substandard housing -People outside during events -Citizens without access to shelter below ground or in reinforced rooms -Elderly with decreased mobility or poor hearing may be at higher risk -Lack of multiple ways to receive weather warnings, especially at night
ECONOMIC	-Agricultural losses to both crops and livestock -Damages to businesses and prolonged power outages can cause significant impacts to the local economy, especially with EF3 tornadoes or greater
BUILT ENVIRONMENT	-All building stock is at risk of significant damages
INFRASTRUCTURE	-Downed power lines and power outages -All above ground infrastructure at risk to damages -Impassable roads due to debris blocking roadways
CRITICAL FACILITIES	-All critical facilities are at risk to damages and power outages
CLIMATE	-Changes in seasonal precipitation and temperature normals can increase frequency and magnitude of events

LEVEE FAILURE

According to FEMA:

"The United States has thousands of miles of levee systems. These manmade structures are most commonly earthen embankments designed and constructed in accordance with sound engineering practices to contain, control, or divert the flow of water to provide some level of protection from flooding. Some levee systems date back as far as 150 years. Some levee systems were built for agricultural purposes. Those levee systems designed to protect urban areas have typically been built to higher standards. Levee systems are designed to provide a specific level of flood protection. No levee system provides full protection from all flooding events to the people and structures located behind it. Thus, some level of flood risk exists in these levee-impacted areas."

Levee failure can occur several ways. A breach of a levee is when part of the levee breaks away, leaving a large opening for floodwaters to flow through. A levee breach can be gradual by surface or subsurface erosion, or it can be sudden. A sudden breach of a levee often occurs when there are soil pores in the levee that allow water to flow through causing an upward pressure greater than the downward pressure from the weight of the soil of the levee. This under seepage can then resurface on the backside of the levee and can quickly erode a hole to cause a breach. Sometimes the levee actually sinks into a liquefied subsurface below.

Another way a levee failure can occur is when the water overtops the crest of the levee. This happens when the flood waters simply exceed the lowest crest elevation of the levee. An overtopping can lead to significant erosion of the backside of the levee and can result to a breach and thus a levee failure.

LOCATION

There are 11 federal levees and five non-federal levees located within the two-county and LPSNRD planning area as reported in USACE's National Levee Database. The Clear Creek Levee System, located just north of Ashland, is outside of the two-county planning area; however, a small portion of the Levee System falls within the LPSNRD boundary, and it provides flood risk reduction for the City of Lincoln wellfield and the Nebraska Army National Guard Camp.

Beyond the USACE's National Levee Database, there is no known comprehensive list of levees that exists in the planning area especially for private agricultural levees. Thus, it is not possible at this time to document the location of non-federal levees, the areas they protect, nor the potential impact of these levees.

HISTORICAL OCCURRENCES

As there is no formal database of historical levee failures, the following sources were consulted: members of the Planning Team, local newspapers and media outlets, and the USACE. After the March 2019 flood event, USACE reported 41 breaches and numerous damages to federal and non-federal levees across the State of Nebraska. The failure of these structures significantly impacted subsequent flooding in neighboring communities. As reported by USACE and the Planning Team, the Clear Creek Levee System was breached, but as noted above, does not fall within the two-county planning area. Three additional levee systems were damaged. Descriptions of these levees from USACE are found below:[89]

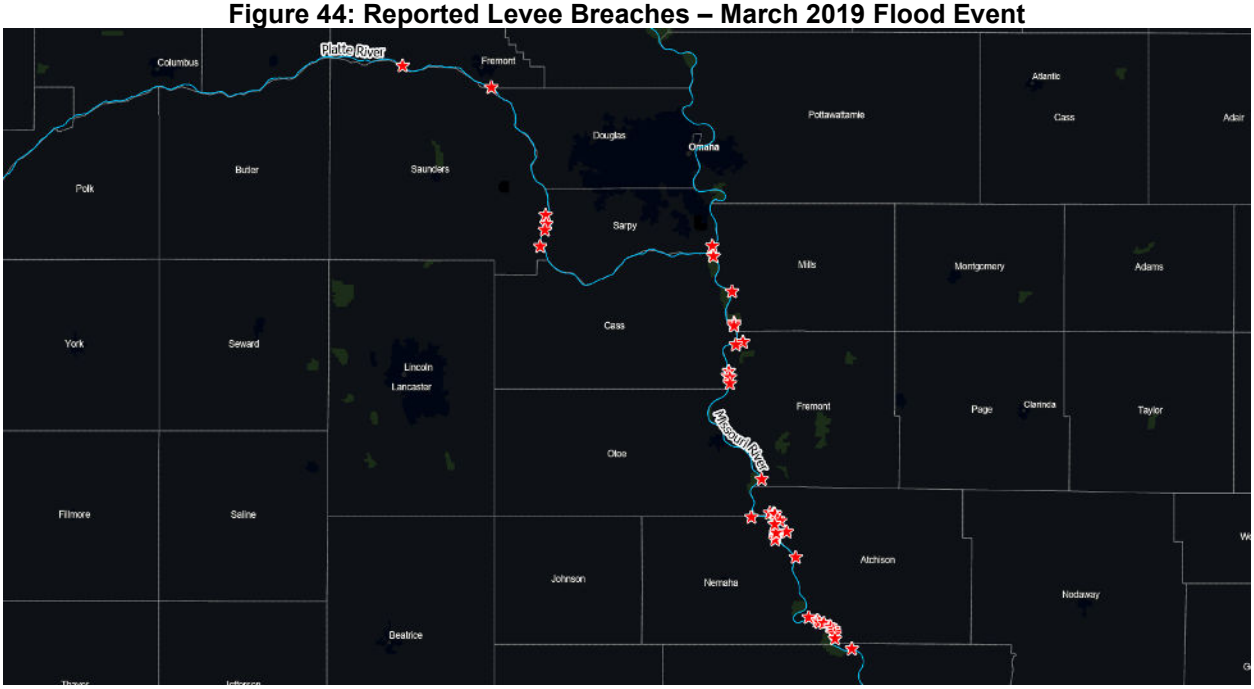
- Salt Creek System Restoration Information. Background**:** Many of the seven (7) Salt Creek Levee Systems were damaged during the 2019 Flood Event, leading to the Project Sponsor submitting Public Law (PL) 84-99 Rehabilitation Assistance requests to the US Army Corps of Engineers – Omaha District. Current Action**:** Design funding has been received to begin the engineering and design work on the levee repair project. The purpose of this rehabilitation project is to repair the levee system to the authorized level of flood risk management.
- Lake Wa Con-Da Levee Restoration Information. Background**:** The Lake Wa Con-Da – Missouri River Right Bank Levee System was damaged during the 2019 Flood Event, leading to the Levee Sponsor submitting a Public Law (PL) 84-99 Rehabilitation Assistance request to the US Army

[89] U.S. Army Corps of Engineers. 2019. "Omaha District System Restoration Team: Levee System Status as of October 3, 2019." https://www.nwo.usace.army.mil/Omaha-District-System-Restoration-Team/.

Corps of Engineers – Omaha District**.** Current Action Design funding has been received to begin work on the Lake Wa Con-da levee repair project. The purpose of this rehabilitation project is to repair the levee system to its authorized level of flood risk management.

- Cedar Creek Omaha (F&W) Restoration Information. Background: The Cedar Creek (Omaha F&W) – Platte River Right Bank Levee System was damaged during the 2019 Flood Event, leading to the Project Sponsor submitting a Public Law (PL) 84-99 Rehabilitation Assistance request to the US Army Corps of Engineers – Omaha District. Current Action: Design funding has been received to begin the engineering and design work on the levee repair project. The purpose of this rehabilitation project is to repair the levee system to the authorized level of flood risk management.
- Clear Creek Levee Restoration Information. Background: The Clear Creek – Platte River Right Bank Levee System experienced significant damage during the 2019 Flood Event. This led to four breaches, along with substantial other damages, occurring throughout the Levee System. Current Action: A priority breach impacting the property and infrastructure behind the Clear Creek Levee System was identified for initial repairs. This construction contract was awarded on 29 March 2019. These initial repairs were directed at stopping the flow from the Platte River into the area behind the levee system and providing an incremental level of flood risk management. Follow-on actions to further repair the levee system and provide additional flood risk management are being coordinated within the PL 84-99 program.

Figure 44: Reported Levee Breaches – March 2019 Flood Event



Source: USACE

Table 79: Levee Information

Levee Name	Sponsor	Condition	Last Inspection Date	Buildings at Risk	People at Risk	Property Value	Acres of Farmland	Communities in Area
Salt Creek LB & Haines RB	LPSNRD	In Progress	11/21/2017	7	32	4,000,000	2.7	2
Salt Creek RB	LPSNRD	Moderate Risk Due to Overtopping 84% Loaded	2/28/2018	440	1,063	160,000,000	16	2
Salt Creek LB & Haines LB & Middle Cr RB	LPSNRD	In Progress	11/29/2018	103	387	130,000,000	16.5	1
Salt Creek LB & Middle Creek LB	LPSNRD	Moderate Risk Due to Overtopping 80% Loaded	11/21/2017	76	701	220,000,000	2.2	1
Salt Creek LB & Oak Creek LB	LPSNRD	Channel & Culvert Erosion has led to unacceptable conditions	11/21/2017	123	827	150,000,000	3.3	1
Salt Creek RB to Dead Man's Run	LPSNRD	Moderate Risk due to unknown embankment conditions	11/21/2017	146	965	110,000,000	1.1	1
Salt Creek RB & Dead Man's Run RB	LPSNRD	In Progress	11/29/2018	203	655	59,000,000	41.1	1
YMCA Camp Kitaki – Platte River RB (NF)	YMCA Camp Kitaki	Low Risk	2/28/2018	2	0	49,000	0.7	1

Levee Name	Sponsor	Condition	Last Inspection Date	Buildings at Risk	People at Risk	Property Value	Acres of Farmland	Communities in Area
Cedar Creek (Omaha F&W) – Platte RB	Omaha Fish and Wildlife Club	In Progress	8/14/2020	386	4	4,000,000	9.6	1
Lake Waconda – Missouri River RB	Cass County SID 1 Lake Waconda	Moderate Risk due to sand boils ; chances of embankment failure	5/10/2016	206	540	47,000,000	107	1
Clear Creek – Platte River RB*								
Oak Creek Levee 1	LPSNRD	N/A	N/A	6	261	46,000,000	124	1
Schilling Refuge Levee 1								
Schilling Refuge Levee 2	FEMA Region 7		N/A	1	0	290,000	1.1	1
Schilling Refuge Levee 3	FEMA Region 7		N/A	0	0	0	96.7	2
YMCA Camp Kataki Levee	FEMA Region 7		N/A	0	0	0	0.4	2

Source: USACE Levee Database

Name	Sponsor	Location	River	Length (miles)	Type of Protection	Protected Area (sq miles)	Risk Level
Salt Creek LB & Haines RB	LPSNRD	Lincoln, Lancaster County	Salt Cr, Haines Cr	1.25	Urban	0.19	Low
Salt Creek RB	LPSNRD	Lincoln, Lancaster County	Salt Creek	4.71	Urban	1.33	Moderate
Salt Creek LB & Haines LB & Middle Cr RB	LPSNRD	Lincoln, Lancaster County	Salt Cr, Haines CR	2.49	Urban	0.47	Low
Salt Creek LB & Middle Creek LB	LPSNRD	Lincoln, Lancaster County	Salt Cr, Middle Cr	1.5	Urban	0.47	Moderate

Name	Sponsor	Location	River	Length (miles)	Type of Protection	Protected Area (sq miles)	Risk Level
Salt Creek LB & Oak Creek LB	LPSNRD	Lincoln, Lancaster County	Salt Cr, Oak Cr	1.72	Urban	0.45	Low
Salt Creek RB to Dead Man's Run	LPSNRD	Lincoln, Lancaster County	Salt Creek	1.62	Urban	0.44	Low
Salt Creek RB & Dead Man's Run RB	LPSNRD	Lincoln, Lancaster County	Salt Creek	1.6	Urban	0.38	Low
YMCA Camp Kitaki – Platte River RB (NF)	YMCA Camp Kitaki	South Bend, Cass County	Platte River	0.22	Structural	0.047	Low
Cedar Creek (Omaha F&W) – Platte RB	Omaha Fish & Wildlife Club and LPSNRD (co-sponsors)	Cedar Creek, Cass County	Platte River	1.56	Residential	0.38	Not Screened
Lake Waconda – Missouri River RB	Cass County SID #1	Cass County	Missouri River and Lake Waconda	2.53	Residential	0.6	Moderate
Clear Creek – Platte River RB*	LPNNRD and LPSNRD (co-sponsors)	Wann, Saunders County	Platte River	12.25	Urban	28.04	Not Screened

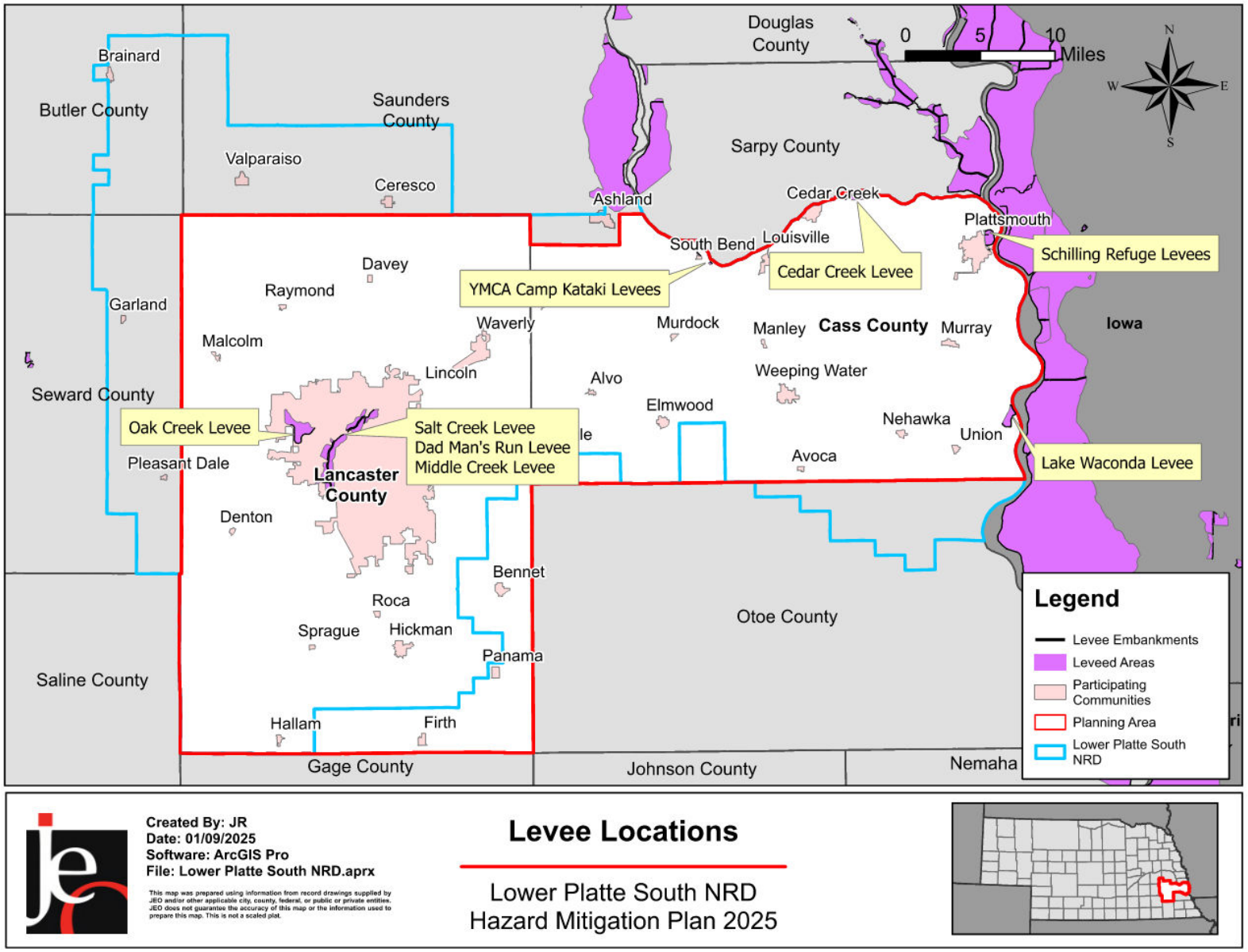
Source: USACE Levee Database
**Note: The Clear Creek Levee System is outside of the two-county planning area. However, a small portion of the levee falls within the LPSNRD area.*

Table 80: LPSNRD Non-USACE Levees

Name	Sponsor	Location	River	Length (miles)	Type of Protection	Protected Area (sq miles)	Risk Level
Oak Creek Levee 1	N/A	Lincoln, Lancaster	Oak Creek	3.32	Commercial	1.62	Not Screened
Schilling Refuge Levee 1	N/A	Plattsmouth, Cass	Schilling Lake	2.29	WMA	0.11	Not Screened
Schilling Refuge Levee 2	N/A	Plattsmouth, Cass	Schilling Lake	0.21	Commercial	0.013	Not Screened
Schilling Refuge Levee 3	N/A	Plattsmouth, Cass	Schilling Lake	2.31	Urban	0.57	Not Screened
YMCA Camp Kataki Levee	N/A	South Bend, Cass	Platte River	0.4	Agricultural	0.062	Not Screened

Source: USACE Levee Database

Figure 45: Leveed Area in the Planning Area



EXTENT

The USACE, who is responsible for federal levee oversight and inspection of levees, has three ratings for levee inspections. Any levee failure events in the planning area will fall within USACE's rating system; however it is not currently possible to determine what level of damage each levee system will experience.

Table 81: USACE Levee Rating Categories

Ratings	Description
Acceptable	All inspection items are rated as Acceptable
Minimally Acceptable	One or more inspection items are rated as Minimally Acceptable or one or more items are rated as Unacceptable and an engineering determination concludes that the Unacceptable inspection items would not prevent the segment/system from performing as intended during the next flood event.
Unacceptable	One or more items are rated as Unacceptable and would prevent the segment/system from performing as intended, or a serious deficiency noted in past inspections has not been corrected within the established timeframe, not to exceed two years.

Source: USACE

HISTORICAL PROBABILITY AND FUTURE LIKELIHOOD

While three levees within the planning area (Salt Creek, Cedar Creek, and Lake Waconda Levee Systems) were damaged and one outside of the planning area but within the LPSNRD region (Clear Creek Levee System) was breached during the 2019 March flood event, no other historical records of levee failure were found. While it is possible for levee failure to occur in the future, this is considered a low probability. For the purposes of this plan, the probability of levee failure will be stated as one percent annually. It should be noted that until permanent repairs are made to damaged levee systems, there is an increased risk of failure. As outlined in the historical occurrences section, the USACE is currently overseeing repairs and working with contractors to complete permanent repairs as soon as practical.

FUTURE DEVELOPMENT

Any future growth in significant levee protected areas increases the impacts from levee failure. As many levee systems are developed in areas to reduce flood risk impacts, changes to waterways and flood risk hazard areas may affect protected areas. Closer to the levee system, breach zones are frequently larger than the identified floodplain, so caution should be used when developing areas adjacent to or downstream of levee systems. Communities or counties could implement requirements for any new development or substantial improvements in levee protected areas similar to floodplain ordinances to minimize the number of people and property impacted during a levee failure event.

CLIMATE CHANGE IMPACTS

While climate change does not directly affect levee failure events, changes in precipitation and temperature swings and extremes are highly likely to impact the planning area. Increased rainfall events, either in frequency and/or in magnitude, will lead to exacerbated stress on infrastructure systems including levee systems. Climate change may impact dam systems in the following ways:

- Drought/Extreme Heat – land subsidence, erosion, embankment settling, or foundation cracking
- Flooding – increased embankment erosion, sloughing, overtopping risk, or damage from ice jams

COMMUNITY TOP HAZARD STATUS

The following jurisdictions identified Levee Failure as a top hazard of concern.

- Lower Platte South NRD
- City of Lincoln
- City of Ashland

REGIONAL VULNERABILITIES

The following table provides information related to regional vulnerabilities; for jurisdictional specific vulnerabilities, refer to *Section Seven: Participant Sections*.

Table 82: Regional Levee Failure Vulnerabilities

SECTOR	VULNERABILITY
PEOPLE	-Those living in federal levee protected areas -Residents with low mobility or with no access to a vehicle are more vulnerable during a levee failure
ECONOMIC	-Businesses and industries protected by levees are at risk during failures
BUILT ENVIRONMENT	-All buildings within levee protected areas are at risk to damages
INFRASTRUCTURE	-Major transportation corridors and bridges at risk during levee failures
CRITICAL FACILITIES	-Critical facilities in levee protected areas are at risk
CLIMATE	-Changes in seasonal precipitation and temperature normals can increase strain on infrastructure

SEVERE THUNDERSTORMS

Severe thunderstorms are common and unpredictable seasonal events throughout Nebraska. A thunderstorm is defined as a storm that contains lightning and thunder, which is caused by unstable atmospheric conditions. When the cold upper air sinks and the warm, moist air rises, storm clouds or "thunderheads" develop, resulting in thunderstorms. This can occur singularly, in clusters, or in lines.

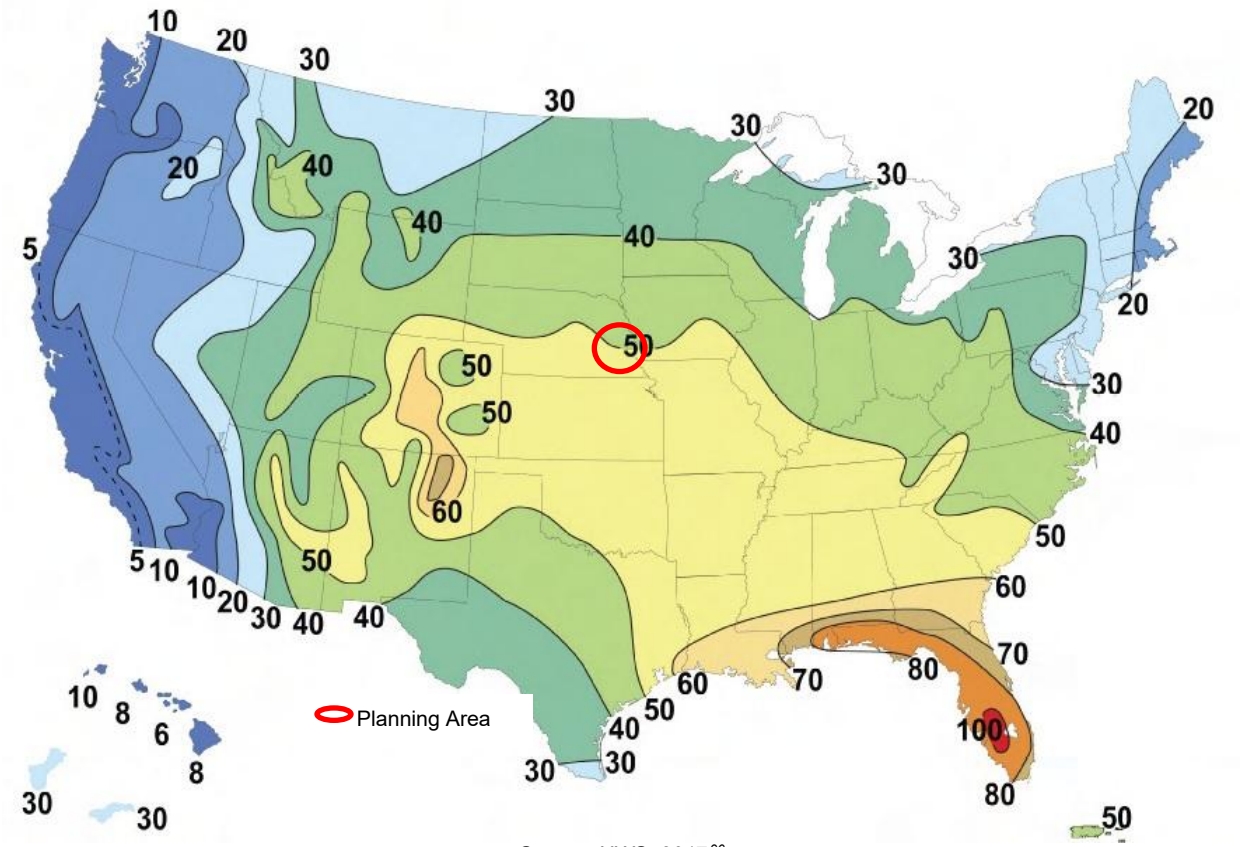
Thunderstorms can develop in fewer than 30 minutes and can grow to an elevation of eight miles into the atmosphere. Lightning, by definition, is present in all thunderstorms and can cause harm to humans and animals, fires to buildings and agricultural lands, and electrical outages in municipal electrical systems. Lightning can strike up to 10 miles from the portion of the storm depositing precipitation. There are three primary types of lightning: intra-cloud, inter-cloud, and cloud to ground. While intra and inter-cloud lightning are more common, communities are potentially impacted when lightning comes in contact with the ground. Lightning generally occurs when warm air mixes with colder air masses resulting in atmospheric disturbances necessary for polarizing the atmosphere.

Economically, thunderstorms are generally beneficial in that they provide moisture necessary to support Nebraska's largest industry, agriculture. The majority of thunderstorms do not cause damage, but when they escalate to severe storms, the potential for damages increases. Damages can include: crop losses from wind and hail; property losses due to building and automobile damages from hail; high wind; flash flooding; and death or injury to humans and animals from lightning, drowning, or getting struck by falling or flying debris. Figure 46 displays the average number of days with thunderstorms across the country each year. The planning area experiences an average of 40 to 50 thunderstorms over the course of one year.

Hail is commonly associated with severe thunderstorms, and this association makes hail just as unpredictable as severe thunderstorms. Additionally, hail events in thunderstorms often occur in series, with one area having the potential to be hit multiple times in one day. Severe thunderstorms usually occur in the evening during the spring and summer months. These, often large, storms can include heavy rain, hail, lightning, and high winds. Hail can destroy property and crops with sheer force, as some hail stones can fall at speeds up to 100 mph.

While the moisture from thunderstorms associated with hail events can be beneficial, when thunderstorms do produce hail, there is potential for crop losses, property losses due to building and automobile damages, injury or death to cattle and other livestock, and personal injury from people not seeking shelter during these events or standing near windows. The potential for damages increases as the size of the hail increases.

Figure 46: Average Number of Thunderstorms



Source: NWS, 2017.[90]

LOCATION

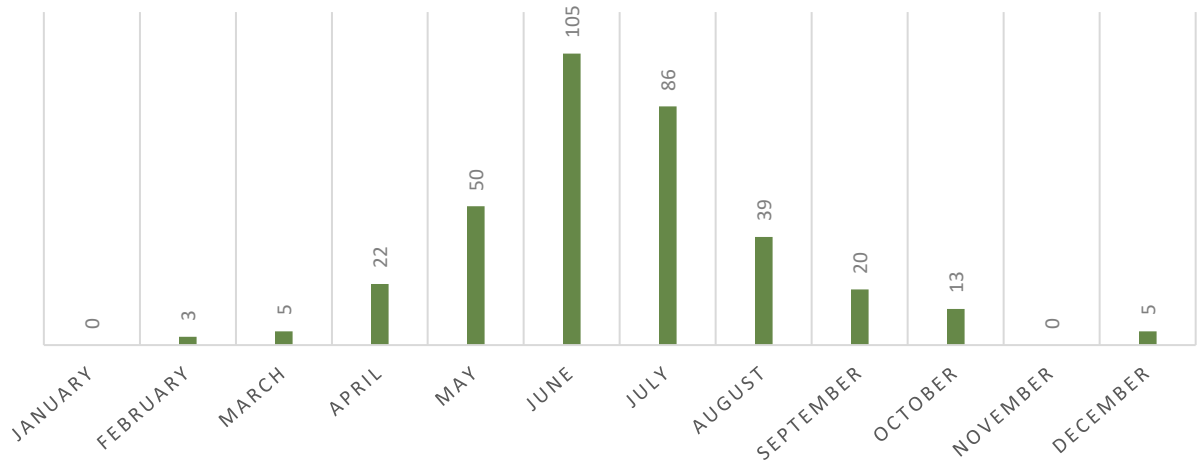
The entire planning area is at risk of severe thunderstorms and associated damages from heavy rain, lightning, hail, and thunderstorm level winds.

HISTORICAL OCCURRENCES

The NCEI reports events as they occur in each community. A single severe thunderstorm event can affect multiple communities and counties at a time; the NCEI reports these large scale, multi-county events as separate events. The result is a single thunderstorm event covering the entire region could be reported by the NCEI as several events. Severe thunderstorms in the planning area usually occur in the afternoon and evening during the summer months (Figure 47).

[90] National Weather Service. 2017. "Introduction to Thunderstorms." http://www.srh.noaa.gov/jetstream/tstorms/tstorms_intro.html.

Figure 47: Thunderstorm Wind Events by Month



Source: NCEI, 1996-2023

The NCEI reports a total of 956 total severe thunderstorm events. Of those there were:

- Hail 581 events
- Heavy Rain 14 events
- Lightning 13 events
- Thunderstorm Wind 348 events

Severe thunderstorm events were responsible for over $6 million in property damage. The USDA RMA data does not specify severe thunderstorms as a cause of loss, however heavy rains which may be associated with severe thunderstorms caused $9,639,944 and hail caused $7,773,271 in crop damages. There were three injuries, and no deaths reported in association with these storms.

EXTENT

The geographic extent of a severe thunderstorm event may be large enough to impact the entire planning area (such as in the case of a squall line, derecho, or long-lived supercell) or just a few square miles, in the case of a single cell that marginally meets severe criteria.

The NWS defines a thunderstorm as severe if it contains hail that is one inch in diameter or capable of winds gusts of 58 mph or higher. The Tornado and Storm Research Organization (TORRO) scale is used to classify hailstones and provides some detail related to the potential impacts from hail. Table 83 outlines the TORRO Hail Scale.

Table 83: TORRO Hail Scale

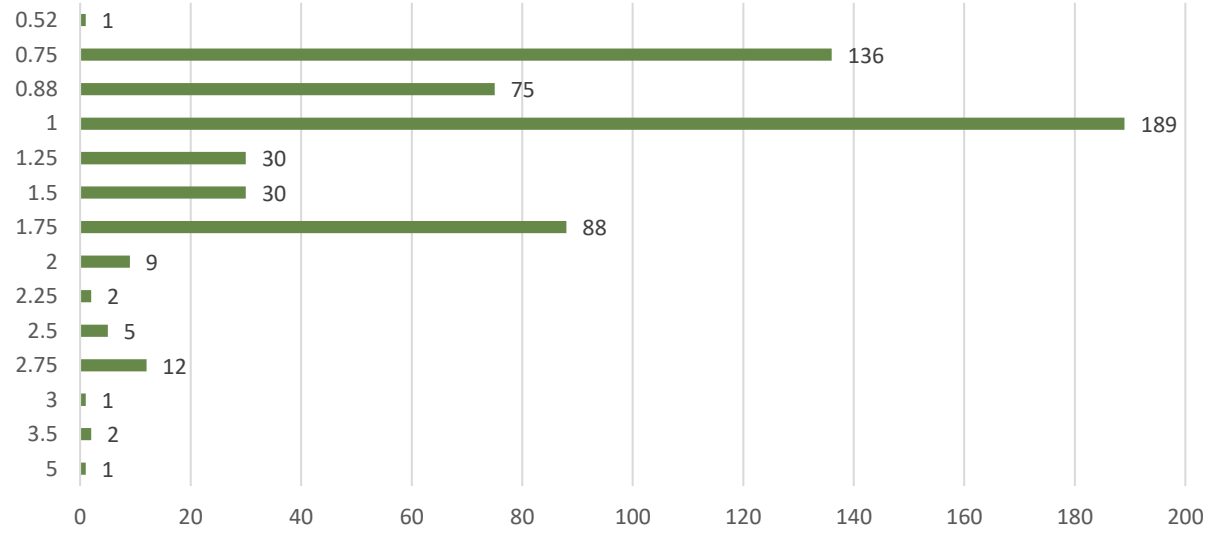
CLASS	TYPE OF MATERIAL	DIVISIONS
H0: Hard Hail	5 mm; (Pea size); 0.2 in	No damage
H1: Potentially Damaging	5 -15 mm (Marble); 0.2 – 0.6 in	Slight general damage to plants and crops
H2: Significant	10 -20 mm (Grape); 0.4 – 0.8 in.	Significant damage to fruit, crops, and vegetation
H3: Severe	20 -30 mm (Walnut); 0.8 – 1.2 in	Severe damage to fruit and crops, damage to glass and plastic structures

CLASS	TYPE OF MATERIAL	DIVISIONS
H4: Severe	30 -40 mm (Squash Ball); 1.2 – 1.6 in	Widespread damage to glass, vehicle bodywork damaged
H5: Destructive	40 – 50 mm (Golf ball); 1.6 – 2.0 in.	Wholesale destruction of glass, damage to tiled roofs; significant risk or injury
H6: Destructive	50 – 60 mm (chicken egg); 2.0 – 2.4 in	Grounded aircrafts damaged, brick walls pitted; significant risk of injury
H7: Destructive	60 – 75 mm (Tennis ball); 2.4 – 3.0 in	Severe roof damage; risk of serious injuries
H8: Destructive	75 – 90 mm (Large orange); 3.0 – 3.5 in.	Severe damage to structures, vehicles, airplanes; risk of serious injuries
H9: Super Hail	90 – 100 mm (Grapefruit); 3.5 – 4.0 in	Extensive structural damage; risk of severe or even fatal injuries to persons outdoors
H10: Super Hail	>100 mm (Melon); > 4.0 in	Extensive structural damage; risk or severe or even fatal injuries to persons outdoors

Source: TORRO, 2017[91]

Of the 581 hail events reported across the planning area, the average hailstone size was 1.16 inches. Events of this magnitude correlate to an H3 classification. It is reasonable to expect H3 classified events to occur several times in a year throughout the planning area. In addition, it is reasonable, based on the number of occurrences, to expect larger hailstones to occur in the planning area annually. The planning area has endured one H10 hail events (>4.0 inches) during the period of record. Figure 48 shows hail events based on the size of the hail.

Figure 48: Hail Events by Magnitude



Source: NCEI, 1996-2023

[91] Tornado and Storm Research Organization. 2017. "Hail Scale." http://www.torro.org.uk/hscale.php.

AVERAGE ANNUAL DAMAGES

The average damage per event estimate was determined based upon recorded damages from NCEI Storm Events Database since 1996 and number of historical occurrences. This does not include losses from displacement, functional downtime, economic loss, injury, or loss of life.

Table 84: Severe Thunderstorms Loss Estimate

Hazard Type	Number of Events[1]	Total Property Loss[1]	Average Annual Property Loss	Total Crop Loss[2]	Average Annual Crop Loss
Hail	581	$2,049,000	$73,179	$7,773,271	$277,617
Heavy Rain	14	$0	$0	$9,639,944	$344,284
Lightning	13	$1,236,400	$44,157	-	
Thunderstorm Wind	348	$2,049,000	$73,179	-	
Total	**956**	**$6,285,400**	$224,479	**$17,413,215**	$621,901

Source: 1 Indicates data is from NCEI (January 1996 to November 2023); 2 Indicates data is from USDA RMA (2000 to 2023)

HISTORICAL PROBABILITY AND FUTURE LIKELIHOOD

Based on historical records and reported events, severe thunderstorms events and storms with hail are likely to occur on an annual basis. The NCEI reported a total of 956 severe thunderstorm events between 1996 and 2023 and at least one event occurring each year within the period of record. Thus, resulting in a 100 percent chance annually for thunderstorms (Highly Likely).

Table 85: Historical Probability & Future Likelihood – Severe Thunderstorms

Historical Probability	Climate Change Impact	Future Development Impact	Future Likelihood
100%	Uncertain	Neither Increase nor Decrease in Frequency. Increase Exposure	**Highly Likely**

FUTURE DEVELOPMENT

All future development could be impacted by severe thunderstorms. The ability to withstand major damage lies in sound land use practices and consistent enforcement of building codes and regulations for new construction. Municipalities that have adopted the current International Building Codes have a lower risk for damage as the code has sections designed to deal with the impacts of hail events. Lightning rods, protected rooftop utilities, and surge protectors, are possible steps new developments can take to reduce impacts from lightning and severe thunderstorms.

CLIMATE CHANGE IMPACTS

For extreme events like severe thunderstorms there is "considerable uncertainty about how projected changes in the climate will affect these events". However, severe thunderstorms will "continue to be a normal feature for Nebraska."[92] Projected trends for precipitation and temperature indicate more favorable conditions for severe thunderstorms to develop more readily and grow larger. According to the Fourth National Climate Assessment, "modeling studies consistently suggest that the frequency and intensity of severe thunderstorms in the United States could increase as climate changes."[93] There is also some suggestion in the models that the atmosphere will become more favorable to severe thunderstorm development and increased intensity.

[92] University of Nebraska-Lincoln. 2014. "Understanding and Assessing Climate Change: Implications for Nebraska". http://snr.unl.edu/download/research/projects/climateimpacts/2014ClimateChange.pdf.

[93] Fourth National Climate Assessment. 2018. "Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II: Chapter 2". https://nca2018.globalchange.gov/chapter/2/.

COMMUNITY TOP HAZARD STATUS

The following jurisdictions identified Severe Thunderstorms as a top hazard of concern:

- Lower Platte South NRD
- Cass County
- Avoca, Village of
- Cedar Creek, Village of
- Conestoga Public Schools
- Eagle, Village of
- Elmwood, Village of
- Greenwood, Village of
- Louisville, City of
- Murdock, Village of
- Union Village of
- Weeping Water, City of
- Lancaster County
- Bennet, Village of
- Davey, Village of
- Denton, Village of
- Lincoln, City of
- Panama, Village of
- Plattsmouth, City of
- Raymond, Village of
- Roca, Village of
- Sprague, Village of
- Waverly, City of
- Brainard, Village of
- Ceresco, Village of
- Lincoln Public Schools
- Norris Public Schools
- Raymond Central Public Schools
- Weeping Water Public Schools

REGIONAL VULNERABILITIES

The following table provides information related to regional vulnerabilities; for jurisdictional-specific vulnerabilities, refer to *Section Seven: Community Profiles*.

Table 86: Regional Thunderstorm Vulnerabilities

SECTOR	VULNERABILITY
PEOPLE	-Elderly citizens with decreased mobility may have trouble evacuating or seeking shelter -Mobile home residents are risk of injury and damage to their property if the mobile home is not anchored properly -Injuries can occur from: not seeking shelter, standing near windows, and shattered windshields in vehicles
ECONOMIC	-Damages to buildings and property can cause significant losses to business owners and employees
BUILT ENVIRONMENT	-Buildings are at risk to hail damage -Downed trees and tree limbs -Roofs, siding, windows, gutters, HVAC systems, etc. can incur damages
INFRASTRUCTURE	-High winds and lightning can cause power outages and down power lines -Roads may wash out from heavy rains and become blocked from downed tree limbs -Power lines and utilities can be damaged

SECTOR	VULNERABILITY
CRITICAL FACILITIES	-Power outages are possible -Critical facilities may sustain damage from hail, lightning, and wind -Property damages and power outages
CLIMATE	-Changes in seasonal precipitation and temperature normals can increase frequency and magnitude of severe storm events -Increased likelihood of more frequent and severe storm events, including hail
OTHER	-High winds, lightning, heavy rain, and possibly tornadoes can occur with this hazard

SEVERE WINTER STORMS

Severe winter storms are an annual occurrence in Nebraska. Winter storms can bring extreme cold, freezing rain, heavy or drifting snow, and blizzards. Blizzards are particularly dangerous due to drifting snow and the potential for rapidly occurring whiteout conditions which greatly inhibit vehicular traffic. Generally, winter storms occur between the months of November and March, but may occur as early as October and as late as April. Heavy snow is usually the most defining element of a winter storm. Large snow events can cripple an entire jurisdiction by hindering transportation, knocking down tree limbs and utility lines, and structurally damaging buildings.

FREEZING RAIN

Along with snow events, winter storms also have the potential to deposit significant amounts of ice. Ice buildup on tree limbs and power lines can cause them to collapse. This is most likely to occur when rain falls that freezes upon contact, especially in the presence of wind. Freezing rain is the name given to rain that falls when surface temperatures are below freezing. Unlike a mixture of rain and snow, ice pellets or hail, freezing rain is made entirely of liquid droplets. Freezing rain can also lead to many problems on the roads, as it makes them slick, causing automobile accidents, and making vehicle travel difficult.

BLIZZARDS

Blizzards are particularly dangerous due to drifting snow and the potential for rapidly occurring whiteout conditions, which greatly inhibits vehicular traffic. Heavy snow is usually the most defining element of a winter storm. Large snow events can cripple an entire jurisdiction for several days by hindering transportation, knocking down tree limbs and utility lines, structurally damaging buildings, and injuring or killing crops and livestock.

LOCATION

The entire planning area is at risk of severe winter storms and associated damage from blizzards, heavy snow, ice storms, winter weather, and winter storms.

HISTORICAL OCCURRENCES

Due to the regional scale of severe winter storms, the NCEI reports events as they occur in each county. According to the NCEI, there were a combined 167 severe winter storm events for the planning area from January 1996 to November 2023. These recorded events caused a total of $19,075,000 in property damage and $568,924 in crop damage. No injuries or fatalities were associated with any severe winter storm events; however, it is reasonable to assume car accidents and injuries were sustained due to slick conditions or poor visibility from winter weather throughout the planning area.

The most damaging event occurred on December 25th, 1997 when six to 14 inches of heavy wet snow fell in the area causing power outages, tree damage, and $16,000,000 in property damage in Lancaster County and $3,000,000 in property damage in Cass County. The NCEI reported "*A major early season snowstorm struck the area. A heavy wet snowfall of 6 to 14 inches fell on trees, many of which were still fully or partially leafed, and caused extensive damage and/or total destruction. At least 205,000 residents in the affected area were without power just after the storm, many of the outages lasted for several days. Omaha Public Power District estimated that it was the worst outage in 50 years. Nearly 85% of the trees in the Omaha area and 25% of the trees in the Lincoln area sustained damage or were totally destroyed. Many emergency shelters in and around the Omaha and Lincoln areas were opened for use by those who suffered a hardship from the storm.*"

Additional information from these events from NCEI and reported by each community are listed *Section Seven: Community Profiles*.

EXTENT

The Sperry-Piltz Ice Accumulation Index (SPIA) was developed by the NWS to predict the accumulation of ice and resulting damages. The SPIA assesses total precipitation, wind, and temperatures to predict the intensity of ice storms. Ice Storm Warnings are issued when accumulation of at least 0.25 inches is

expected from a storm, which controlling for high winds, would tend to classify ice storms in Nebraska as SPIA Level 2 or higher. NCEI does not report local ice accumulation data. However, based on the most common accumulation during ice storms in the planning area equaling a quarter of an inch, coupled with average wind speeds being between 25 to 35 mph, communities in the planning area will likely experience scattered utility issues along with dangerous road conditions. The following figure shows the SPIA index.

Figure 49: SPIA Index

ICE DAMAGE INDEX	*AVERAGE ICE AMOUNT (in inches) *Revised: Oct. 2011*	WIND (mph)	DAMAGE AND IMPACT DESCRIPTIONS
0	<0.25	<15	Minimal risk of damage to exposed utility systems; no alerts or advisories needed for crews, few outages.
1	0.10 – 0.25	15 – 25	Some isolated or localized utility interruptions are possible, typically lasting only a few hours. Roads and bridges may become slick and hazardous.
	0.25 – 0.50	>15	
2	0.10 – 0.25	25 – 35	Scattered utility interruptions expected, typically lasting 12 to 24 hours. Roads and travel conditions may be extremely hazardous due to ice accumulation.
	0.25 – 0.50	15 – 25	
	0.50 – 0.75	>15	
3	0.10 – 0.25	> – 35	Numerous utility interruptions with some damage to main feeder lines and equipment expected. Tree limb damage is excessive. Outages lasting 1 – 5 days.
	0.25 – 0.50	25 – 35	
	0.50 – 0.75	15 – 25	
	0.75 –1.00	>15	
4	0.25 – 0.50	> – 35	Prolonged and widespread utility interruptions with extensive damage to main distribution feeder lines and some high voltage transmission lines/structures. Outages lasting 5 – 10 days.
	0.50 – 0.75	25 – 35	
	0.75 –1.00	15 – 25	
	1.00 –1.50	>15	
5	0.50 – 0.75	> – 35	Catastrophic damage to entire exposed utility systems, including both distribution and transmission networks. Outages could last several weeeks in some areas. Shelters needed.
	0.75 –1.00	> – 25	
	1.00 –1.50	> – 15	
	> 1.50	Any	

(Categories of damage are based upon combinations of precipitation totals, temperatures and wind speeds/directions.)

Source: SPIA-Index, 2017.[94]

The Wind Chill Index was developed by the NWS to determine the decrease in air temperature felt by the body on exposed skin due to wind. The wind chill is always lower than the air temperature and can quicken the effects of hypothermia or frost bite as it gets lower. Figure 50 shows the Wind Chill Index used by the NWS.

[94] SPIA-Index. 2009. "Sperry-Piltz Ice Accumulation Index." Accessed June 2017. http://www.spia-index.com/index.php.

Figure 50: Wind Chill Index Chart

Temperature (°F)

Wind (mph)	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-82	-89	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 Minutes | 10 MInutes | 5 Minutes

Wind Chill (°F) = 35.74 + 0.6215T - 35.75($V^{0.16}$) + 0.4275T($V^{0.16}$)

T = Air Tempurature (°F) **V** = Wind Speed (mph)

Source: NWS, 2017[95]

The likely extent from severe winter storms would apply the same to each jurisdiction in the planning area as each individual event will have different impacts.

Average monthly snowfall for the planning area is shown in Figure 51, which shows the snowiest months are December, January, and February. A common snow event (likely to occur annually) will result in accumulation totals between one to three inches. Often these snow events are accompanied by high winds. It is reasonable to expect wind speeds of 25 to 35 mph with gusts reaching 50 mph or higher. Strong winds and low temperatures can combine to produce extreme wind chills of 10°F to 30°F below zero.

[95] National Weather Service. 2001. "Wind Chill Chart." http://www.nws.noaa.gov/om/cold/wind_chill.shtml.

Figure 51: Monthly Normal Snowfall in Inches (2006-2020)

Source: NCEI, 2024

Average Annual Damages

The average damage per event estimate was determined based upon NCEI Storm Events Database since 1996 and includes aggregated calculations for each of the six types of winter weather as provided in the database. This does not include losses from displacement, functional downtime, economic loss, injury, or loss of life. Severe winter storms have caused an average of $681,250 per year in property damage for the planning area.

Table 87: Severe Winter Storm Loss Estimate

Hazard Type	Number of Events[1]	Average Events Per Year[1]	Total Property Loss[1]	Average Annual Property Loss [1]	Total Crop Loss[2]	Average Annual Crop Loss [2]
Blizzard	18	0.6	$-	$-	$568,924	$23,706
Heavy Snow	9	0.3	$19,000,000	$678,571		
Ice Storm	6	0.2	$-	$-		
Winter Storm	95	3.4	$-	$-		
Winter Weather	39	1.4	$75,000	$2,679		
Severe Winter Storms	**167**	**6.0**	**$19,075,000**	**$681,250**	**$568,924**	**$23,706**

Source: 1 Indicates data is from NCEI (January 1996 to December 2018); 2 Indicates data is from USDA RMA (2000 to 2018)

Historical Probability and Future Likelihood

Based on the historical record and reported events, severe winter storms are likely to occur on an annual basis. The NCEI reported 167 severe winter storms between 1996 and 2023, with at least one hazard event occurring in each year resulting in a 100 percent chance annually for severe winter storms (Highly Likely).

Table 88: Historical Probability & Future Likelihood – Severe Winter Storms

Historical Probability	Climate Change Impact	Future Development Impact	Future Likelihood
100%	Uncertain	Neither Increase nor Decrease in Frequency. Increase Exposure	**Highly Likely**

FUTURE DEVELOPMENT

All future development will be affected by severe winter storms. Increased development or infrastructure in the planning area creates a higher probability of damage to occur from winter weather as more property is exposed to risk. The ability to withstand impacts lies in sound land use practices and consistent enforcement of codes and regulations for new construction.

CLIMATE CHANGE IMPACTS

For extreme events like severe winter storms "it is difficult to know what will happen to the frequency and intensity" of these events. However, winter storms will "continue to be a normal feature for Nebraska."[96] Some studies indicate that atmospheric circulation patterns in the Arctic could affect winter storms in midlatitude regions, and there may be a link between arctic warming and the frequency and intensity of severe winter storms in the United States..[97] Cold temperatures are likely to be impacted by climate change. The table below shows the number of freezing days in three-county region with different warming scenarios.

Table 89: Number of Freezing Days

	Warming Scenarios			
	1° C	1.5° C	2° C	3° C
Number of Freezing Days	31-90 Days per Year Avg. 38	31-90 Days per Year Avg. 32	8-30 Days per Year Avg. 29	8-30 Days per Year Avg. 23

Source: Probable Futures[98]

COMMUNITY TOP HAZARD STATUS

The following jurisdictions identified Severe Winter Storms as a top hazard of concern:

- Cass County
- Conestoga Public Schools
- Elmwood, Village of
- Manley, Village of
- Murdock, Village of
- Murray, Village of
- Plattsmouth, City of
- South Bend, Village of
- Weeping Water, City of
- Lancaster County
- Davey, Village of
- Lincoln, City of
- Panama, Village of
- Ceresco, Village of
- Lincoln Public Schools
- Norris Public Schools
- Raymond Central Public Schools
- Weeping Water Public Schools

REGIONAL VULNERABILITIES

The following table provides information related to regional vulnerabilities; for jurisdictional-specific vulnerabilities, refer to *Section Seven: Community Profiles*.

[96] University of Nebraska-Lincoln. 2014. "Understanding and Assessing Climate Change: Implications for Nebraska". http://snr.unl.edu/download/research/projects/climateimpacts/2014ClimateChange.pdf.

[97] Fourth National Climate Assessment. 2018. "Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II: Chapter 2". https://nca2018.globalchange.gov/chapter/2/.

[98] Probable Futures. "Maps of Temperature". Accessed December 2024. https://probablefutures.org/ .

Table 90: Regional Severe Winter Storm Vulnerabilities

SECTOR	VULNERABILITY
PEOPLE	-Elderly citizens are at higher risk to injury or death, especially during extreme cold and heavy snow accumulations -Citizens without adequate heat and shelter at higher risk of injury or death
ECONOMIC	-Closed roads and power outages can cripple a region for days, leading to significant revenue loss and loss of income for workers
BUILT ENVIRONMENT	-Heavy snow loads can cause roofs to collapse -Significant tree damage possible, downing power lines and blocking roads
INFRASTRUCTURE	-Heavy snow and ice accumulation can lead to downed power lines and prolonged power outages -Transportation may be difficult or impossible during blizzards, heavy snow, and ice events
CRITICAL FACILITIES	-Emergency response and recovery operations, communications, water treatment plants, and others are at risk to power outages, impassable roads, and other damages
CLIMATE	-Changes in seasonal precipitation and temperature normals can increase frequency and magnitude of severe storm events

TERRORISM

According to the Federal Bureau of Investigation (FBI), there is no single, universally accepted definition of terrorism. Terrorism is defined in the Code of Federal Regulations as "the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof in furtherance of political or social objectives" (28 C.F.R. Section 0.85).

The FBI further describes terrorism as either domestic or international, depending on the origin, base, and objectives of the terrorist organization. For the purpose of this report, the following definitions from the FBI will be used:

- Domestic terrorism is the unlawful use, or threatened use, of force or violence by a group or individual based and operating entirely within the United States or Puerto Rico without foreign direction committed against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof in furtherance of political or social objectives.

- International terrorism involves violent acts or acts dangerous to human life that are a violation of the criminal laws of the United States or any state, or that would be a criminal violation if committed within the jurisdiction of the United States or any state. These acts appear to be intended to intimidate or coerce a civilian population, influence the policy of a government by intimidation or coercion, or affect the conduct of a government by assassination or kidnapping. International terrorist acts occur outside the United States or transcend national boundaries in terms of the means by which they are accomplished, the persons they appear intended to coerce or intimidate, or the locale in which their perpetrators operate or seek asylum.

There are different types of terrorism depending on the target of attack, which are

- Political terrorism
- Bio-terrorism
- Cyber-terrorism
- Eco-terrorism
- Nuclear-terrorism
- Narco-terrorism
- Agro-terrorism

Terrorist activities are also classified based on motivation behind the event (such as ideology: i.e. religious fundamentalism, national separatist movements, and social revolutionary movements). Terrorism can also be random with no ties to ideological reasoning.

The FBI also provides clear definitions of a terrorist incident and prevention:

- A terrorist *incident* is a violent act or an act dangerous to human life, in violation of the criminal laws of the United States, or of any state, to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives.

- Terrorism *prevention* is a documented instance in which a violent act by a known or suspected terrorist group or individual with the means and a proven propensity for violence is successfully interdicted through investigative activity.

Primarily, threat assessment, mitigation, and response to terrorism are federal and state directives and work in conjunction with local law enforcement.

Note: The FBI investigates terrorism-related matters without regard to race, religion, national origin, or gender. Reference to individual members of any political, ethnic, or religious group in this report is not meant to imply that all members of that group are terrorists. Terrorists represent a small criminal minority in any larger social context.

LOCATION

Terrorist activities could occur throughout the entire planning area. Concerns are primarily related to agro-terrorism, tampering with water supplies, or potential violence on school campuses.

HISTORICAL OCCURRENCES

Previous accounts of terrorism in the planning area were gathered from the Global Terrorism Database, maintained by the University of Maryland and the National Consortium for the Study of Terrorism and Responses to Terrorism (START). This database contains information for over 140,000 terrorist attacks. According to this database, there have been two terrorist incidents in the planning area between 1970 - 2018..[99]

Table 91: Terrorism Occurrences

Year	Location	Injuries	Deaths	Property Damage	Description[1]
1979	Lincoln	0	0	Unknown	Bombing/Explosion
2016	Lincoln	0	0	Minor (likely <$1 million)	Assailants set fire to the Belmont Baptist Church in Lincoln, Nebraska, United States. There were no reported casualties. This was one of two arson attacks targeting the church on this date. No group claimed responsibility for the incident.

Source: Global Terrorism Database, 1970 - 2018

EXTENT

Terrorist attacks can vary greatly in scale and magnitude, depending on the location of the attack.

AVERAGE ANNUAL DAMAGES

The average damage per event estimate was determined based upon the START Global Terrorism Database information since 1970. This does not include losses from displacement, functional downtime, or economic loss. If a terrorist event were to occur damages would likely be minor (<$1 million).

HISTORICAL PROBABILITY AND FUTURE LIKELIHOOD

Given two incidences over the available period of record, the annual probability for terrorism in the planning area has a less than 1 percent chance of occurring during any given year. This does not indicate that a terrorist event will never occur within the planning area, only that the likelihood of such an event is incredibly low (Unlikely).

Table 92: Historical Probability & Future Likelihood – Terrorism & Civil Disobedience

Historical Probability	Climate Change Impact	Future Development Impact	Future Likelihood
>1%	Neither Increase nor Decrease in Frequency	Neither Increase nor Decrease in Frequency. Increase Exposure	Unlikely

FUTURE DEVELOPMENT

Future community development should promote transparent and accountable governance, allowing residents to have a say in decisions that affect their lives. Investing in public infrastructure, healthcare, and social services can further enhance community well-being. Best practices for future development will reduce the likelihood of unrest, such as prioritizing inclusivity, economic opportunity, and social stability. Communities in the planning area may focus on access to quality education, job opportunities, and affordable housing to reduce the sense of disenfranchisement that often fuels civil unrest. The largest

[99] National Consortium for the Study of Terrorism and Responses to Terrorism (START). 2016. Global Terrorism Database [Data file]. Retrieved from https://www.start.umd.edu/gtd.

concern for future development and increasing risk of terrorism events exists for growing school districts and water districts.

Climate Change Impacts

Climate change and terrorism or civil disobedience can be indirectly related. The impacts of climate change are likely to exacerbates the risk of hazard events such as drought, extreme heat, or extreme storms. Impacts from hazards including water insecurity, rising costs of insurance, declining mental health, and storm-induced stress will increase the prevalence of civil unrest. These conditions can strain critical resources such as water and food, disrupt livelihoods, and lead to social unrest in vulnerable regions. In some cases, unrest can create fertile ground for extremist ideologies and recruitment efforts, potentially contributing to terrorism.

Community Top Hazard Status

The following jurisdictions identified Terrorism as a top hazard of concern.

- Conestoga Public Schools
- Raymond Central Public Schools
- Weeping Water Public Schools
- Eagle, Village of

Regional Vulnerabilities

The following table provides information related to regional vulnerabilities; for jurisdictional-specific vulnerabilities, refer to *Section Seven: Community Profiles.*

Table 93: Regional Terrorism Vulnerabilities

SECTOR	VULNERABILITY
PEOPLE	-Police officers and first responders at risk of injury or death
ECONOMIC	-Damaged business can cause loss of revenue and loss of income for workers -Agricultural attacks could cause significant economic losses for the region
BUILT ENVIRONMENT	-Targeted buildings may sustain heavy damage
INFRASTRUCTURE	-Water supply, power plants, utilities all at risk of damage
CRITICAL FACILITIES	-Police stations and governmental offices are at higher risk
CLIMATE	-Activism pertaining to climate can place first responders and residents at risk

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SECTION FIVE
MITIGATION STRATEGY

INTRODUCTION

The primary focus of the mitigation strategy is to identify action items to reduce the effects and impacts from the identified top hazards of concern per community. These action items should help reduce impacts on existing infrastructure and property in a cost effective and technically feasible manner. Mitigation strategy development is also based upon the established Goals and Objectives as determined by the Planning Team at the Kick-off meeting.

At the Kick-off Meeting the Planning Team reviewed the goals from the 2020 HMP and discussed recommended additions and modifications. The intent of each goal and set of objectives is to develop strategies to account for risks associated with hazards and identify ways to reduce or eliminate those risks. Each goal and set of objectives is followed by 'mitigation alternatives,' or actions.

Requirement §201.6(c)(3)(i): [The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

Requirement §201.6(c)(3)(ii): [The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

Requirement: §201.6(c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.

Requirement: §201.6(c)(3)(iii): [The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

Requirement §201.6(c)(3)(iv): For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.

GOALS

Below is the list of goals and objectives as determined by the Planning Team. These goals and objectives provided specific direction to guide participants in reducing future hazard related losses and in their selection of mitigation actions.

- **Goal 1: Protect Health and Safety of the General Public**
  - *Objective 1.1: Reduce or prevent damage to property or prevent loss of life or serious injury (overall intent of the plan).*
- **Goal 2: Reduce Future Losses from Hazard Events**
  - *Objective 2.1: Provide protection for existing structures, future development, community lifelines, services, utilities, and the natural environment to the greatest extent possible.*
  - *Objective 2.2: Develop hazard specific plans and conduct studies or assessments to identify opportunities for mitigation from hazards to minimize their impacts.*
  - *Objective 2.3: Minimize and control the impact of hazard events through enacting or updating ordinances, permits, laws, or regulations.*
- **Goal 3: Increase Public Awareness and Education Regarding Vulnerability to Hazards**
  - *Objective 3.1 Develop and provide information to the general public about their risk and vulnerability to hazard types and impacts, what they can do to be better prepared, and what their communities are doing to protect against these risks.*
  - *Objective 3.2: Identify and foster relationships with local organizations and stakeholders to leverage capabilities, resources, and build awareness to hazards.*
- **Goal 4: Improve Emergency Management Capabilities**
  - *Objective 4.1: Develop or improve Emergency Response Plan, procedures, and personnel abilities.*
  - *Objective 4.2: Develop or improve Evacuation Plan and procedures.*
  - *Objective 4.3: Improve warning systems and ability to communicate with the public before, during, and after a significant hazard event.*
- **Goal 5: Enhance Overall Resilience and Promote Sustainability**

- *Objective 5.1: Incorporate hazard mitigation and adaptation into updating other existing planning endeavors (e.g., comprehensive plans, zoning ordinance, subdivision regulation, etc.)*
- *Objective 5.2: Expand and incorporate hazard mitigation planning process across other preparedness, response, and recovery planning efforts.*

MITIGATION ALTERNATIVES (ACTION ITEMS)

Local planning teams evaluated, prioritized, and identified mitigation actions with the guidance of established goals and through an in-depth discussion of local capabilities and relevance. Actions included in the plan include both the mitigation actions identified by participating jurisdictions in the previous plan and new mitigation actions identified per hazard of top concern during the planning process. Participants were encouraged to think of actions that may need FEMA grant assistance and to review their hazard prioritization section for potential mitigation actions. These suggestions helped participants determine which actions would best assist their respective jurisdiction in alleviating damage in the event of a disaster.

The local planning teams were instructed that each hazard of top concern must have an action that addresses it. Mitigation actions must be specific activities that are concise and can be implemented individually; however, other capability and resilience building activities may also be included in the plan even if they do not specifically address a mitigation need.

During the update of previous identified actions and the identification of new actions, each local planning team prioritized each identified mitigation action as high, medium, or low. A strategy presented to assist participants in prioritizing actions was the STAPLEE (Social, Technical, Administrative, Political, Legal, Economic, Environmental) feasibility review. Jurisdictions were also highly encouraged and led through a process to determine individual responsibility for mitigation actions, such as for infrastructure at risk to determine if outside partnerships would be necessary for implementation.

The listed priority rating does not indicate which actions will be implemented first. Generally, high priority actions either address a major concern for the jurisdiction, have few to no challenges in implementation, and/or garner large support from the public and administration. Low priority actions either address a minor concern for the jurisdiction, have many challenges in implementation, and/or may not have support from the public or administration at this time. Medium priority actions may only have one or two of the items listed above. A mitigation action's priority may change very quickly as circumstances change.

It is also important to note that not all the mitigation actions identified by a jurisdiction may ultimately be implemented due to limited capabilities, prohibitive costs, low benefit-cost ratio, or other concerns. These factors may not be identified during this planning process. Participants have not committed to undertaking identified mitigation actions in the plan. The cost estimates, priority ranking, potential funding, and identified agencies are used to give communities an idea of what actions may be the most feasible over the next five years. This information will serve as a guide for the participants to assist in hazard mitigation for the future. Additionally, some jurisdictions may identify and pursue additional mitigation actions not identified in this HMP. Such actions should be discussed and noted in the HMP during the annual plan maintenance process.

Finally, not all mitigation actions may be eligible for funding through the Hazard Mitigation Assistance programs (HMGP, BRIC, or FMA). It is important to note that not all identified mitigation actions are solely for mitigation but may also address response or recovery activities. These mitigation actions are also a way for communities to address local vulnerabilities in response and recovery capabilities. Many of these types of projects are ineligible for HMA funding. Ineligibility for these grant programs should not preclude a community from identifying or pursuing such an action or project. Numerous funding sources have been identified across the state and planning area to assist jurisdictions fund projects. All mitigation strategies aimed at reducing risk to natural or human-caused hazards should be identified and discussed in the HMP.

PARTICIPANT MITIGATION ALTERNATIVES

Mitigation alternatives identified by participants of the Lower Platte South NRD HMP are found in the Mitigation Alternative Project Matrix below. Additional information about selected actions can be found in

Section Seven: Community Profiles. Each action includes the following information in the respective community profile:

- Mitigation Action – general title of the action item
- Description – brief summary of what the action item(s) will accomplish
- Hazard(s) Addressed – which hazard the mitigation action aims to address
- Estimated Cost – a general cost estimate for implementing the mitigation action for the appropriate jurisdiction
- Potential funding – a list of any potential funding mechanisms to fund the action
- Timeline – a general timeline as established by planning participants
- Priority –a general description of the importance and workability in which an action may be implemented (high/medium/low); priority may vary between each community, mostly dependent on funding capabilities and the size of the local tax base
- Lead agency – listing of agencies or departments which may lead or oversee the implementation of the action item
- Status – a description of what has been done, if anything, to implement the action item

Implementation of the actions will vary between individual plan participants based upon the availability of existing information; funding opportunities and limitations; and administrative capabilities of communities. Establishment of a cost-benefit analysis is beyond the scope of this plan and could potentially be completed prior to submittal of a project grant application or as part of a five-year update. Completed, removed, and ongoing or new mitigation alternatives for each participating jurisdiction can be found in *Section Seven: Community Profiles.*

Table 94: Mitigation Alternatives Selected by Each Jurisdiction – Cass County

Mitigation Actions	Cass County	Alvo	Avoca	Cedar Creek	Eagle	Elmwood	Greenwood	Louisville	Manley	Murdock	Murray	Nehawka	Plattsmouth	South Bend	Union	Weeping Water
Acquire Identification Resources						x										
Alert Siren															x	
Alternate Water Sources								x								
Anchor Fertilizer, Fuel, and Propane Tanks				x												
Backup Generator			x			x		x	x				x	x	x	
Backup Municipal Records		x		x	x								x			
Bury Main Power Lines							x									
Civil Service Improvements		x		x	x											
Complete Citywide Flood Project Master Plan				x												
Comprehensive Disaster/Emergency Response Plan		x														
Continuity Planning	x	x			x		x				x					x
Designate Snow Routes										x						
Develop Automated Messages for Evacuation						x										
Emergency Fuel Supply Plan		x														
Evacuation Planning											x					
Hazard Education	x								x					x		
Hazard Risk Reduction- LPSNRD and DNR Collaborative Dam Improvements	x												x			
Hazardous Tree Removal						x				x		x				
Improve Construction Standards and Building Survivability							x									
Improve Emergency Communication				x												
Improve Water Supply and Redundancies			x													

Mitigation Actions	Cass County	Alvo	Avoca	Cedar Creek	Eagle	Elmwood	Greenwood	Louisville	Manley	Murdock	Murray	Nehawka	Plattsmouth	South Bend	Union	Weeping Water
Improve/Provide Facilities for Vulnerable Populations		x														
Infrastructure Assessment Study				x												
Infrastructure Hardening					x											
Investigate New Sources of Water	x															
Join the Community Rating System																x
New Fire Station				x												
Obtain Tree City Designation														x		
Participate in the Community Rating System	x							x								
Power and Service Lines				x												
Prepare Sample Water Conservation Ordinances	x															
Preserve Natural and Beneficial Functions	x															x
Promote Use of Higher Codes and Standards										x						x
Property Acquisition, Elevation or Floodproofing	x												x	x		
Provide Short Term Residency Shelters		x														
Public Education											x					
Relocate Water Treatment Plant													x			
Safe Rooms				x												
Sanitary Sewer Improvements												x				
Shelter-in-Place Training													x			
Siren Upgrades								x								
Snow Fences									x							
Storm Shelter Identification					x											
Storm Shelters	x						x	x			x					

Mitigation Actions	Cass County	Alvo	Avoca	Cedar Creek	Eagle	Elmwood	Greenwood	Louisville	Manley	Murdock	Murray	Nehawka	Plattsmouth	South Bend	Union	Weeping Water
Stormwater System and Drainage Improvements	x				x			x		x						x
Transportation Route				x												
Tree Planting						x										
Update Comprehensive Plan				x												
Urban Drainage Study													x			
Utilize Low-Impact Development and Green Infrastructure	x															
Vehicular Barriers	x						x				x					
Vulnerable Population Assistance Database					x											x
Water Distribution Line													x			
Water System Improvements							x								x	
Water Treatment Plant Improvements						x										
Weather Radios										x						
Well Improvements										x						
Windbreaks									x							

Table 95: Mitigation Alternatives Selected by Each Jurisdiction – Lancaster County

Mitigation Actions	Lancaster County	Bennet	Davey	Denton	Firth	Hallam	Hickman	Malcolm	Panama	Raymond	Roca	Sprague	Waverly
Alert Sirens	x												
Automated Telephone Dialer									x				
Backup Generators	x		x				x		x		x	x	x
Bury Main Power Lines			x	x						x			
Complete City-wide Flood Project Master Plan		x											

Mitigation Actions	Lancaster County	Bennet	Davey	Denton	Firth	Hallam	Hickman	Malcolm	Panama	Raymond	Roca	Sprague	Waverly
Comprehensive Village Disaster/Emergency Response Plan					x								
Continuity Planning	x							x	x				
Develop Dam Failure Emergency Action and Evacuation Plans													x
Educate Local Businesses about Continuity Planning									x				
Educate Public and Businesses on Flood Mitigation Projects		x											
Elevate Infrastructure							x						
Emergency Action Plan											x		
Emergency Exercise: Dam Failure							x						
Emergency Exercise: Hazardous Material Spill							x						
Emergency Operations Center	x												
Evacuation Planning					x	x			x				x
Evaluate/Elevate Lift Station										x			
Hail Resistant Roofing	x												
Hazard Education	x												
Hazard Risk Reductio-LPSNRD and DNR Collaborative Dam Improvements	x												
Hazardous Tree Inventory													x
Hazardous Tree Removal			x							x			
Improve Water Supply												x	
Install Weather Station	x												
Investigate New Sources of Water		x											
Join Community Rating System		x											
Lagoon Expansion and Elevation				x									
New Fire Hall													x

Mitigation Actions	Lancaster County	Bennet	Davey	Denton	Firth	Hallam	Hickman	Malcolm	Panama	Raymond	Roca	Sprague	Waverly
Obtain Tree City USA Designation						x							
Preserve Natural and Beneficial Functions	x	x						x					x
Promote Use of High Codes and Standards		x	x					x					
Public Education				x		x		x	x			x	x
Rural Drainage Study	x												
Shelter in Place Training		x											x
Source Water Contingency Plan							x						
Storage Facility							x						
Storm Shelter	x			x		x	x		x		x		x
Stormwater System and Drainage Improvements	x	x			x				x		x	x	x
Stream Stabilization	x												
Surge Protectors			x										
Update Comprehensive Plan									x				
Update Drought Ordinance					x								
Utilize Low Impact Development and Green Infrastructure	x												
Vulnerable Population Assistance Database	x								x				

Table 96: Mitigation Alternatives Selected by Each Jurisdiction – Special Districts

Mitigation Actions	LPSNRD	Brainard	Ashland	Ceresco	Valparaiso	Cass County RWD #1	Conestoga Public Schools	Lincoln Public Schools	Norris Public School District	Raymond Central Public Schools	Weeping Water Public Schools
Alert Sirens		x					x				
Backup Generators			x	x			x	x		x	x

Mitigation Actions	LPSNRD	Brainard	Ashland	Ceresco	Valparaiso	Cass County RWD #1	Conestoga Public Schools	Lincoln Public Schools	Norris Public School District	Raymond Central Public Schools	Weeping Water Public Schools
Backup Municipal Records				x							
Backup Power		x									
City Wide Master Plan			x								
Constructing an Academic, Activity, and Athletic Facility										x	
Continue & Expand Water Conservation Awareness Programs, such as pamphlets	x										
Continuity Planning						x	x				
Dead Mans Run Flood Reduction Project	x										
Drought Education		x									
Drought Feasibility Study	x										
Drought Response Plan and Drought Contingency Plan	x										
Early Warning Systems											x
Education Program for Chemical Releases				x							
Elevate Infrastructure						x					
Emergency Action Plans and Exercises	x										
Emergency Exercise: Hazardous Spill				x							
Evacuation Planning			x								
Facilities Analysis/Assessment									x		
Green Mitigation	x										
Hail Resistant Roofing								x	x		
Hazard Education	x							x			x
Hazard Risk Reduction- DNR Collaborative Dam Improvements	x										
Hazardous Tree Inventory					x						
Hazardous Tree Removal	x			x							
Improve Construction Standards and Building Survivability					x						
Improve Security Measures											x

Mitigation Actions	LPSNRD	Brainard	Ashland	Ceresco	Valparaiso	Cass County RWD #1	Conestoga Public Schools	Lincoln Public Schools	Norris Public School District	Raymond Central Public Schools	Weeping Water Public Schools
Increase Fence Post Gauge								x			
Infrastructure Hardening	x										
Integrated Water Management Plan (IMP)	x										
Lift Station Improvements					x						
Lightning Rods								x			x
New Secondary Entrance/Exit										x	
Preserve Floodplain	x										
Promote Use of Higher Codes and Standards			x								
Property Acquisition, Elevation or Floodproofing	x										
Public Education		x					x				
Safety Action Plan									x		
Shelter-in-Place Training			x		x						
Staff Safety Training									x		
Storm Shelters	x	x					x				
Stormwater System and Drainage Improvements			x								
Surge Protectors				x							
Update Emergency Operations Plan/Continuity of Operations Plan										x	
Utilize Low-Impact Development and Green Infrastructure			x								
Vehicular Barriers				x			x				
Vulnerable Population Assistance Database					x						
Water Conservation Awareness						x					
Wellfield Improvements			x								

SECTION SIX: PLAN IMPLEMENTATION AND MAINTENANCE

MONITORING, EVALUATING, AND UPDATING THE PLAN

Participants of the LPSNRD HMP will be responsible for monitoring (annually at a minimum), evaluating, and updating the plan during its five-year lifespan. Hazard mitigation projects will be prioritized by each participant's governing body and/or local planning team with support and suggestions from the public, business owners, and stakeholders. Unless otherwise specified by each participant's governing body, the governing body will be responsible for implementation of the recommended projects. The responsible party for the various implementation actions will report on the status of all projects and include which implementation processes worked well, any difficulties encountered, how coordination efforts are proceeding, and which strategies could be revised.

Requirement §201.6(c)(4)(i): [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

Requirement §201.6(c)(4)(ii): [The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

Requirement §201.6(c)(4)(iii): [The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.

PLAN UPDATE AND MAINTENANCE

FEMA requires a full update of this plan at least every five years, to prevent the risk of the HMP expiring. Updates may be incorporated more frequently, especially in the event of a major hazard. The Lower Platte South NRD who serves as the project sponsor will begin discussion of plan update at least 12 months prior to the deadline for completing the plan update. Some questions to consider when evaluating the plan for updates or when developing a scope for future plan updates may include:

- Do the goals and objectives address current and expected conditions?
- If any of the recommended projects have been completed, did they have the desired impact on the goal for which they were identified? If not, what was the reason it was not successful (lack of funds/resources, lack of political/popular support, underestimation of the amount of time needed, etc.)?
- Have either the nature, magnitude, and/or type of risks changed?
- Are there implementation problems?
- Are there public engagement barriers identified to be addressed in future plan updates?
- Are current resources appropriate to implement the plan?
- Did the plan partners participate as originally planned?
- Are there other agencies or stakeholders which should be included in the revision process?

At the discretion of each governing body, updates may be incorporated more frequently, especially in the event of a major hazard. The governing body will start meeting to discuss mitigation updates at least six months prior to the deadline for completing the plan review. The persons overseeing the evaluation process will review the goals and objectives of the previous plan and evaluate them to determine whether they are still pertinent and current. In addition, the governing body will be responsible for ensuring that the HMP's goals are incorporated into applicable revisions of each participant's comprehensive plan and any new planning projects undertaken by the participant. The HMP will also consider any changes in comprehensive plans, and incorporate the information accordingly in its next update.

CONTINUED PUBLIC INVOLVEMENT

To ensure continued plan support and input from the public and business owners, public involvement will remain a top priority for each participant. Notices for public meetings involving discussion of an action on mitigation updates will be published and posted in the following locations a minimum of two weeks in advance:

- Public spaces around the jurisdiction
- City/Village Hall
- Websites
- Local radio stations
- Local newspapers
- Regionally-distributed newspaper

Further discussion on plan maintenance and engagement strategies are outlined in applicable jurisdictional profiles.

UNFORESEEN OPPORTUNITIES

If new, innovative mitigation strategies arise that could impact the planning area or elements of this plan, which are determined to be of importance, a plan amendment may be proposed and considered separate from the annual review and other proposed plan amendments. The LPSNRD will compile a list of proposed amendments received annually and prepare a report for NEMA, by providing applicable information for each proposal, and recommend action on the proposed amendments.

PLAN AMENDMENTS

If new, innovative mitigation strategies arise that could impact the planning area or elements of this plan, which are determined to be of importance, a plan amendment may be proposed and considered separate from the annual review and other proposed plan amendments. The applicable jurisdictions' Planning Team will compile a list of proposed amendments received annually and prepare a report for NEMA, who will file it with FEMA. Re-adoption of the plan would not be needed until the normal five-year update. Such amendments should include all applicable information for each proposed action, including description of changes, identified funding, responsible agencies, etc. For an amendment template, see Appendix C.

INCORPORATION INTO EXISTING PLANNING MECHANISMS

The Planning Team utilized a variety of plan integration tools to help communities determine how their existing planning mechanisms were related to the Hazard Mitigation Plan. According to FEMA's Local Mitigation Planning Policy Guide (2021) and the Local Mitigation Planning Policy Guide (2023), incorporation of planning mechanisms means to reference or include information from other existing sources to form the content of the mitigation plan. Local communities utilized FEMA's *Integrating the Local Natural Hazard Mitigation Plan into a Community's Comprehensive Plan*[100] guidance, FEMA's *2015 Plan Integration*[101] guide, as well as the *Comprehensive Economic Development Strategy and Hazard Mitigation Plan Alignment Guide*[102] to identify plans or documents in which plan integration could take place. During the planning process, specific questions which highlighted hazard mitigation principles from various types of planning mechanisms were discussed. This process offered an easy way for participants to notify the Planning Team of existing planning mechanisms and if they interface with the Hazard Mitigation Plan.

Summaries of plan integration are found in each participant's individual profile. For these communities that lack existing planning mechanisms, especially smaller villages, the Hazard Mitigation Plan may be used as a guide for future activity and development in the community. Each local review team will be responsible for ensuring that the HMP's goals are incorporated into applicable revisions of each participant's relevant planning documents. The current HMP should be reviewed for including during any available document's next update period or development.

[100] Federal Emergency Management Agency. November 2013. "FEMA Region X Integrating the Local Natural Hazard Mitigation Plan into a Community's Comprehensive Plan." https://www.fema.gov/media-library-data/20130726-1908-25045-0016/integrating_hazmit.pdf.

[101] Federal Emergency Management Agency. July 2015. "Plan Integration: Linking Local Planning Efforts." https://www.fema.gov/media-librarydata/1440522008134-ddb097cc285bf741986b48fdcef31c6e/R3_Plan_Integration_0812_508.pdf.

[102] Federal Emergency Management Agency. September 2022. "Comprehensive Economic Development Strategy and Hazard Mitigation Plan Alignment Guide." https://www.fema.gov/sites/default/files/documents/fema_ceds-hmp-alignment-guide_2022.pdf.

SECTION SEVEN: COMMUNITY PROFILES

PURPOSE OF COMMUNITY PROFILES

Community Profiles contain information specific to jurisdictions participating in the LPSNRD planning effort. Community Profiles were developed with the intention of highlighting each jurisdiction's unique characteristics that affect its risk to hazards. Community Profiles may serve as a short reference of identified vulnerabilities and mitigation actions for a jurisdiction as they implement the mitigation plan. Information from individual communities was collected at public and one-on-one meetings and used to establish the plan. Community Profiles may include the following elements:

- Local Planning Team
- Location/Geography
- Demographics
- Capabilities
- Plans and Studies
- Future Development Trends
- Parcel Improvements and Valuations
- NFIP Involvements
- Community Lifelines
- Hazard Prioritization
- Mitigation Strategy

In addition, maps specific to each jurisdiction are included such as: jurisdiction identified critical facilities; flood prone areas; and a future land use map (when available). The hazard prioritization information, as provided by individual participants, in *Section Seven: Community Profiles* varies due in large part to the extent of the geographical area, the jurisdiction's designated representatives (who were responsible for completing meeting worksheets), identification of hazards, and occurrence and risk of each hazard type.

The overall risk assessment for the identified hazard types represents the presence and vulnerability to each hazard type throughout the entire planning area. A discussion of certain hazards selected for each Community Profile was prioritized by the local planning team based on the identification of hazards of greatest concern, hazard history, and the jurisdiction's capabilities. Some communities have omitted specific hazards if those hazards would not impact the community. Prioritized and omitted hazards for each community can be found in the table below. The hazards not examined in depth for each community profile can be found in *Section Four: Risk Assessment.*

Table 97: Prioritized and Omitted Hazards

Jurisdiction	Ag Disease – Plant / Animal	Dam Failure	Drought	Extreme Temperatures	Flooding	Grass or Wildfire	Hazardous Materials	High Winds &Tornadoes	Levee Failure	Severe Thunderstorms	Severe Winter Storms	Terrorism
Lower Platte South NRD		P	P		P				P	P		
Cass County			P		P		P	P		P	P	
Alvo		O					P	P	O			
Avoca		O			P				O	P		
Cedar Creek					P		P	P		P		
Eagle					P		P	P		P		P

Jurisdiction	Ag Disease – Plant / Animal	Dam Failure	Drought	Extreme Temperatures	Flooding	Grass or Wildfire	Hazardous Materials	High Winds &Tornadoes	Levee Failure	Severe Thunderstorms	Severe Winter Storms	Terrorism
Elmwood		O					P	P	O	P	P	
Greenwood							P	P		P		
Louisville					P			P	O	P		
Manley							P	P			P	
Murdock		O	P				P	P	O	P	P	
Murray							P	P			P	
Nehawka		O			P			P	O			
Plattsmouth					P		P			P	P	
South Bend		O			P						P	
Union		O	P					P	O	P		
Weeping Water					P					P	P	
Lancaster County				P	P			P		P	P	
Bennet			P		P		P	P		P		
Davey								P		P	P	
Denton					P		P	P		P		
Firth			P		P		P	P				
Hallam			P			P	P	P				
Hickman		P	P		P		P	P				
Lincoln	P	P			P		P	P	P	P	P	
Malcolm			P		P							
Panama								P		P	P	
Raymond					P			P		P		
Roca					P		P	P		P		
Sprague			P					P	O	P		
Waverly		P			P		P	P		P		
Brainard		O							O	P		
Ashland			P		P			P	P			
Ceresco		O					P	P	O	P	P	
Valparaiso		O			P		P		O			
Cass County Rural Water District #1			P		P							
Conestoga Public Schools							P	P		P	P	P
Lincoln Public Schools							P	P		P	P	
Norris School District					P			P	O	P	P	

Jurisdiction	Ag Disease – Plant / Animal	Dam Failure	Drought	Extreme Temperatures	Flooding	Grass or Wildfire	Hazardous Materials	High Winds &Tornadoes	Levee Failure	Severe Thunderstorms	Severe Winter Storms	Terrorism
Raymond Central Public Schools						P		P	O	P	P	P
Weeping Water Public Schools		O						P	O	P	P	P

Note: "P" signifies Prioritized Hazard and "O" signifies Omitted Hazard.

Community Profile

City of Waverly

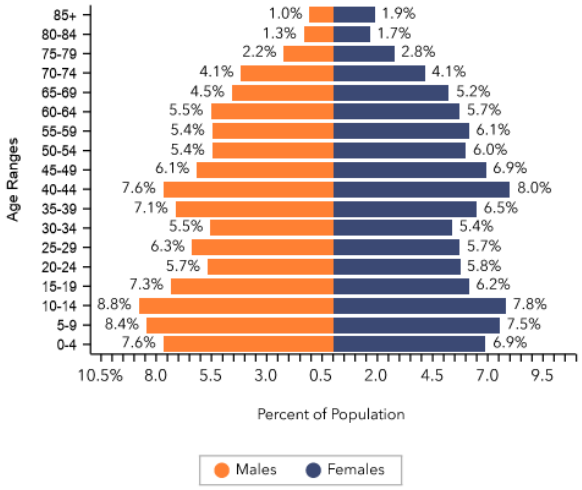
Lower Platte South NRD
Hazard Mitigation Plan 2025

Community Summary Fact Sheet

Waverly City, NE
Lower Platte South NRD Hazard Mitigation Plan 2025

4,560	36.9	$95,830	$249,758	1.0%	3%
Population	Median Age	Median Household Income	Median Home Value	Unemployment Rate	Households Below the Poverty Level

AGE PYRAMID



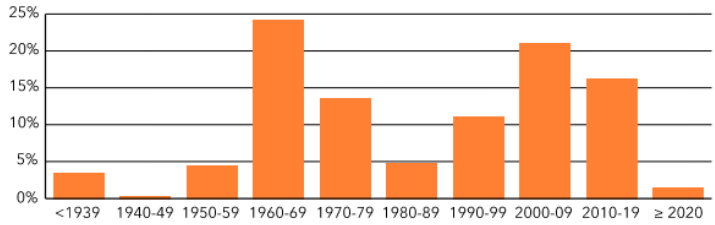
TOTAL POPULATION

2023 Total Population (Estimate)	4,560
2020 Total Population (U.S. Census)	4,279
2010 Total Population (U.S. Census)	3,279
2000 Total Population (U.S. Census)	2,453

AT RISK POPULATION

246	657	55
Households With Disability	Population 65+	Households Without Vehicle

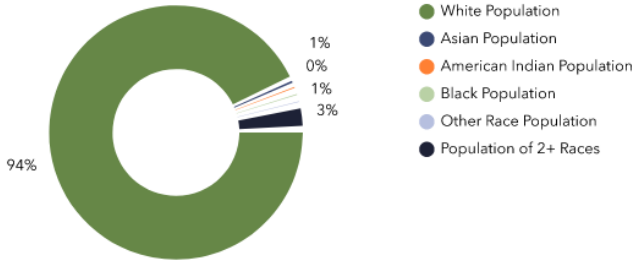
HOUSING: YEAR BUILT



COMMUTER

0%	3%
Workers Who Took Public Transportation	90+ Minute Commute

POPULATION BY RACE



HOUSING

1%	19%	0%
Vacant Housing Units	Renter Households	Mobile Homes

esri THE SCIENCE OF WHERE

Source: Esri, U.S. Census, ACS. Esri forecasts for 2023, 2020, 2010, 2000, 2017-2021, 2028.

Local Planning Team

Local Planning Team

Name	Title	Jurisdiction	Engagement
Robin Hoffman	Emergency Services Coordinator	City of Waverly	Plan Development
Stephanie Fisher	City Administrator	City of Waverly	Plan Development, Attended Meetings
Tracey Whyman	Public Works Director	City of Waverly	Plan Development
Mike Palm	Building Inspector/Zoning Administrator	City of Waverly	Plan Development

Plan Maintenance

Hazard Mitigation Plans should be living documents and updated regularly to reflect changes in hazard events, priorities, and mitigation actions. These updates are encouraged to occur after every major disaster event, alongside community planning documents (i.e. annual budgets and Capital Improvement Plans), during the fall before the HMA grant cycle begins, and/or prior to other funding opportunity cycles begin.

The City Administrator, Building Inspector, Emergency Services Coordinator, and Public Works Director will be responsible for reviewing and updating the community profile outside of the five-year update. The City of Waverly will review the plan annually and the public will be notified through website updates, CIP meetings, council meetings, and/or social media.

Location and Geography

The City of Waverly is in the northeast corner of Lancaster County, approximately 15 miles southwest of the Platte River and 12 miles northeast of downtown Lincoln. The City covers an area of 2.34 square miles. There is one major waterway near the town, the Salt Creek, which flows south-to-north on the northeast side of town.

Capability Assessment

The planning team assessed the City of Waverly's hazard mitigation capabilities by reviewing planning and regulatory capabilities, administrative and technical capabilities, fiscal capabilities, and education and outreach capabilities.

Capability Assessment

Capability/Planning Mechanism		Yes/No
Planning & Regulatory Capability	Comprehensive Plan	Yes
	Capital Improvements Plan	Yes
	Economic Development Plan	Yes
	Emergency Operations Plan	Yes
	Floodplain Management Plan	Yes
	Storm Water Management Plan	Yes
	Zoning Ordinance	Yes
	Subdivision Regulation/Ordinance	Yes
	Floodplain Ordinance	Yes

Capability/Planning Mechanism		Yes/No
	Building Codes	Yes
	Water System Emergency Response Plan	Yes
	Wellhead Protection Plan	Yes
	National Flood Insurance Program	Yes
	Community Rating System	Yes – Class 9
	Community Wildfire Protection Plan	Yes
	Other (if any)	
Administrative & Technical Capability	Planning Commission	Yes
	Floodplain Administrator	Yes
	GIS Capabilities	No
	Chief Building Official	Yes
	Civil Engineering	No
	Grant Manager	No
	Mutual Aid Agreement	Yes
	Other (if any)	
Fiscal Capability	1- & 6-Year Plan	Yes
	Applied for Grants in the Past	Yes
	Awarded a Grant in the Past	Yes
	Authority to Levy Taxes for Specific Purposes such as Mitigation Projects	Yes
	Gas/Electric Service Fees	No
	Storm Water Service Fees	No
	Water/Sewer Service Fees	Yes
	Development Impact Fees	No
	General Obligation Revenue or Special Tax Bonds	Yes
	Other (if any)	TIF, Franchise Fees, City Sales Tax, Property Taxes
Education & Outreach Capability	Local Citizen Groups or Non-Profit Organizations Focused on Environmental Protection, Emergency Preparedness, Access and Functional Needs Populations, etc.	Yes
	Ongoing Public Education or Information Program (e.g., Responsible Water Use, Fire Safety, Household Preparedness, Environmental Education)	No
	Natural Disaster or Safety Related School Programs	No
	StormReady Certification	No
	Firewise Communities Certification	No
	Tree City USA	Yes
	Other (if any)	

Waverly Overall Capability

Capability	2020 Plan	2025 Plan
Financial Resources to Implement Mitigation Projects	Moderate	Moderate
Staff/Expertise to Implement Projects	High	High
Public Support to Implement Projects	Moderate	Moderate
Time to Devote to Hazard Mitigation	Limited	Limited
Ability to Expand and Improve the Identified Capabilities to Achieve Mitigation	-	Moderate

National Flood Insurance Program (NFIP)

NFIP Overview	
Date of NFIP Participation:	04/15/1982 CRS (Class 9) – 10/01/2024
Floodplain Administrator:	Mike Palm
Is Floodplain Administrator a Certified Floodplain Manager?	No
Is Floodplain Management an Auxiliary Function?	Yes
Number of NFIP Policies In-Force:	16
Total NFIP Premium ($):	$12,190
Total NFIP Coverage ($):	$8,220,000
Number of Claims Paid Out:	6
Total Amount of Claims Paid Out ($:)	$98,081
Number of Repetitive Loss Structures:	0
Number of Severe Repetitive Loss Structures:	0
Is the Community Currently Suspended from the NFIP?	No
Any Outstanding Compliance Issues?	No
FIRMs Digital or Paper?	Both

The Floodplain Administrator enforces the floodplain regulations and ensures that development is compliant with the Salt Freek Valley Floodplain/Floodway Overlay District requirements. An additional permit is required for the construction of new or substantially improved structures in the floodplain. Information about the NFIP can be found on the City's website, along with information regarding community risks from flood events. Letters of Map Change can be found on the FEMA Map Service Center website.

Parcel Improvements and Valuation

The planning team requested GIS parcel data from the County Assessor as of December 2019. This data allowed the planning team to analyze the location, number, and value of property improvements at the parcel level. The data did not contain the number of structures on each parcel. A summary of the results of this analysis is provided in the following table. Several structures in Waverly have been removed from the floodplain via LOMA. A summary of LOMAs identified for Waverly can be found in the table below.

Parcel Value in the 100 Year Floodplain

Number of Parcels	Total Parcel Value	Number of Parcels in Floodplain	Value of Parcels in Floodplain	Percentage of Parcels in Floodplain
1,685	$549,444,700	140	$72,072,300	8.3%

Parcel Value in the 100 Year Floodplain

Number of Parcels	Total Parcel Value	Number of Parcels in Floodplain	Value of Parcels in Floodplain	Percentage of Parcels in Floodplain
1,685	$549,444,700	100	$29,338,300	5.9%

Source: County Assessor, 2024

Flood Map Products

Type of Product	Product ID	Effective Date	Details
FIRM Panel	31109CIND0B	04/16/2013	Current FIRM Panel
FIRM Panel	31109C0210G	04/16/2013	Current FIRM Panel
FIRM Panel	31109C0215G	04/16/2013	Current FIRM Panel
FIRM Panel	31109C0216F	02/18/2011	Current FIRM Panel
FIRM Panel	31109C0217G	04/16/2013	Current FIRM Panel
FIRM Panel	31109C0218G	04/16/2013	Current FIRM Panel
FIRM Panel	31109C0219G	04/16/2013	Current FIRM Panel
FIRM Panel	31109C0240G	04/16/2013	Current FIRM Panel
LOMA	11-07-0721A-310140	02/18/2011	Current LOMA
LOMA	11-07-1016A-310140	03/01/2011	Current LOMA
LOMA	11-07-1680A-310140	05/19/2011	Current LOMA
LOMA	11-07-1755A-310140	04/25/2011	Current LOMA
LOMA	11-07-1942A-310140	05/11/2011	Current LOMA
LOMA	11-07-2133A-310140	08/16/2011	Current LOMA
LOMA	11-07-2320A-310140	08/04/2011	Current LOMA
LOMA	11-07-2614A-310140	09/13/2011	Current LOMA
LOMA	11-07-2698A-310140	08/01/2011	Current LOMA
LOMA	11-07-2834A-310140	08/15/2011	Current LOMA
LOMA	11-07-2851A-310140	09/30/2011	Current LOMA
LOMA	11-07-2863A-310140	08/16/2011	Current LOMA
LOMA	11-07-2888A-310140	08/16/2011	Current LOMA
LOMA	12-07-0670A-310140	11/30/2011	Current LOMA
LOMA	12-07-1591A-310140	03/06/2012	Current LOMA
LOMA	12-07-1592A-310140	03/08/2012	Current LOMA
LOMA	12-07-1594A-310140	03/15/2012	Current LOMA
LOMA	12-07-1595A-310140	03/06/2012	Current LOMA
LOMA	12-07-1596A-310140	03/08/2012	Current LOMA
LOMA	12-07-1597A-310140	05/29/2012	Current LOMA
LOMA	12-07-1749A-310140	04/05/2012	Current LOMA
LOMA	12-07-2081A-310140	05/01/2012	Current LOMA
LOMA	12-07-2350A-310140	05/31/2012	Current LOMA
LOMA	12-07-2351A-310140	05/31/2012	Current LOMA
LOMA	12-07-2353A-310140	05/31/2012	Current LOMA
LOMA	12-07-2355A-310140	05/31/2012	Current LOMA
LOMA	12-07-2357A-310140	05/31/2012	Current LOMA
LOMA	12-07-2358A-310140	05/31/2012	Current LOMA
LOMA	12-07-2359A-310140	05/31/2012	Current LOMA
LOMA	12-07-2360A-310140	05/31/2012	Current LOMA
LOMA	12-07-2361A-310140	05/31/2012	Current LOMA
LOMA	12-07-2362A-310140	05/31/2012	Current LOMA

Type of Product	Product ID	Effective Date	Details
LOMA	12-07-2447A-310140	08/21/2012	Current LOMA
LOMA	12-07-2761A-310140	07/19/2012	Current LOMA
LOMA	12-07-2762A-310140	07/26/2012	Current LOMA
LOMA	12-07-2763A-310140	07/19/2012	Current LOMA
LOMA	12-07-2764A-310140	07/17/2012	Current LOMA
LOMA	12-07-2765A-310140	07/19/2012	Current LOMA
LOMA	13-07-0011A-310140	12/21/2012	Current LOMA
LOMA	13-07-0075A-310140	10/09/2012	Current LOMA
LOMA	13-07-0354A-310140	12/18/2012	Current LOMA
LOMA	13-07-0387A-310140	12/20/2012	Current LOMA
LOMA	13-07-0703A-310140	01/11/2013	Current LOMA
LOMA	13-07-0724A-310140	01/11/2013	Current LOMA
LOMA	13-07-0828A-310140	01/29/2013	Current LOMA
LOMA	13-07-0829A-310140	01/29/2013	Current LOMA
LOMA	13-07-0986A-310140	03/26/2013	Current LOMA
LOMA	13-07-2261A-310140	09/05/2013	Current LOMA
LOMA	14-07-0612A-310140	02/24/2014	Current LOMA
LOMA	14-07-1488A-310140	04/29/2014	Current LOMA
LOMA	14-07-2376A-310140	09/04/2014	Current LOMA
LOMA	15-07-0382A-310140	01/06/2015	Current LOMA
LOMA	15-07-2355A-310140	09/25/2015	Current LOMA
LOMA	16-07-1329A-310140	06/10/2016	Current LOMA
LOMA	16-07-1436A-310140	07/15/2016	Current LOMA
LOMA	17-07-1203A-310140	04/24/2017	Current LOMA
LOMA	17-07-2214A-310140	09/07/2017	Current LOMA
LOMA	19-07-1063A-310140	04/30/2019	Current LOMA
LOMA	19-07-1267A-310140	06/21/2019	Current LOMA
LOMA	19-07-1341A-310140	06/17/2019	Current LOMA
LOMA	19-07-1996A-310140	10/28/2019	Current LOMA
LOMA	20-07-0881A-310140	05/21/2020	Current LOMA
LOMA	20-07-1404A-310140	10/13/2020	Current LOMA
LOMA	21-07-0390A-310140	02/08/2021	Current LOMA
LOMA	22-07-0746A-310140	06/03/2022	Current LOMA
LOMA	22-07-1172A-310140	10/13/2022	Current LOMA
LOMA	24-07-0020A-310140	11/08/2023	Current LOMA

Source: Flood Map Service Center

Plans and Studies

Waverly has several planning documents that discuss or relate to hazard mitigation. Each plan is listed below along with a short description of how it is integrated with the hazard mitigation plan or how it contains hazard mitigation principles. When the City updates these planning mechanisms, the local planning team will review the hazard mitigation plan for opportunities to incorporate the goals and objectives, risk and vulnerability data, and mitigation actions into the plan update.

Comprehensive Plan

The 2023-2033 Comprehensive Plan is designed to guide the future actions and growth of the City of Waverly. This is a 10-year plan and encourages annual reviews to ensure the vision, goals, and objectives are accurate to the needs of the community. Development is discouraged in the floodplain. The hazard mitigation plan has not been integrated with the comprehensive plan; however, the comprehensive plan does have goals aimed at Smart Growth. Such goals include safe routes to school, increasing connectivity, increasing different housing types, and preserving open space such as agricultural and natural resources.

Ordinances and Regulations

Waverly's zoning ordinance outlines where and how development should occur in the future and subdivision regulations govern the division of land from one or more larger parcels into smaller lots. These documents were adopted in 2013. The zoning ordinance has the Salt Creek Valley Floodplain/Floodway Overlay District that outlines requirements for structures and developments located within its district. These documents limit development in the floodplain. New or substantially improved structures must be built at least one foot above Base Flood Elevation. Development is permitted in the ETJ, and the wildland urban interface is not discussed in the zoning ordinance or subdivision regulations.

Watershed Master Plan

The Watershed Master Plan was completed in October 2010, and later revised in February 2011. The key goal of the plan was to analyze existing drainage conditions for the surrounding water basins and identify projects for flood mitigation and stormwater management. Projects included the construction of the Ash Hollow dam, culvert and road drainage improvements, and channel work and easements on Waverly Tributaries.

Building Codes

The City of Waverly has adopted the 2018 International Building Code to set standards for constructed buildings and structures. The City made amendments regarding one-story detached accessory dwelling units, not permitting embedded posts in R-1 through R-4 zones and requiring concrete footings extended below the frost line for certain buildings, and requiring certain buildings to have a concrete perimeter extending below the frost line and have vertical insulation. Enforcement of the building code is handled by the City Building Inspector.

Southeast Nebraska Community Wildfire Protection Plan

The purpose of the Southeast Nebraska Community Wildfire Protection Plan CWPP is to help effectively manage wildfires and increase collaboration and communication among organizations who manage fire. The CWPP discusses county-specific historical wildfire occurrences and impacts, identifies areas most at risk from wildfires, discusses protection capabilities, and identifies wildfire mitigation strategies. Wildfire projects and concerns from the 2015 hazard mitigation plan were included in the CWPP and wildfire projects in the current hazard mitigation plan will be included during the next CWPP update. Between 2000 to 2018, there were 30 fires that burned 111 acres in Waverly according to the CWPP. Recommendations relating to emergency preparedness, training and education, fuels mitigation and maintenance strategies are discussed in this plan. This document is updated every five years.

Lancaster County Local Emergency Operations Plan

The Lancaster County Local Emergency Operations Plan (LEOP) was last updated in 2022. The LEOP incorporates hazard mitigation through the following: addresses hazards of top concern; assigns specific responsibilities to individual communities; identifies scenarios that would require

evacuation; identifies sheltering locations; and provides clear assignment of responsibility during an emergency. Several departments are familiar with the County LEOP including fire departments and city staff.

Future Development Trends

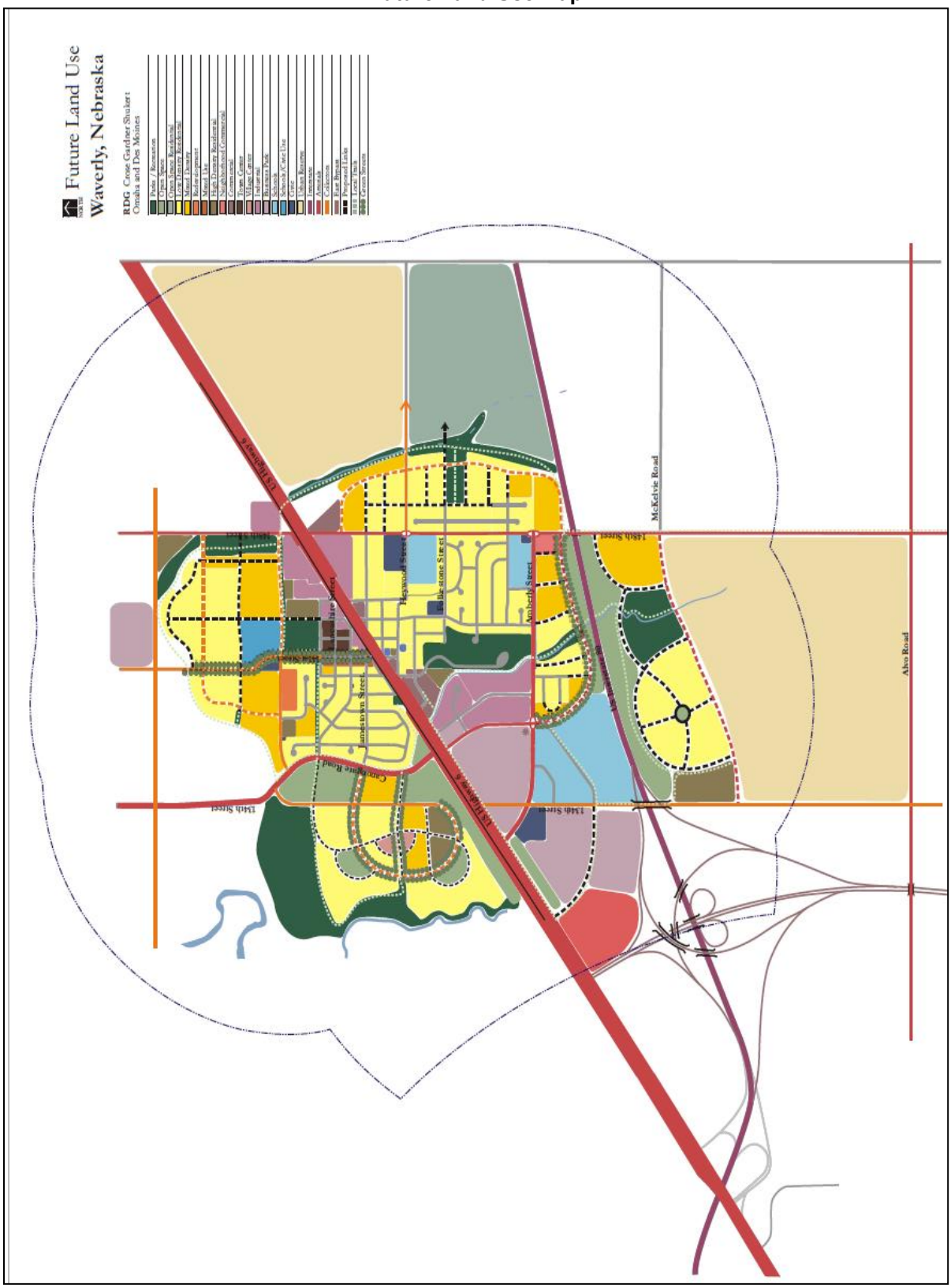
About 50 new homes have been added to the community each year for the past seven years. This trend is likely to continue, though more lots will need to be annexed to accommodate continued growth at this rate. One major developer is building most of this new housing. They have a preliminary plat on the north side of Waverly that would accommodate 200 homes – 80 of these have already been platted and the newest phase of development will add 37 lots with working utilities. There is an area for sale on the southeast side of the town that is zoned for both commercial and residential properties. Another development on the south side of town will have about 17 townhomes and 90 apartments. Any new developments must bury utilities. They must also have tree coverage. Waverly has been a member of Tree City USA for 20 years. Residents cost-share to remove deceased trees on the right-of-way and to plant new trees. An arborist is contracted by the city.

There is continued residential development on the north side of Waverly, with approximately 100 lots yet to be developed to reach full buildout. A new residential subdivision is being developed on the east-southeast side and will have approximately 471 residential lots at full buildout, estimated in 5 to 10 years. Light industrial development inside the city limits slowly continues along Amberly Road, Dovers Street and Woodstock Street. Commercial and Retail development is being sought to fill in along Hwy 6 and Callum Drive, and soon along Hwy 6 and N 148th St. Light industrial development has grown quickly in the area adjacent and to the northeast of the city limits, very near Salt Creek. This area is planned for continued expansion to the east as the city has received several plats in the last year. There is still one heavily trafficked street that is gravel, Oldfield St from Canongate Rd to N 141st St. Grant funds are tentative and the City is committed to improving the street surface to concrete with a 10-foot walking path on the north side. The City also moved from a Community Development Agency (CDA) to a Community Redevelopment Authority (CRA) that oversees Tax Increment Financing (TIF) projects and the use of TIF funds.

The baseball field built in 2006 has evolved into a large sports complex in the last eight years. The facilities are rented, leading to higher traffic on the weekends but also an economic boost for the city from rental fees. A new tractor supply retail store has been built recently, and the grocery store bought by Russ's Market and renovated. Two new facilities have been developed in potentially hazardous areas: Empire Fence/The Wave built at 14650 Woodstock St. – obtained a LOMR and an addition built Commercial Plastics at 10240 Deer Park Rd which did not include a LOMR.

In the coming decade additional development is anticipated. New Waverly Ridge residential lots being developed generally located at Hwy 6 & N 148th St. This includes a small area of floodplain which will contribute to change in storm water flows downstream, Empire Addition lots being developed generally located at 12901 N 148th St and are located in the floodplain, and TMCO has purchased a 20 acre parcel generally located at Dovers St & N 134th St that is not in a floodplain. Families are attracted to Waverly because of its proximity to the Cities of Lincoln and Omaha, good school system, and small-town feel. The population is expected to grow to between 5,000 to over 6,000 by 2033.

Future Land Use Map



Community Lifelines

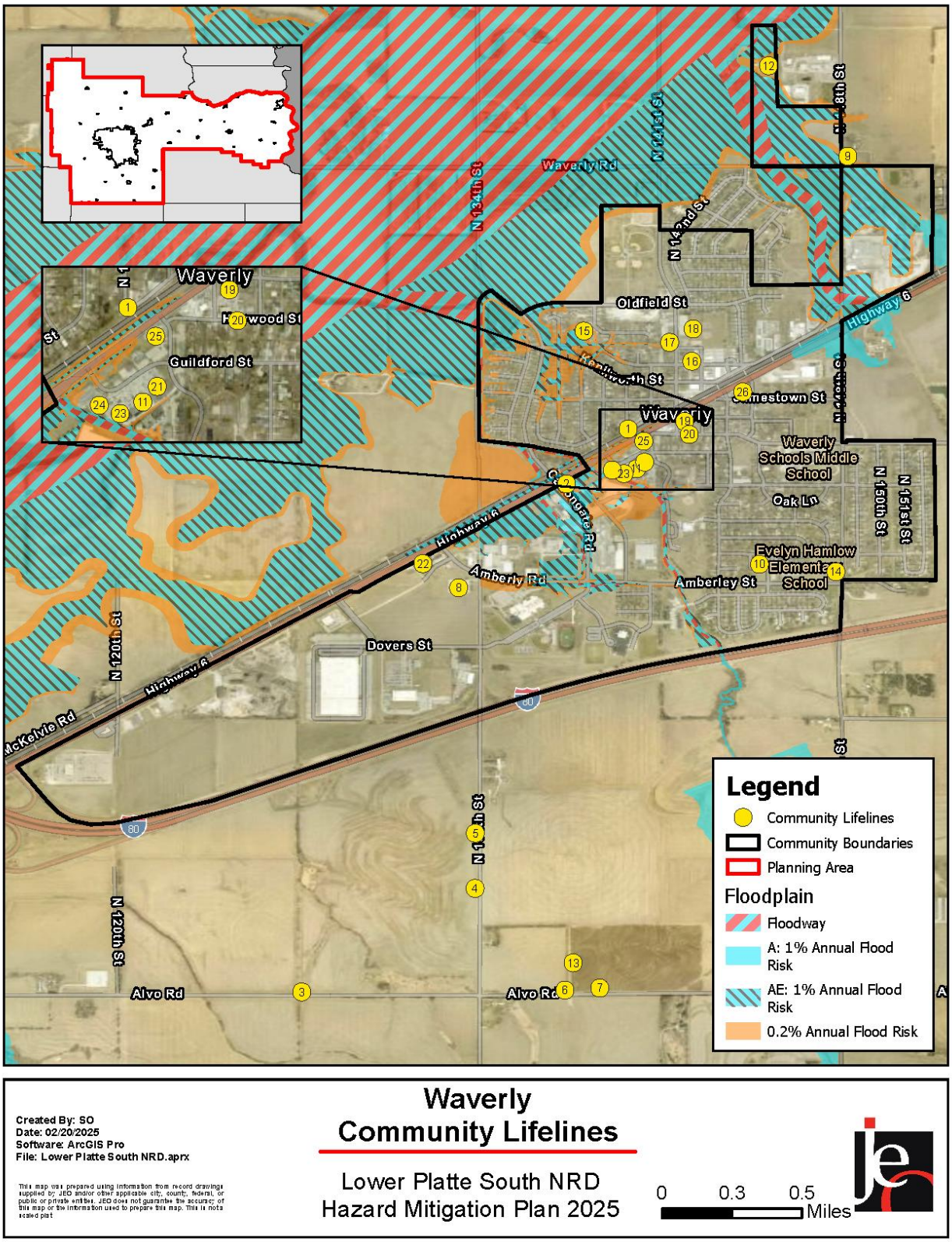
As listed in the following table, each participating jurisdiction identified community lifelines that are vital for disaster response and essential for returning the jurisdiction's functions to normal during and after a disaster per the FEMA Community Lifelines guidance. The FEMA lifeline categories include Safety and Security; Food, Water, and Shelter; Health and Medical; Energy; Communication; Transportation; and Hazardous Material Facilities.

Waverly Community Lifelines

CF #	Lifeline	Name	Generator	Shelter	Floodplain
1	Food, Water, Shelter	City Well #4	N	N	N
2	Food, Water, Shelter	City Well #5	N	N	Y
3	Food, Water, Shelter	City Well #6	Y*	N	N
4	Food, Water, Shelter	City Well #7	Y*	N	N
5	Food, Water, Shelter	City Well #8	Y*	N	N
6	Food, Water, Shelter	City Well #9	Y*	N	N
7	Food, Water, Shelter	City Well #10 & #11	Y	N	N
8	Energy	LES Substation	N	N	N
9	Communications	MCI Communication	N	N	N
10	Other	Peace Lutheran Church	N	N	N
11	Other	Phantom II Post #9875	N	N	N
12	Food, Water, Shelter	Wastewater Treatment Facility	Y^	N	Y
13	Food, Water, Shelter	Water Storage Tank	N	N	N
14	Food, Water, Shelter	Water Tower	N	N	N
15	Health and Medical	Waverly Care Center	Y	N	N
16	Safety and Security	Waverly City Office	N	N	N
17	Other	Waverly City Shop	Y	N	N
18	Other	Waverly Community Foundation	N	N	N
19	Safety and Security	Waverly Fire & Rescue	Y	N	N
20	Communications	Windstream Communication	Y	N	N
21	Food, Water, Shelter	Russ's Market Grocery Store	U	N	N
22	Health and Medical	Waverly Health Care Urgent Care	U	N	N
23	Health and Medical	Family Practice of Waverly	U	N	N

CF #	Lifeline	Name	Generator	Shelter	Floodplain
24	Energy	Cubby's Gas Station	U	N	N
25	Energy	Casey's Gas Station	U	N	N
26	Energy	Mammoth Station	U	N	N

**a portable diesel generator is available for hookup. ^While the Wastewater Treatment Facility has a small diesel generator, it is not sufficient to meet local needs.*



Created By: SO
Date: 02/20/2025
Software: ArcGIS Pro
File: Lower Platte South NRD.aprx

This map was prepared using information from record drawings supplied by JEO and/or other applicable city, county, federal, or public or private entities. JEO does not guarantee the accuracy of this map or the information used to prepare this map. This is not a sealed plat.

Waverly Community Lifelines

Lower Platte South NRD
Hazard Mitigation Plan 2025

0 0.3 0.5 Miles

Hazard Prioritization and Mitigation Strategy

The Lower Platte South NRD Hazard Mitigation Plan evaluates a range of natural and human-caused hazards which pose a risk to the counties, communities, and other participants. During the planning process, the local planning team prioritized specific hazards of top concern for Waverly which required a more nuanced and in-depth discussion of past local events, potential impacts, capabilities, and vulnerabilities. The following section expands on the prioritized hazards identified by the City of Waverly. Based on this analysis, the local planning team determined their vulnerability to all other hazards to be of low concern. For a review and analysis of other regional hazards, please see *Section Four* and *Appendix A*.

Hazard Risk Assessment for Lancaster County

HAZARD TYPE		LANCASTER COUNTY		
		Count	**Property**	**Crop**
Agricultural Disease	**Animal Disease[2]**	45	388	N/A
	Plant Disease[3]	22	N/A	$200,119
Hazardous Materials	**Chemical Fixed Sites[5]**	172	$1,500,000.00	N/A
	Chemical Transportation[6]	75	$1,239,064	N/A
Civil Disorder/Terrorism[10]		3	Minor (<$1 million)	N/A
Dam Failure[7]		0	$0	N/A
Drought[8]		443 out of 1550 months	$0	$79,060,597
Extreme Temperatures[11]	**Extreme Heat[9]**	Avg 5 days/yr	$0	$4,325,321
	Extreme Cold/Wind Chill	Avg 38 days/yr	$100,000	$303,069
Flooding[1]	**Flash Flood**	47	$5,005,000	$64,569
	Flood	10	$100,154,000	
Grass/Wildfires[4]		847	6,444.75 acres	$0.00
High Winds and Tornadoes	**High Winds[1]**	34	$28,000	$913,713
	Tornadoes[1]	28	$100,300,000	
Severe Thunderstorms[1]	**Thunderstorm Wind** Avg: 57mph Range: 45-100mph	216	$1,505,000	N/A
	Hail Avg: 1.17" Range: 0.52" - 5.0"	381	$2,000,000	$5,543,263
	Heavy Rain	8	$0	$5,626,632
	Lightning	12	$936,400	N/A
Severe Winter Storms[1]	**Blizzard**	10	$0	$423,880
	Heavy Snow	6	$16,000,000	
	Ice Storm	3	$0	
	Winter Storm	53	$0	
	Winter Weather	22	$75,000	
TOTAL		**2,480**	**$228,842,464**	**$102,004,426**

Hazardous Materials Release (Transportation)

Large liquid nitrogen, liquid oxygen, and milk spills have all occurred in Waverly. The community does not know the identity of most chemicals that are transported through the community, leading to concern that they may not be prepared for a spill. The fire station is vulnerable to spills and transportation incidents because it is near the railroad. Waverly does not have an evacuation plan for the community, though it has an informal agreement with the Waverly Public School District to use their buses in case of an evacuation.

ACTION	Shelter in Place Training
Description	Provide shelter in place training to facilities housing vulnerable populations (nursing homes, childcare facilities, schools, etc.)
Hazards Addressed	Hazardous Materials (Transportation)
Estimated Cost	$100 per person, Staff Time
Potential Local Funding	General Fund
Lead Agency	City Administration
Timeline	2-5 years
Priority	Medium
Status	This action not yet started.

ACTION	Evacuation Planning
Description	Develop an evacuation plan to be prepared for any disaster that would require evacuation
Hazards Addressed	Civil Disorder/Terrorism, Dam Failure, Extreme Temperatures, Flooding, Grass/Wildfires, Hazardous Materials, High Winds and Tornadoes, Levee Failure, Severe Thunderstorms, Severe Winter Storms
Estimated Cost	$0
Potential Local Funding	General Fund
Lead Agency	Emergency Services Coordinator
Timeline	2-5 Years
Priority	High
Status	This project has not yet been started

Dam Failure

While there have been no dam failure incidents in the past, Waverly would be devastated if the Ash Hollow Dry Dam, a high hazard dam, south of the city were to fail. The dam was built in 2017 in a cost-share project between the city and the Lower Platte South NRD. Waverly maintains the dam. The dam has an Emergency Action Plan (EAP) established in case of failure.

ACTION	Develop Dam Failure Emergency Action and Evacuation Plans
Description	Work with officials to develop emergency action and evacuation plans if a dam were to fail.
Hazards Addressed	Dam Failure
Estimated Cost	$10,000+
Potential Local Funding	General Fund
Lead Agency	Floodplain Administrators
Timeline	2-5 years

ACTION	Develop Dam Failure Emergency Action and Evacuation Plans
Priority	Medium
Status	In progress – completed a TTX for Ash Hollow Dam. Still need to develop an official evacuation plan and agreement with local schools as a shelter location. Elementary school is not located within the inundation area. The city's Emergency Action Plan (EAP)for the Ash Hollow Dry Dam was last updated in August of 2021 in conjunction with the LPSNRD

Flooding

Waverly frequently experiences heavy rains that could lead to localized flash flooding especially as there are few drainage areas or stormwater sewers. Flooding tends to occur on the west side of town (near 135th and Jonestown Streets), and flooding in 2017 left water along Waverly Rd and 144th Street. Lancashire and 144th Streets also have poor drainage. Flooding conditions can block transportation routes and prevent access to emergency services for residents. Riverine flooding along Salt Creek is also a concern for the local planning team. New homes in the floodplain are elevated to conform to NFIP regulations. A new dry dam has been constructed south of town which has significantly helped reduce flood risk to the City. Waverly began its participation in the Community Rating System on October 1, 2024 to provide lower flood insurance rates for residents. The City is in Class 9 and has a five percent discount on insurance rates.

ACTION	Preserve Natural and Beneficial Functions
Description	Preserve natural and beneficial functions of floodplain land through measures such as: retaining natural vegetation, restoring streambeds, and preserving open space in the floodplain. Channel work is planned by Ash Hollow, with the priority being to keep the floodplain where it is but reduce residential flood risk. Restrictions will be placed to restrict new development in the floodplain.
Hazards Addressed	Flooding
Estimated Cost	$5,000+
Potential Local Funding	General Fund, LPSNRD cost-share, WSF NET
Lead Agency	Building & Zoning Department, Floodplain Administrators
Timeline	2-5 years
Priority	Low
Status	Channel improvements to Ash Hollow, between Amberly Rd. and Hwy 6. Ash Hollow stabilization work, from 134th St. to Salt Creek, was complete in Summer of 2024. There are no current plans in place (other than discussion) for Ash Hollow channel improvements between Hwy 6 and N 134th St.

ACTION	Stormwater System and Drainage Improvements
Description	Undersized systems can contribute to localized flooding. Stormwater system improvements may include pipe upsizing and additional inlets. These improvements can serve to more effectively convey runoff, preventing interior localized flooding. Retention and detention facilities may also be implemented to decrease runoff rates while also decreasing the need for other stormwater system improvements. Some projects are listed in

	the Stormwater Management Plan and some are identified in the CIP.
Hazards Addressed	Flooding
Estimated Cost	$100,000+
Potential Local Funding	CIP, LPSNRD cost-share
Lead Agency	Public Works
Timeline	2-5 years
Priority	Medium
Status	This project has not yet been started. All new storm drainage systems must comply with the city of Waverly Drainage Criteria Manual requirements. Undersized culverts at Hwy 6 and N 148th St. will be addressed with future intersection improvements. Requires funding and planning coordination with NDOT.

Severe Thunderstorms

Hail is one of the most damaging aspects of thunderstorms in Waverly. Hail damage from a 2017 storm required nearly one third of the town to replace roofs. The building code does not require hail resistant roofing materials. Most critical facilities have flat roofs while some well houses have hail-resistant, metal roofs. Power outages are also a concern during severe thunderstorms. Trees in older neighborhoods are at risk of dropping limbs onto power lines.

ACTION	New Fire Hall
Description	Build a new fire hall with a FEMA-certified storm shelter and a full-sized back-up generator that can also be used to power the city hall. The facility will also be used to house the EOC, Fire Department, and City Hall.
Hazards Addressed	Civil Disorder/Terrorism, Dam Failure, Drought, Extreme Temperatures, Flooding, Grass/Wildfires, Hazardous Materials, High Winds and Tornadoes, Levee Failure, Severe Thunderstorms, Severe Winter Storms
Estimated Cost	$8 million
Potential Local Funding	General Fund, Forestry Services, Fire Grants
Lead Agency	City Administrator
Timeline	2-5 Years
Priority	High
Status	Currently there are no community shelter facilities in the City. Current fire hall does not meet the needs for Waverly's growing population and emergency management team. The new fire hall will improve available space for training and education outreach efforts, training for staff and storm spotters, and shelter for residents and those traveling through Waverly during poor conditions. The current Fire Hall is also located in a highly vulnerable area near railroad tracks and main transportation route. A land purchase is currently under development for siting the new fire hall. Land purchase is complete. Conceptual plans have been developed. Next steps are to secure financing and begin design engineering.

ACTION	Public Education
Description	Increase public awareness of vulnerability and risk reduction measure through hazard education. This would include information on trees and home flooding, and a flyer on backflow prevention.
Hazards Addressed	Agricultural Disease, Civil Disorder/Terrorism, Dam Failure, Drought, Extreme Temperatures, Flooding, Grass/Wildfires, Hazardous Materials, High Winds and Tornadoes, Levee Failure, Severe Thunderstorms, Severe Winter Storms
Estimated Cost	$0-1,000
Potential Local Funding	General funds
Lead Agency	City Clerk
Timeline	2-5 years
Priority	Medium
Status	Flooding and backlow prevention information is available on the city website. Informational backflow flyers are sent to businesses and residents. Commercial properties are required to have an annual inspection performed on backflow devices. Inspection results are filed with the city.

High Winds and Tornadoes

Tornadoes have not yet occurred in the community, though they would have a large impact if they were to occur. There is a handshake agreement in place with the schools to use their buses in the case of an evacuation. Approximately 90% of residents have a basement in case they need shelter during a storm.

ACTION	Storm Shelters
Description	Design and construct storm shelters and safe rooms in vulnerable areas which are available to the public during hazard events. Establish a community safe room or safe area for residents.
Hazards Addressed	High Winds and Tornadoes, Severe Thunderstorms, Severe Winter Storms
Estimated Cost	$200-$250 per sf
Potential Local Funding	General Fund
Lead Agency	City Administration
Timeline	2-5 years
Priority	High
Status	A safe room/storm shelter is included in the new fire station preliminary plans. There are no current plans for an additional storm shelter at the community pool, due to planning and cost.

ACTION	Backup Generators
Description	Provide backup generators for the city maintenance shop, wells, city hall, and wastewater treatment plan
Hazards Addressed	All
Estimated Cost	Varies
Potential Local Funding	General Fund
Lead Agency	City Administrator

Timeline	2-5 Years
Priority	High
Status	The city currently has permanent generators on two (out of eight) water wells along with one portable generator. A generator is available at the wastewater treatment plant to allow for primary functions. Data servers at city hall have a battery backup. Cost/Budget has prevented installation of permanent generators at the remaining wells, city hall, and maintenance shop. Several generators are needed including two for wells, one large unit at Water Treatment Facility, and one at the City Office. The City is currently evaluating size and cost estimates for generators.

ACTION	Hazardous Tree Inventory
Description	Tree inventory to ID problem trees that may lose or drop branches and ash trees that are vulnerable to the Emerald Ash Borer
Hazards Addressed	High Winds and Tornadoes, Severe Thunderstorms, Severe Winter Storms
Estimated Cost	$0 for inventory; $2,000/tree removal
Potential Local Funding	General Fund
Lead Agency	Parks & Recreation Department, Tree Committee
Timeline	1 year
Priority	Low
Status	Condition of trees are regularly monitored by the city Arborist and Zoning Administrator. Parks Department monitors park trees. Trees are removed as needed. This has been completed for city owned properties. The city sends letters to residents if their trees encroach on streets or sidewalks.

Completed or Removed Mitigation Actions

ACTION	Utilize Low Impact Development and Green Infrastructure
Description	Utilize low impact development practices and green infrastructure to reduce flood risk
Hazards Addressed	Flooding
Status	Completed - All new development in or around the floodplain is reviewed for flood risk. All development must comply with the city of Waverly Drainage Criteria Manual requirements

ACTION	Dam Failure Exercise
Description	Conduct tabletop exercises to determine the response scenarios in the event of dam failure.
Hazards Addressed	Dam Failure
Status	Completed – City of Waverly participated in a TTX with the NRD regarding Ash Hollow Dam in 2023.

ACTION	New Overpass Construction
Description	Design and construct an overpass to provide an additional transportation route across railroad tracks in town.

ACTION	New Overpass Construction
Hazards Addressed	Hazardous Materials (Transportation)
Status	Removed - This action is no longer applicable. Construction of additional overpass will require elimination of current at grade crossings.

INTERLOCAL AGREEMENT
BETWEEN THE CITY OF WAVERLY OF LANCASTER COUNTY, NEBRASKA
AND THE CITY OF LINCOLN, NEBRASKA / LINCOLN FIRE & RESCUE DEPARTMENT

THIS Interlocal ("Agreement"), made and entered into by and between the City of Waverly ("Fire District"); and the Lincoln Fire & Rescue Department ("LFR"); and the City of Lincoln, Nebraska, a Nebraska Political Subdivision and Municipal Corporation, (hereinafter collectively referred to as "City").

WHEREAS, NEB. REV. STAT. § 35-514.02 (as amended) provides "a rural and suburban fire protection district may establish an emergency medical service, including the provision of scheduled or unscheduled ambulance service" and "may enter into agreements under the Interlocal Cooperation Act and the Joint Public Agency Act for the purpose of establishing an emergency medical service" and "may contract with any city, person, firm, corporation, or other fire protection district to provide such services, may expend funds of the district, and may charge a reasonable fee to the user"; and,

WHEREAS, the Interlocal Cooperation Act, NEB. REV. STAT. § 13-801, et seq. (as amended), permits units of local governments in the State of Nebraska to cooperate with other localities on a basis of mutual advantage and thereby provide services in a manner that will best serve local communities; and,

WHEREAS, NEB. REV. STAT. § 13-303 (as amended) provides "The governing bodies of cities and villages may establish an emergency medical service, including the provision of scheduled and unscheduled ambulance service, as a governmental service either within or without the county or municipality. If the governing body may contract with any city, person, firm, or corporation licensed as an emergency medical service for emergency medical care by out-of-hospital emergency care providers. Each may enter into an agreement with the other under the Interlocal Cooperation Act or Joint Public Agency Act for the purpose of establishing an emergency medical service or may provide a separate service for itself"; and,

WHEREAS, the LFR possess the regulatory licensure and approval, personnel, equipment, training, skills, knowledge, and medical direction to provide Advanced Life Support–Emergency Ambulance Service ("ALS–EAS") within the State of Nebraska; and,

WHEREAS, the Fire District desires to ensure there is ALS–EAS available to the Fire District; and,

WHEREAS, the City, by and through LFR, is charged with the responsibility of providing ALS–EAS within the City of Lincoln, Nebraska; and,

WHEREAS, the City maintains equipment and staffing allowing LFR to provide supplemental ALS–EAS to the Fire District pursuant to the terms and conditions set forth herein; and,

WHEREAS, the Fire District maintains resources to enter to this Agreement for ALS–EAS with the City pursuant to the terms and conditions set forth herein.

THEREFORE, in consideration of the mutual covenants herein contained, it is agreed as follows by the parties hereto:

The City, acting by and through LFR, agrees to provide ALS–EAS within the Service Area of the Fire District, outside the corporate limits of the City of Lincoln, in the manner set forth in this Agreement as follows:

1. This Agreement shall apply only to those requests for ALS–EAS originating within the Area of Service of the Fire District. The City shall not respond to requests for ALS–EAS originating outside the City of Lincoln, Nebraska, and outside the Area of Service for the Fire District, except as may be requested by another rural fire district or emergency agency; However, nothing in this Agreement shall otherwise prevent LFR from responding to emergencies pursuant to mutual aid agreements, declared disasters, or other emergencies not related to requests for ALS–EAS from the Fire District–Nor otherwise prevent or limit the Fire District from entering into agreements with other mutual aid departments.

2. LFR shall aid with the provision of ALS–EAS and, the readiness to provide such service, to the Fire District. The City shall not be the sole provider of Emergency Ambulance Service to the Fire District and shall only respond to calls for ALS–EAS at the request of the Fire District.

3. LFR is not automatically dispatched to any incidents within the Area of Service of the Fire District by the Lincoln Lancaster 911 Center. For Alpha, Bravo, Charlie, or Delta responses (as defined by the current medical priority dispatch system used by the City), the Fire District may request ALS–EAS after arriving on location and determining a need for an advanced level of pre-hospital emergency care; When dispatched to an Echo response with credible pre-arrival information indicating a need for ALS–EAS, the Fire District may request LFR to respond and provide ALS–EAS prior to arriving on location.

4. LFR will provide ALS–EAS when available, however in times of peak-demand within the City of Lincoln, Nebraska, ALS–EAS response may be delayed until such time that an ambulance resource becomes available. LFR command staff will notify the Fire District by means of the dispatch center when response will be delayed. Under this Agreement LFR will not respond to incidents to aid with "Lift Assists" or to provide lifting and moving of patients.

5. The City agrees to (a) furnish all tools, equipment, supplies, superintendence, transportation, and other accessories, services, and facilities necessary for the performance of ALS–EAS to the Fire District; (b) furnish all materials, supplies, and equipment specified to be incorporated into and necessary for the performance of ALS–EAS to the Fire District; (c) provide and perform all necessary labor in accordance with the provisions of the Agreement Documents; and (d) execute and complete all services and work included therein.

6. All matters relating to the duties, standards of service, discipline of employees, rendition of performance, training, and other such matters incidental to the performance of this Agreement, and the personnel employed in the performance of this Agreement shall be under the exclusive control of the City. In exercising this control, the City shall give due consideration to those complaints and reasonable requests of the Fire District properly brought to its attention.

7. The City and LFR shall assume responsibility for supplying all supervision of its employees and agents and shall not be responsible for the supervision of the employees and agents of the Fire District. The City and LFR shall be responsible for supplying all materials, communications, and equipment, (including vehicles) necessary for the rendering of ALS–EAS offered to the Fire District. Maintenance and replacement of vehicles and equipment used in the performance of Emergency Ambulance Service shall be pursuant to LFR policy and procedure and all laws, rules, and regulations governing the maintenance and replacement of same.

8. The City and LFR warrants it has trained and instructed its employees, representatives, consultants, and subcontractors to abide by all laws, rules, and regulations governing the practices and procedures under which the City, LFR, and its employees, representatives, consultants, and subcontractors is/are

licensed, and shall act within the parameters of all applicable ethical and professional standards in providing the services.

9. The City agrees that it, and its employees, representatives, consultants, and subcontractors, shall, at all times during the Agreement, be properly licensed, credentialed, and/or certified to provide the services performed pursuant to this Agreement.

10. The Fire District shall pay the City a fee for providing ALS–EAS in the sum of $673.16 per ALS–EAS request for the first year of this Agreement. The fee for each successive year thereafter shall be increased by five percent (5%) unless otherwise agreed upon by the Fire District and the City. Payment shall be due as follows:

    a. One-half (1/2) of the amount due (invoiced by the City) on or before December 15; and,

    b. One half (1/2) of the amount due (invoiced by the City) on or before June 15, each year. Failure to pay on time constitutes a breach of this Agreement until full payment is received.

11. Billing and Payment:

    a. The City will bill the patient or the financially responsible party when a transport occurs in a City ambulance, and shall retain all amounts collected therefrom. The financially responsible party shall not include the Fire District, and the Fire District shall not be billed when a transport occurs in a City ambulance, unless the Fire District is the financially responsible party pursuant to law or not in compliance with the Agreement, such as delinquent in payment or has requested assistance from the City for an incident originating outside the "Area of Service". Nothing in this agreement shall limit any rights or remedies that the City may have or choose to exercise in collection of any amounts due from the financially responsible party.

    b. When the City intercepts, LFR providers deliver ALS–EAS, and transport is provided in an ambulance not owned by the City, the transporting agency may bill the patient or the financially responsible party as they deem appropriate and will retain all collected amounts therefrom.

    c. To facilitate an efficient and effective billing process, the Fire District shall provide initial billing company and contact information requested in Attachment A, and hereby authorizes the City, if requested by the Fire District, to forward patient care reports related to billings to any billing service hired by the Fire District, provided that said billing services have previously entered into Business Associate agreements with the City. In the event the Fire District changes the billing service to another billing service, the Fire District shall provide an addendum to this Agreement demonstrating the name and contact information for the new billing service. Unless a reasonable objection is provided by the City, the new billing service shall be recognized by the City. The Parties hereto agree and acknowledge that changing the billing service does not constitute an amendment to this Agreement and the addendum can be added administratively by the Parties.

    d. All payments under this Agreement shall be remitted to:
    Lincoln Fire & Rescue
    EMS Business Manager
    901 West Bond, Suite 200
    Lincoln, NE 68521

12. The Parties agree to follow the National Incident Management System (NIMS) at all incidents. The Authority having Jurisdiction (AHJ) retains authority over and responsibility for the emergency incident unless a separate Delegation of Authority has been approved by both parties.

13. The term of this Agreement shall run from September 01, 2025, through August 31, 2035 – Unless otherwise earlier terminated in accordance with paragraph 14.

14. This Agreement may be terminated as follows:

    a. The City, or the Fire District, may terminate this Agreement at any time and for any reason, with or without cause, upon providing the other party written notice of such termination not less than thirty (30) calendar days prior to the effective date of termination. Upon termination, all requests for ALS–EAS by the terminated Fire District will be billed through the last day of the Agreement, and the amount owed will be due within sixty (60) days of receipt of invoice.

    b. If the Fire District fails to make payment as required by this Agreement, the City may immediately terminate this Agreement; or,

    c. The City, or Fire District, may terminate this Agreement in whole or in part when funding is not lawfully available for expenditure or when sources of funding are terminated, suspended, reduced, or otherwise not forthcoming through no fault of the City or Fire District.

    d. As otherwise allowed by law.

15. Each party agrees to indemnify, defend and hold harmless, to the fullest extent allowed by law, the other party and its principals, officers, employees, and agents from and against all claims, demands, suits, actions, payments, liabilities, judgments, and expenses (including court-ordered attorneys' fees), arising out of or resulting from the acts or omissions of their principals, officers, or employees in the performance of this Agreement. Liability includes any claims, damages, losses, and expenses arising out of or resulting from performance of this Agreement that results in any claim for damage whatsoever including any bodily injury, civil rights liability, sickness, disease, or damage to or destruction of tangible property, including the loss of use resulting therefrom. Further, each party shall maintain a policy or policies of insurance (or a self-insurance program), sufficient in coverage and amount to pay any judgments or related expenses from or in conjunction with any such claims. Nothing in this Agreement shall require either party to indemnify or hold harmless the other party from liability for the negligent or wrongful acts or omissions of said other party or its principals, officers, employees, or agents.

16. It is the express intent of the parties that this Agreement shall not create an employer-employee relationship. Employees of the City shall not be deemed to be employees of the Fire District, and employees of the Fire District shall not be deemed to be employees of the City. The City and the Fire District shall be responsible to their respective employees for all salaries and benefits. Neither the City's employees nor the Fire District's employees shall be entitled to any salary, wages, or benefits from the other party, including but not limited to overtime, vacation, retirement benefits, workers' compensation, sick leave, or injury leave. Accordingly:

a. City shall be responsible for maintaining workers' compensation insurance, unemployment insurance for its employees, and for payment of all federal, state, local and any other payroll taxes with respect to its employees' compensation.

b. Fire District shall be responsible for maintaining workers' compensation insurance, unemployment insurance for its employees, and for payment of all federal, state, local and any other payroll taxes with respect to its employees' compensation.

c. The Parties acknowledge that some LFR personnel, during their off-duty hours, may work in a volunteer or paid capacity with the Fire District. The City shall not be responsible for the payment of salary and benefits, including workers compensation, for such personnel while they are off duty from LFR and are performing services in a volunteer or paid capacity for the Fire District.

17. Neither the Fire District nor the City shall assign its duties and responsibilities under this Agreement without the express written permission of the other Party to the Agreement. The foregoing notwithstanding, it is understood that the City may cause the services to be provided hereunder by use of contractors as allowed under State law or Section 7.08.010 of the Lincoln Municipal Code.

18. If any portion of this Agreement is held invalid, the remainder hereof shall not be affected thereby if such remainder would then continue to conform to the terms and requirements of applicable law.

19. Each party agrees that in providing services pursuant to this Agreement, it shall not discriminate against any employee, applicant for employment, or any other person based on race, color, religion, sex, disability, national origin, age marital status, source of income, or any other basis prohibited by applicable state or federal law.

20. The validity, construction, interpretation, and performance of this Agreement shall be governed by and construed in accordance with the laws of the State of Nebraska.

21. The City agrees to provide prompt and efficient service to the Fire District, but nothing in this Agreement shall be construed to incorporate a required response time or other performance measure not required by applicable law.

22. The Fire District shall use reasonable efforts to inform the City of road, weather, bridge, or other conditions affecting the City's response to a request for service.

23. For purposes of the Health Insurance Portability and Protection Act (HIPAA) and subsequently the Health Information Technology for Economic and Clinical Health Act ("HITECH Act") City has been designated a "hybrid entity", and LFR is a "covered entity" as defined in part by 45 C.F.R. § 160.103 (as amended). Performance of this Agreement involves the use or disclosure of Protected Health Information (PHI), as defined in 45 C.F.R. § 160.103. Fire District acknowledges and agrees to enter into, and comply with, the terms and conditions contained in the Business Associate Agreement, attached hereto, marked as Attachment B, and incorporated by reference

24. This Agreement and incorporated Attachments represents the entirety of the Agreement between the parties, and all prior agreements, negotiations or representations are hereby expressly excluded from this Agreement. The Parties agree the terms and conditions of this Agreement shall prevail and govern

in the case of any inconsistent terms that appear in the other Agreement Documents. In the event of silence or ambiguity in the Agreement, the Agreement Documents shall be referred to in the prioritized order listed above.

25. It is expressly understood neither City nor Fire District waives its governmental immunity, sovereign or otherwise, by entering into this Agreement, and fully retains all immunities and defenses provided by law.

26. Each section and each subdivision of a section of this Agreement is hereby declared to be independent of every other section or subdivision of a section so far as inducement for the acceptance of this Agreement and invalidity of any section or subdivision of a section of this Agreement shall not invalidate any other section or subdivision of a section thereof.

    The City and the Fire District hereby agree all the terms and conditions of the Agreement shall be binding upon themselves, their successors, and their assigns.

EXECUTED this ____ day of _____, 2025, by the City of Waverly.

CITY OF WAVERLY

Signature: _____

Name: Abbey L. Pascoe

Title: Mayor

Address: PO Box 427 / 14130 Lancashire St.

City, State, Zip: Waverly, NE 68462

EXECUTED this ____ day of _____, 2025, by the City of Lincoln, Nebraska.

CITY OF LINCOLN, NEBRASKA

_____

Leirion Gaylor Baird, Mayor
City of Lincoln
555 South 10th Street | Suite 301
Lincoln, Nebraska 68508

ATTACHMENT A

1) Choose one option:

☐ The City of Waverly does not authorize Lincoln Fire & Rescue to send patient care reports directly to our billing company. If patient care reports are requested for billing purposes, they are directed to be sent directly to the City of Waverly at: _____.

☒ The City of Waverly authorizes Lincoln Fire & Rescue to send patient care reports directly to the City of Waverly's billing company (selected below) for the purposes of this Agreement.

- ☐ **Quick Med Claims, PO Box 641880, Omaha, NE 68164**
- ☒ **One Billing Solutions, 10802 Farnam Dr., Omaha, NE 68154**
- ☐ **HMKB Billing, PO Box 745, Tecumseh, NE 68450**
- ☐ **Other:** _____

2) Financial invoices shall be sent to:

Name:	**City of Waverly**
Attention:	~~**City Administrator Stephanie Fisher**~~ Melanie Vorderstrasse, Utility Billing/Accounts Payable
Address:	**PO Box 427, Waverly NE 68462**
Phone:	**402-786-2312**
E-Mail:	~~**cityadministrator@citywaverly.com**~~ utilityclerk@citywaverly.com

3) Correspondence related to this Interlocal Agreement shall be sent to:

Name:	**City of Waverly**
Attention:	**City Administrator Stephanie Fisher**
Address:	**PO Box 427, Waverly NE 68462**
Phone:	**402-786-2312**
E-Mail:	**cityadministrator@citywaverly.com**

4) Individual designated to assist the Fire District representative in determining which dispatches belong to the Fire District:

Name:	~~**Jared Rains**~~ Robin Hoffman, Fire Chief
Address:	**10530 N. 141st St, Waverly NE 68462**
Phone:	~~**402-440-9309**~~ 402-432-1322
E-Mail:	**firechief@citywaverly.com**

ATTACHMENT B

HIPAA Business Associate Agreement

ARTICLE I
PREAMBLE AND DEFINITIONS.

Section 1.01 Pursuant to the Health Insurance Portability and Accountability Act of 1996, as amended (**"HIPAA"**), City of Lincoln Nebraska, a Municipality, duly organized and existing under the laws of the State of Nebraska, whose notice address is 901 W. Bond, Suite 200, Lincoln NE 68521 (**"Covered Entity"**), and the Fire District (**"Business Associate"**), enter into this Business Associate Agreement (**"BAA"**) as of September 1, 2024, (the **"Effective Date"**) that addresses the HIPAA requirements with respect to "business associates," as defined under the privacy, security, breach notification and enforcement rules at 45 C.F.R. Part 160 and Part 164 (**"HIPAA Rules"**). A reference in this BAA to a section in the HIPAA Rules means the section as in effect or as amended.

Section 1.02 This BAA is intended to ensure that Business Associate will establish and implement appropriate safeguards for the Protected Health Information (**"PHI"**) (as defined under the HIPAA Rules) that Business Associate may receive, create, maintain, use or disclose in connection with the functions, activities and services that Business Associate performs for Covered Entity. The functions, activities and services that Business Associate performs for Covered Entity may be the subject of a separately drafted agreement executed between the Covered Entity and Business Associate (the **"Underlying Agreement"**).

Section 1.03 Pursuant to changes required under the Health Information Technology for Economic and Clinical Health Act of 2009 (the **"HITECH Act"**) and under the American Recovery and Reinvestment Act of 2009 (**"ARRA"**), this BAA also reflects federal breach notification requirements imposed on Business Associate when "Unsecured PHI" (as defined under the HIPAA Rules) is acquired by an unauthorized party and the expanded privacy and security provisions imposed on business associates.

Section 1.04 Unless the context clearly indicates otherwise, the following terms in this BAA shall have the same meaning as those terms in the HIPAA Rules: Breach, Data Aggregation, Designated Record Set, disclosure, Electronic Media, Electronic Protected Health Information (ePHI), Health Care Operations, individual, Minimum Necessary, Notice of Privacy Practices, Required By Law, Secretary, Security Incident, Subcontractor, Unsecured PHI and use.

Section 1.05 A reference in this BAA to the Privacy Rule means the Privacy Rule, in conformity with the regulations at 45 C.F.R. Parts 160-164 (the **"Privacy Rule"**) as interpreted under applicable regulations and guidance of general application published by the HHS, including all amendments thereto for which compliance is required, as amended by the HITECH Act, ARRA and the HIPAA Rules.

ARTICLE II
GENERAL OBLIGATIONS OF BUSINESS ASSOCIATE.

Section 2.01 Business Associate agrees not to use or disclose PHI, other than as permitted or required by this BAA or as Required By Law, or if such use or disclosure does not otherwise cause a Breach of Unsecured PHI.

Section 2.02 Business Associate agrees to use appropriate safeguards, and comply with Subpart C of 45 C.F.R. Part 164 with respect to ePHI, to prevent use or disclosure of PHI other than as provided for by this BAA.

Section 2.03 Business Associate agrees to mitigate, to the extent practicable, any harmful effect that is known to Business Associate as a result of a use or disclosure of PHI by Business Associate in violation of this BAA's requirements or that would otherwise cause a Breach of Unsecured PHI.

Section 2.04 The Business Associate agrees to the following breach notification requirements:

(a) Business Associate shall notify Covered Entity by telephone call without unreasonable delay, which in no event shall be more than three business days from which Business Associate knows of such Breach, Unauthorized Use or Disclosure, or Security Incident, or by exercising reasonable diligence would have been known to Business Associate. Business Associate shall notify Covered Entity of all Breaches, even if Business Associate determines there is a low probability that the PH has been compromised based on its risk assessment. Business Associate shall provide a full written report to Covered Entity within five business days of verbal notice. Such notice shall include the identification of each individual whose Unsecured PHI has been, or is reasonably believed by Business Associate to have been, accessed, acquired, or disclosed in connection with such Breach. In addition, Business Associate shall provide any additional information reasonably requested by Covered Entity for purposes of investigating the Breach and any other available information that Covered Entity is required to include to the individual under 45 C.F.R. 164.404(c) at the time of notification or as promptly thereafter as information becomes known. Business Associate's notification of a Breach of Unsecured PHI under this Section shall comply in all respects with each applicable provision of section 13400 of Subtitle D (Privacy) of ARRA, the HIPAA Rules and related guidance issued by the Secretary or the delegate of the Secretary from time to time.

(b) Business Associate agrees to provide notification of any Breach of Unsecured PHI of which it becomes aware, as required under 45 C.F.R. 164.410, and any Security Incident of which it becomes aware, in violation of this BAA to individuals, the media (as defined under the HITECH Act), the Secretary and/or any other parties as required under HIPAA, the HITECH

Act, ARRA and the HIPAA Rules, subject to the prior review and written approval by Covered Entity of the content of such notification. In the event Business Associate fails to perform its obligations hereunder, the Covered Entity shall have the right, within its sole discretion, to take over the notification functions specified herein. Any and all costs incurred by Covered Entity in fulfilling the notification requirements specified in HIPAA, the HITECH Act, ARRA or the HIPAA Rules, including but not limited to attorneys' fees, fines, penalties, publication and mailing charges, and any fees associated with creating and maintaining a toll-free call number or modifications to any Covered Entity website related to breach notification, shall be paid immediately by Business Associate upon demand by Covered Entity consistent with Article VI of this BAA.

(c) In the event of Business Associate's use or disclosure of Unsecured PHI in violation of HIPAA, the HITECH Act or ARRA, Business Associate bears the burden of demonstrating that notice as required under this **Section 2.04** was made, including evidence demonstrating the necessity of any delay, or that the use or disclosure did not constitute a Breach of Unsecured PHI.

Section 2.05 Business Associate agrees, in accordance with 45 C.F.R. 164.502(e)(1)(ii) and 164.308(b)(2), if applicable, to require that any Subcontractors that create, receive, maintain or transmit PHI on behalf of the Business Associate agree to the same restrictions, conditions and requirements that apply to the Business Associate with respect to such information.

Section 2.06 Business Associate agrees to make available PHI in a Designated Record Set to the individual or the individual's designee as necessary to satisfy Covered Entity's obligations under 45 C.F.R. 164.524. Business Associate shall be solely responsible for verifying the right of any individual or individual's designee to access the requested PHI.

(a) Business Associate agrees to comply with an individual's request to restrict the disclosure of their personal PHI in a manner consistent with 45 C.F.R. 164.522, except where such use, disclosure or request is required or permitted under applicable law.

(b) Business Associate agrees that when requesting, using or disclosing PHI in accordance with 45 C.F.R. 502(b)(1) that such request, use or disclosure shall be to the minimum extent necessary, including the use of a "limited data set" as defined in 45 C.F.R. 164.514(e)(2), to accomplish the intended purpose of such request, use or disclosure, as interpreted under related guidance issued by the Secretary from time to time.

Section 2.07 Business Associate agrees to make any amendments to PHI in a Designated Record Set as directed or agreed to by the Covered Entity pursuant to 45 C.F.R. 164.526, or take other measures as necessary to satisfy Covered Entity's obligations under 45 C.F.R. 164.526.

Section 2.08 Business Associate agrees to maintain and make available the information required to provide an accounting of disclosures to the individual or individual's designee as necessary to satisfy Covered Entity's obligations under 45 C.F.R. 164.528.

Section 2.09 Business Associate agrees to make its internal practices, books and records, including policies and procedures regarding PHI, relating to the use and disclosure of PHI and Breach of any Unsecured PHI received from Covered Entity, or created or received by the Business Associate on behalf of Covered Entity, available to Covered Entity (or the Secretary) for the purpose of Covered Entity or the Secretary determining compliance with the Privacy Rule (as defined in **Article VIII**).

Section 2.10 To the extent that Business Associate is to carry out one or more of Covered Entity's obligation(s) under Subpart E of 45 C.F.R. Part 164, Business Associate agrees to comply with the requirements of Subpart E that apply to the Covered Entity in the performance of such obligation(s).

Section 2.11 Business Associate agrees to account for the following disclosures:

(a) Business Associate agrees to maintain and document disclosures of PHI and Breaches of Unsecured PHI and any information relating to the disclosure of PHI and Breach of Unsecured PHI in a manner as would be required for Covered Entity to respond to a request by an individual or the Secretary for an accounting of PHI disclosures and Breaches of Unsecured PHI.

(b) Business Associate agrees to provide to Covered Entity, or to an individual at Covered Entity's request, information collected in accordance with this **Section 2.11**, to permit Covered Entity to respond to a request by an individual or the Secretary for an accounting of PHI disclosures and Breaches of Unsecured PHI.

(c) Business Associate agrees to account for any disclosure of PHI used or maintained as an Electronic Health Record (as defined in **Article V**) (**"EHR"**) in a manner consistent with 45 C.F.R. 164.528

and related guidance issued by the Secretary from time to time; provided that an individual shall have the right to receive an accounting of disclosures of EHR by the Business Associate made on behalf of the Covered Entity only during the three years prior to the date on which the accounting is requested directly from the Business Associate.

(d) In the case of an EHR that the Business Associate acquired on behalf of the Covered Entity as of January 1, 2009, paragraph (c) above shall apply to disclosures with respect to PHI made by the Business Associate from such EHR on or after January 1, 2014. In the case of an EHR that the Business Associate acquires on behalf of the Covered Entity after January 1, 2009, paragraph (c) above shall apply to disclosures with respect to PHI made by the Business Associate from such EHR on or after the later of January 1, 2011 or the date that it acquires the EHR.

Section 2.12 Business Associate agrees to comply with the "Prohibition on Sale of Electronic Health Records or Protected Health Information," as provided in section 13405(d) of Subtitle D (Privacy) of ARRA, and the "Conditions on Certain Contacts as Part of Health Care Operations," as provided in section 13406 of Subtitle D (Privacy) of ARRA and related guidance issued by the Secretary from time to time.

Section 2.13 Business Associate acknowledges that, effective on the Effective Date of this BAA, it shall be liable under the civil and criminal enforcement provisions set forth at 42

U.S.C. 1320d-5 and 1320d-6, as amended, for failure to comply with any of the use and disclosure requirements of this BAA and any guidance issued by the Secretary from time to time with respect to such use and disclosure requirements.

ARTICLE III
PERMITTED USES AND DISCLOSURES BY BUSINESS ASSOCIATE.

Section 3.01 General Uses and Disclosures. Business Associate agrees to receive, create, use or disclose PHI only in a manner that is consistent with this BAA, the Privacy Rule or Security Rule (as defined in **Article V**) and only in connection with providing services to Covered Entity; provided that the use or disclosure would not violate the Privacy Rule, including 45 C.F.R. 164.504(e), if the use or disclosure would be done by Covered Entity. For example, the use and disclosure of PHI will be permitted for "treatment, payment and health care operations," in accordance with the Privacy Rule.

Section 3.02 Business Associate may use or disclose PHI as Required By Law.

Section 3.03 Business Associate agrees to make uses and disclosures and requests for PHI consistent with the “Minimum Necessary” requirements of HIPAA.

Section 3.04 Business Associate may not use or disclose PHI in a manner that would violate Subpart E of 45 C.F.R. Part 164 if done by the covered entity

Section 3.05 Business Associate may use or disclose PHI as necessary to carry out Business Associate Functions.

Section 3.06 Business Associate may use PHI for the proper management and administration of Business Associate or to carry out the legal responsibilities of Business Associate.

ARTICLE IV
OBLIGATIONS OF COVERED ENTITY.

Section 4.01 Covered Entity shall:

(a) Provide Business Associate with the Notice of Privacy Practices that Covered Entity produces in accordance with the Privacy Rule, and any changes or limitations to such notice under 45 C.F.R. 164.520, to the extent that such changes or limitations may affect Business Associate's use or disclosure of PHI.

(b) Notify Business Associate of any restriction to the use or disclosure of PHI that Covered Entity has agreed to or is required to abide by under 45 C.F.R. 164.522, to the extent that such restriction may affect Business Associate's use or disclosure of PHI under this BAA.

(c) Notify Business Associate of any changes in or revocation of permission by an individual to use or disclose PHI, if such change or revocation may affect Business Associate's permitted or required uses and disclosures of PHI under this BAA.

Section 4.02 Covered Entity shall not request Business Associate to use or disclose PHI in any manner that would not be permissible under the Privacy and Security Rule if done by Covered Entity, except as provided under **Article III** of this BAA.

ARTICLE V
COMPLIANCE WITH SECURITY RULE.

Section 5.01 Business Associate shall comply with the HIPAA Security Rule, which shall mean the Standards for Security of Electronic Protected Health Information at 45 C.F.R. Part 160 and Subparts A and C of Part 164, as amended by ARRA and the HITECH Act. The term **"Electronic Health Record"** or **"EHR"** as used in this BAA shall mean an electronic record of health-related information on an individual that is created, gathered, managed and consulted by authorized health care clinicians and staff.

Section 5.02 In accordance with the Security Rule, Business Associate agrees to:

(a) Implement the administrative safeguards set forth at 45 C.F.R. 164.308, the physical safeguards set forth at 45 C.F.R. 164.310, the technical safeguards set forth at 45 C.F.R. 164.312, and the policies and procedures set forth at 45 C.F.R. 164.316 to reasonably and appropriately protect the confidentiality, integrity and availability of the ePHI that it creates, receives, maintains or transmits on behalf of Covered Entity as required by the Security Rule. Business Associate acknowledges that, effective on the Effective Date of this BAA, (a) the foregoing safeguards, policies and procedures requirements shall apply to Business Associate in the same manner that such requirements apply to Covered Entity, and (b) Business Associate shall be liable under the civil and criminal enforcement provisions set forth at 42 U.S.C. 1320d-5 and 1320d-6, as amended from time to time, for failure to comply with the safeguards, policies and procedures requirements and any guidance issued by the Secretary from time to time with respect to such requirements;

(b) Require that any agent, including a Subcontractor, to whom it provides such PHI agrees to

implement reasonable and appropriate safeguards to protect the PHI; and

(c) Report to the Covered Entity any Security Incident of which it becomes aware.

ARTICLE VI
INDEMNIFICATION.

Business Associate shall indemnify, defend and hold harmless the Covered Entity, its sponsor, if different from Covered Entity, and sponsor's and Covered Entity's affiliates ("Indemnified Parties"), from and against any and all losses, expense, damage or injury (including, without limitation, all costs and attorneys' fees) that the Indemnified Parties may sustain as a result of, or arising out of (a) a breach of this BAA by Business Associate or its agents or Subcontractors, including but not limited to any unauthorized use, disclosure or breach of PHI, (b) Business Associate's failure to notify any and all parties required to receive notification of any Breach of Unsecured PHI pursuant to **Section 2.04** or (c) any negligence or wrongful acts or omissions by Business Associate or its agents or Subcontractors, including without limitations, failure to perform Business Associate's obligations under this BAA, the Privacy Rule or the Security Rule.

Notwithstanding the foregoing, nothing in this Section shall limit any rights any of the Indemnified Parties may have to additional remedies under the Underlying Agreement or under applicable law for any acts or omissions of Business Associate or its agents or Subcontractors. The parties acknowledge and agree that, to the extent this Article VI is inconsistent with any agreement of the parties in the Underlying Agreement, this Article VI of this BAA shall control.

ARTICLE VII
TERM AND TERMINATION.

Section 7.01 This BAA shall be in effect as of the Effective Date, and shall terminate on the earlier of the date that:

(a) The term of this Agreement shall be effective for ten (10) years; or

(b) Either party terminates for cause as authorized under **Section 7.02**.

Section 7.02 Upon either party's knowledge of material breach by the other party, the non-breaching party shall provide an opportunity for the breaching party to cure the breach or end the violation; or terminate the BAA. If the breaching party does not cure the breach or end the violation within a reasonable timeframe not to exceed fifteen (15) days from the notification of the breach, or if a material term of the BAA has been breached and a cure is not possible, the non-breaching party may terminate this BAA and the Underlying Agreement, upon written notice to the other party.

Section 7.03 Upon termination of this BAA for any reason, the parties agree that upon termination of this BAA for any reason, Business Associate, with respect to PHI received from Covered Entity, or created, maintained, or received by Business Associate on behalf of Covered Entity, shall:

(a) Retain only that PHI that is necessary for Business Associate to continue its proper

management and administration or to carry out its legal responsibilities.

(b) Return to Covered Entity [or, if agreed to by Covered Entity, destroy] the remaining PHI that the Business Associate still maintains in any form.

(c) Continue to use appropriate safeguards and comply with Subpart C of 45 C.F.R. Part 164 with respect to ePHI to prevent use or disclosure of the PHI, other than as provided for in this Section 7, for as long as Business Associate retains the PHI.

(d) Not use or disclose the PHI retained by Business Associate other than for the purposes for which such PHI was retained and subject to the same conditions set out at paragraphs (2) and (3) above under "Specific Other Uses and Disclosures"] which applied prior to termination.

(e) Return to Covered Entity [or, if agreed to by Covered Entity, destroy] the PHI retained by Business Associate when it is no longer needed by Business Associate for its proper management and administration or to carry out its legal responsibilities.

Section 7.04 The obligations of Business Associate under this Section 7 shall survive the termination of this BAA and the Underlying Agreement.

ARTICLE VIII
MISCELLANEOUS.

Section 8.01 The parties agree to take such action as is necessary to amend this BAA to comply with the requirements of the Privacy Rule, the Security Rule, HIPAA, ARRA, the HITECH Act, the HIPAA Rules and any other applicable law.

Section 8.02 The respective rights and obligations of Business Associate under **Article VI** and **Article VII** of this BAA shall survive the termination of this BAA.

Section 8.03 This BAA shall be interpreted in the following manner:

(a) Any ambiguity shall be resolved in favor of a meaning that permits Covered Entity to comply with the HIPAA Rules.

(b) Any inconsistency between the BAA's provisions and the HIPAA Rules, including all amendments, as interpreted by the HHS, court or another regulatory agency with authority over the Parties, shall be interpreted according to the interpretation of the HHS, the court or the regulatory agency.

(c) Any provision of this BAA that differs from those mandated by the HIPAA Rules, but is nonetheless permitted by the HIPAA Rules, shall be adhered to as stated in this BAA.

Section 8.04 This BAA constitutes the entire agreement between the parties related to the subject matter of this BAA, except to the extent that the Underlying Agreement imposes more stringent requirements related to the use and protection of PHI upon Business Associate. This BAA supersedes all prior negotiations, discussions, representations or proposals, whether oral or written. This BAA may not be

modified unless done so in writing and signed by a duly authorized representative of both parties. If any provision of this BAA, or part thereof, is found to be invalid, the remaining provisions shall remain in effect.

Section 8.05 This BAA will be binding on the successors and assigns of the Covered Entity and the Business Associate. However, this BAA may not be assigned, in whole or in part, without the written consent of the other party. Any attempted assignment in violation of this provision shall be null and void.

Section 8.06 This BAA may be executed in two or more counterparts, each of which shall be deemed an original.

Section 8.07 Except to the extent preempted by federal law, this BAA shall be governed by and construed in accordance with the laws of the State of Nebraska unless the Underlying Agreement specifies that a different state's laws shall control in which event this BAA shall be subject to the laws of the state specified in the Underlying Agreement.

Section 8.08 A waiver with respect to one event shall not be construed as continuing, or as a bar to or waiver of any right or remedy as to subsequent events.

	Agreement Date 9-1-25 to 8-31-26	# of Calls	Rate Per Call	Amount Due from Each Fire District
1.	Adams, Village of	6	$ 673.16	$ 4,038.96
2.	Bennet Rural Fire District	1	$ 673.16	$ 673.16
3.	Ceresco Rural Fire District	2	$ 673.16	$ 1,346.32
4.	Clatonia, Village of	1	$ 673.16	$ 673.16
5.	Cortland Rural Fire District	0	$ 673.16	$ -
6.	Douglas, Village of	3	$ 673.16	$ 2,019.48
7.	Elmwood Rural Fire District	0	$ 673.16	$ -
8.	Firth Rural Fire District	1	$ 673.16	$ 673.16
9.	Greenwood, Village of	0	$ 673.16	$ -
10.	Hallam Rural Fire District	3	$ 673.16	$ 2,019.48
11.	Hickman Rural Fire District	5	$ 673.16	$ 3,365.80
12.	Malcolm-Rural Fire District	8	$ 673.16	$ 5,385.28
13.	Palmyra, Village of	3	$ 673.16	$ 2,019.48
14.	Raymond Rural Fire District	10	$ 673.16	$ 6,731.60
15.	Southeast Rural Fire District	4	$ 673.16	$ 2,692.64
16.	Southwest Rural Fire District	0	$ 673.16	$ -
17.	Valparaiso Rural Fire District	3	$ 673.16	$ 2,019.48
18.	Waverly, City of	10	$ 673.16	$ 6,731.60
	TOTAL	60		$40,389.60

AGREEMENT

THIS AGREEMENT is entered into by and between the City of Waverly, Nebraska, hereinafter referred to as "the City," and the County of Lancaster, Nebraska, a political subdivision of the State of Nebraska, hereinafter referred to as "the County."

WHEREAS, the Interlocal Cooperation Act, Neb. Rev. Stat. § 13-801 *et seq*. (Reissue 2012), permits units of local government in the State of Nebraska to cooperate with other localities on a basis of mutual advantage and thereby provide services in a manner that will best serve local communities;

WHEREAS, Lancaster County and the City of Waverly are responsible for providing road improvement and maintenance to the streets and roads located within their respective jurisdictions;

WHEREAS, the City desires to improve a portion of Oldfield Street located within the City's corporate limits, from N. 141st Street to Canongate Road ("the Road"), by regrading and applying Permazyme to its surface (the Project);

WHEREAS, the County has the ability to make such road improvements, and agrees to perform such work on the basis of mutual advantage according to the terms and conditions included in this Agreement; and

WHEREAS, the City agrees to compensate the County for such road improvements as further stated herein.

NOW, THEREFORE, in consideration of the above recitals and mutual covenants contained herein, it is agreed between the parties as follows:

1) Term. The length of this Agreement shall begin from the date of execution by both parties and shall terminate upon completion of the Project or on November 3, 2026, whichever is sooner. The Term may be extended by mutual written agreement of the parties.

2) Project. The purpose of this Agreement is to improve a portion of Oldfield Street, from N. 141st Street to Canongate Road by regarding and applying Permazyme to the road's surface. The Project lies fully inside the corporate limits of the City of Waverly.

3) Responsibilities.

A. The City will have the following duties and responsibilities:

i. The City hereby permits the County to perform the regrading and Permazyme application work within the City's corporate limits.

ii. The City agrees to compensate the County for such work in

accordance with the cost estimate attached hereto as Attachment "A" and incorporated by this reference.

iii. At least thirty (30) days prior to beginning work on the Project, the County shall invoice the City and the City shall pay to the County the sum of $21,343.48 (twenty-one thousand, three hundred forty-three dollars and forty-eight cents) in accordance with the cost estimate in Attachment "A".

iv. In the event that the total of the actual costs of materials, equipment, supplies, and/or labor to complete the Project exceeds the estimated total cost identified in Attachment "A", the City agrees to pay the County for the additional cost within thirty (30) days of receiving an invoice from the County.

B. The County will have the following responsibilities:

i. The County shall be responsible for regrading and applying the Permazyme application on Oldfield Street from 141st Street to Canongate Road, in accordance with all applicable state and federal laws.

ii. The construction, placement of barricades, and posting of warning signs in the area of construction will be the responsibility of the County.

iii. To the extent that the total of the actual costs of materials, equipment, supplies, and/or labor to complete the Project exceeds the estimated costs identified in Attachment "A", Lancaster County will invoice the City for the difference.

iv. In the event the total of the actual costs of materials, equipment, supplies, and/or labor to complete the Project are less than the estimated costs identified in Attachment "A", the County agrees to make a payment to the City to reimburse the City for costs paid that exceed the actual costs.

4) Ongoing Maintenance. The City shall continue to be responsible for maintenance of its respective portions of Oldfield Street following completion of the Project. The parties agree that the County expressly does not assume responsibility for any future maintenance of the portions of Oldfield Steet that lie within the City's corporate limits.

5) Independent Contractor. It is the express intent of the parties that this Agreement shall not create an employer-employee relationship. Employees of the City shall not be deemed to be employees of the County and employees of the County shall not be deemed to be employees of

the City.

6) Assignment. Neither the County nor the City shall assign its duties and responsibilities under this Agreement without the express written permission of the other party to this agreement. However, it is expressly understood and agreed to by the parties that the County may subcontract the pavement construction services outlined herein.

7) Hold Harmless. Each party agrees to indemnify and hold harmless, to the fullest extent allowed by law, the other party and its principals, officers, and employees from and against all claims, demands, suits, actions, payments, liabilities, judgments and expenses (including court-ordered attorneys' fees), arising out of or resulting from the acts or omissions of their principals, officers, or employees in the performance of this Agreement. Liability includes any claims, damages, losses, and expenses arising out of or resulting from performance of this Agreement that results in any claim for damage whatsoever including any bodily injury, civil rights liability, sickness, disease, or damage to or destruction of tangible property, including the loss of use resulting therefrom. Further, each party shall maintain a policy or policies of insurance (or a self-insurance program), sufficient in coverage and amount to pay any judgments or related expenses from or in conjunction with any such claims. Nothing in this Agreement shall require either party to indemnify or hold harmless the other party from liability for the negligent or wrongful acts or omissions of said other party or its principals, officers, or employees.

8) Subcontractors. The County agrees to require any contractors or subcontractors, providing services under this agreement, to indemnify and hold the City harmless to the same extent and as provided in Section 7, of this Agreement.

9) Severability. If any portion of this Agreement is held invalid, the remainder hereof shall not be affected thereby if such remainder would then continue to conform to the terms and requirements of applicable law.

10) Equal Employment Opportunity. In connection with the carrying out of the activities provided herein, neither the County nor the City shall discriminate against any bidder, employee, applicant for employment, or any other person because of race, color, religion, sex, disability, national origin, age, marital status or receipt of public assistance.

11) Termination. This Agreement may be terminated at any time by either party giving thirty (30) days written notice. However, such termination shall not affect obligations that have been incurred prior to the notice of termination or money owed by either party for work performed under this Agreement prior to termination.

12) This Agreement constitutes the entire agreement between the parties with respect to the subject matter herein and merges all prior discussions between them. It shall not be modified except by written agreement dated subsequent to the date of this Agreement and signed by all parties.

EXECUTED this _____ day of _____, 2025, by Lancaster County, Nebraska.

By: _____
Chair
Lancaster County Board of
Commissioners

APPROVED AS TO FORM:
This _____ day of _____, 2025.

_____
Deputy County Attorney
for PAT CONDON
County Attorney

EXECUTED this _____ day of _____, 2025, by the City of Waverly, Nebraska.

City of Waverly

By: _____

City of Waverly

APPROVED AS TO FORM:
This _____ day of _____, 2025.

_____
City Attorney

ATTACHMENT "A"

LANCASTER COUNTY ENGINEERING DEPARTMENT
ENGINEERS ESTIMATE

Date	October 23, 2025	**Project Part**	WPA & Salt Storage Property
Project Description	Permazyme (Regrade and Application)	**Proj Location**	Waverly - Oldfield Street

	Item No.	Item	Estimate	Type	Rate	Amount
Regrade before Permazyme						
		Workers				
	1	Worker #1	10.00	Hour	$43.68	$436.80
	2	Worker #2	6.00	Hour	$47.88	$287.28
	3	Worker #3	6.00	Hour	$44.82	$268.92
		Total Workers =				**$993.00**
		Vehicles				
	4	#0322	10.00	Hour	$79.45	$794.50
	5	#0185	6.00	Hour	$87.56	$525.36
	6	#0189	6.00	Hour	$61.82	$370.92
	7	#3401	6.00	Hour	$5.00	$30.00
		Total Vehicle =				**$1,720.78**
		Rock				
	8	Rock	120.00	Ton	$30.85	$3,702.00
		Total Rock =				**$3,702.00**
		Total Regrade before Permazyme =				**$6,415.78**
Permazyme Application						
		Workers				
	1	Worker #1	10.00	Hour	$43.68	$436.80
	2	Worker #2	6.00	Hour	$49.83	$298.98
	3	Worker #3	10.00	Hour	$40.32	$403.20
	4	Worker #4	10.00	Hour	$44.82	$448.20
	5	Worker #5	7.00	Hour	$47.88	$335.16
	6	Worker #6	6.00	Hour	$37.33	$223.98
		Total Workers =				**$2,146.32**
		Vehicles				
	7	#0322	10.00	Hour	$79.45	$794.50
	8	#0336	6.00	Hour	$104.69	$628.14
	9	#0181	5.00	Hour	$8.51	$42.55
	10	#0309	4.00	Hour	$49.11	$196.44
	11	#0171	5.00	Hour	$88.53	$442.65
	12	#0189	5.00	Hour	$61.82	$309.10
	13	#3401	5.00	Hour	$87.56	$437.80
	14	#0185	7.00	Hour	$87.56	$612.92
	15	#1068	7.00	Hour	$87.56	$612.92
	16	#0362	4.00	Hour	$31.09	$124.36
	17	#3302	4.00	Hour	$5.00	$20.00
		Total Vehicle =				**$4,221.38**
		Rock				
	18	Rock	200.00	Ton	$30.85	$6,170.00
		Total Rock =				**$6,170.00**
		Drum Roller				
	19	84in Smooth Drum Roller	1.00	Week	$2,390.00	$2,390.00
		Total Drum Roller =				**$2,390.00**
		Permazyme				
	20	Permazyme	7.50	Gallons		$0.00
		Total Permazyme =				**$0.00**
		Total Permazyme Application =				**$14,927.70**
		ENGINEERS TOTAL ESTIMATE				**$21,343.48**

GREGG
ELECTRIC CO
EST. 1911 | OVER 100 YEARS OF SERVICE

3521 N 22nd Street • Lincoln, NE 68521 • Phone: (402) 476–6463 • Fax: (402) 476-6491 • www.GreggElectric.net

October 24, 2025

City of Waverly

RE: Furnish power to NE Waverly Wastewater Treatment Plant

To Whom it May Concern:

We are pleased to provide you with our proposal for the electrical work on the referenced project. Our lump sum base bid price is $28,840.00.

If you have any questions or require any additional information, please call.

Very Truly Yours,
GREGG ELECTRIC COMPANY

Frank Dush

Capitol City Electric
4501 S 86th St. Suite 101
Lincoln, NE, 68526
P 402-420-7435
capitolcityelectricinc.com

PROJECT INFORMATION	PROPOSAL DATE	EXPIRATION
Air Gas Monitor Installation 14130 Lancashire Street P.O. Box 427 Waverly, Nebraska 68462	**October 21, 2025**	**Valid 10 days from the Proposal Date.** *(unless noted below)*

PREPARED FOR	DRAWINGS	
Tracey Whyman **City of Waverly** 14130 Lancashire Street P.O. Box 427 Waverly, Nebraska 68462 Publicworksdirector@citywaverly.com (402) 786-2312	**Drawing Date:** **Addendums:**	***NO DRAWINGS ACKNOWLEDGED*** ***NO ADDENDA ACKNOWLEDGED***

PROJECT OVERVIEW

Capitol City Electric, Inc. (CCE) is pleased to submit our **Not to Exceed** proposal for the above-mentioned project. It is understood that this project will be billed on a "Time and Material" basis according to the negotiated rates. Proposal is based on the scope of work below and the inclusions and exclusions of this document.

PROJECT PRICING

BASE BID: $30,600.00

Thirty thousand, six hundred dollars

SCOPE OF WORK

AIR GAS MONITOR INSTALLATION

- Install (4) owner-provided 'Beacon 410A' gas monitoring cabinets – (1) for wet well sensors, (1) for dry well sensors, (2) for pump room sensors.
- Install (4) owner-provided '35-3001-01' combustible gas sample-draw detectors.
- Install (16) owner-provided 'M2A' transmitters.
- Provide and install PVC-coated RMC conduit/fittings/boxes for wet well sensors (C1, D1 areas).
- Provide and install RMC conduit/fittings/boxes for dry well and pump room sensors (C1, D2 areas).
- Provide/install/terminate cabling for all 'M2A' sensors.
- Provide and install 24vDC power supplies to power 'Beacon 410A' cabinets and '35-3001-01' detectors.
- Provide and install seal-offs in conduit runs per NEC requirements.

INCLUSIONS & EXCLUSIONS

We **INCLUDE** the following items:

1. Branch power system
2. Grounding system

We **EXCLUDE** the following items:

1. Liquidated damages.
2. Material escalation/Tariffs
3. Commissioning/testing gas sensors.

CLARIFICATION & ASSUMPTIONS

- This proposal excludes all premium time work unless specifically included below. Any premium time work required due to the action or inaction of others will be performed only upon receipt of written direction and approval of any additional costs associated with this work. The proposal assumes Regular working hours are 7 AM-4 PM, Monday-Friday.
- This proposal is based on the presumption that it is the responsibility of the designing engineer/architect to provide complete and accurate documents for our installation. With that, this proposal excludes any additional design or engineering work and/or cost required due to insufficient drawings or specifications. The price of this proposal is based solely on the documents provided.

CONDITIONS

- We qualify for a payment and performance bond if required, but the costs of premiums are not included in this proposal.

- Costs for Builder's Risk or Owner's Protective Insurance are not included.
- In the event an order is cancelled, customer acknowledges that supplier will immediately cease all work on the project and prepare final project costs based upon material costs and person-hours expended from the commencement of the project until the date of cancellation.
- All material is guaranteed to be as specified. All work to be completed in a workmanlike manner according to standard practices. Any Alteration or deviation from above specifications involving extra costs will be executed only upon written orders and will become an extra charge over and above the estimate. All agreements contingent upon strikes, accidents, or delays beyond our control. Customer to carry fire, tornado, and other necessary insurance. Our workers are fully covered by Workman's Compensation Insurance.
- Repairs will be approved by customer and a PO will be issued for each repair.
- This Capitol City Electric, Inc. (CCE) proposal is subject to a Force Majeure clause for a pandemic (e.g., Covid- 19) as declared by the World Health Organization ("WHO") and the corresponding governmental orders and regulations. This clause applies to CCE's inability to perform its contractual obligations based on the unforeseeable events that may have a future impact on our labor force, the timely delivery of materials, and the escalation of the cost of said materials. CCE will keep you apprised if this situation develops, and CCE will contact all parties in the proposal. CCE welcomes the opportunity develop risk avoidance and mitigation strategies with you and all other parties involved (e.g., Owner, General Contractor, Architects, Engineers, etc.).
- Capitol City Electric, Inc. reserves the right to negotiate contract documents.
- All building cable is subject to "non-metal" increases, which will be adjusted appropriately on the day of award. Non-Metal increases are petroleum-based impacts to pricing for insulation, trucking, etc.
- If prior to the performance of this contract, written notification to proceed, and/or signed contract, the price of material increases, through no fault of Subcontractor, the price of material shall be equitably adjusted by an amount reasonably necessary to cover any such price increase. The Prime Contractor shall be given written notice with detailed/itemized breakdown of the material increase and the subcontract sum shall be increased by the difference of new increased material price, which will not include profit.
- CCE shall not be held liable for delays in construction due to equipment not being delivered per the schedule provided or delays by other contractors.
- CCE shall not be held liable for errors or omissions in the designs of others, nor inadequacies of material and equipment specified or supplied by others.

All work to be completed in a professional manner according to standard Practices. Any alteration or deviation from above specifications involving extra costs will be executed only upon written orders and will become an extra charge over and above the estimate.

CONTACT INFORMATION

Alex Wooters | Service Department
Capitol City Electric
| awooters@cce-ne.com

ACCEPTED BY:

Printed Name: _____

Signature: _____

Date: _____

Waverly, NE Wastewater Treatment Plant

Controller X 3

CH4 X 4

O2 X 4

CO X 4

H2S X 4

Pump pulling air sample from tubing running up to the ceiling area

Dry Well

Controller

CH4

CO

O2

H2S

Wet Well

Controller

CH4

CO

O2

H2S

CH4 Sensors at accessible height level for easier maintenance,

(calibration, or sensor replacement).

Pump Room

Controller Upstairs

CH4

CH4

CO

O2

O2

CO

H2S

H2S

Ceiling is lower, allowing for direct LEL sensor placement in danger zone.

Due to the size of this room, a second set of sensors is recommended.