Projects Committee Meeting
Thursday, May 29, 2025 7:30 AM
Lower Platte North NRD Office
P.O. Box 126
Wahoo, NE 68066

1. UNFINISHED BUSINESS

2. SWCP
   Adam Brockman, Conservation Technician, will be present to discuss status of SWCP projects and outlook for upcoming fiscal year.
   2.A. SWCP Application Approvals

   2.B. SWCP Payments
   Below is a completed tree planting to be approved for payment:

REECE KLUG	$	488.80	**Farmstead windbreak**

   2.C. SWCP Cancellations

   2.D. Wahoo Creek Cost Share Approvals

3. JOINT WATER MANAGEMENT ADVISORY BOARD (JWMAB)

   3.A. West Fremont - FEMA BRIC

   3.B. Rawhide Creek Watershed - NRCS WFPO
   Update from Director Tonnies to be given.

4. SHELL CREEK WATERSHED

   4.A. Shell Creek Implementation - 319 & NET
   The Final Bend project is complete and we expect to see a bill from Colfax County soon. An additional large stream bank erosion project is being investigated next to Christ Lutheran School.
   NDEE conducted training for volunteer monitoring students in Newman Grove on May 22nd and Schuyler on May 28th. Maslonka went to the Schuyler training - pictures attached. We are working with Lakeview to set a training date soon.
   The next SCWIG meeting is scheduled for June 17th. Moriah Brown, a PHD student at UNL, originally planned to present her work at the March meeting but is now planning to present at the June meeting. Moriah's work is focused on antibiotic resistant bacteria in surface water samples taken from Shell Creek.

5. WAHOO CREEK WATERSHED

   5.A. Construction Update
   Monthly construction updates:

- 24" Principal Spillway pipe has been set at site 27 on 5/23. Pressure testing to be conducted week of 5/27 (weather permitting). Riser structure construction to begin week of 6/2.
- Foundation/sand drains completed at site 27.
- Shoreline stabilization at site 27 completed.
- Shanahan is planning on transitioning work over to site 26A as TCI begins riser/spillway work at site 27

TCI invoice #6 attached.

5.B. Dam Site Planning Update

5.B.1. Design - Olsson

Olsson has addressed NRCS comments for site 84 and has submitted design to DNR for review.

Olsson environmental team will submit the Phase 2 404 permit to Army Corps of Engineers the week of 5/26; the Corps review is allotted 120 days. There were no comments requiring reworking of biological assessment from any partner agency reviews.

5.B.2. Real Estate - Olsson & Great Plains Appraisal

Danielle will be available at Board meeting to discuss acquisition status and approval of purchase agreements.

Invoice attached

5.B.3. Funding - NRCS WFPO & NeDNR JEDI

The appropriations bill passed by the unicameral on May 15th does not appear to reduce or limit our annual use of JEDI funds under contract. As such, we will proceed as planned.

5.C. Water Quality - NWQI & 319

Postcards were sent to producers within the Wahoo Creek Watershed on Friday, May 23rd promoting the NWQI program. 927 postcards were sent.

6. LOWER PLATTE RIVER CORRIDOR ALLIANCE

The meeting was held on May 8th at the Lower Platte South NRD with all entities represented. Preliminary results from the long term water quality trend analysis include: turbidity going down, nitrate decreasing, water temperature increasing, and dissolved oxygen decreasing. The final report is planned to be published by 7/31/2026 with a preliminary draft available to the Alliance in November 2025. Attached is the Alliance's FY26 budget.

Agency updates:

USGS = flows in the Lower Platte continue to be lower than average. Lower flows account for turbidity at half of normal, water temperature increases of 10 degrees, higher dissolved oxygen, and lower nitrate.

NDEE & NeDNR are merged to NWEE

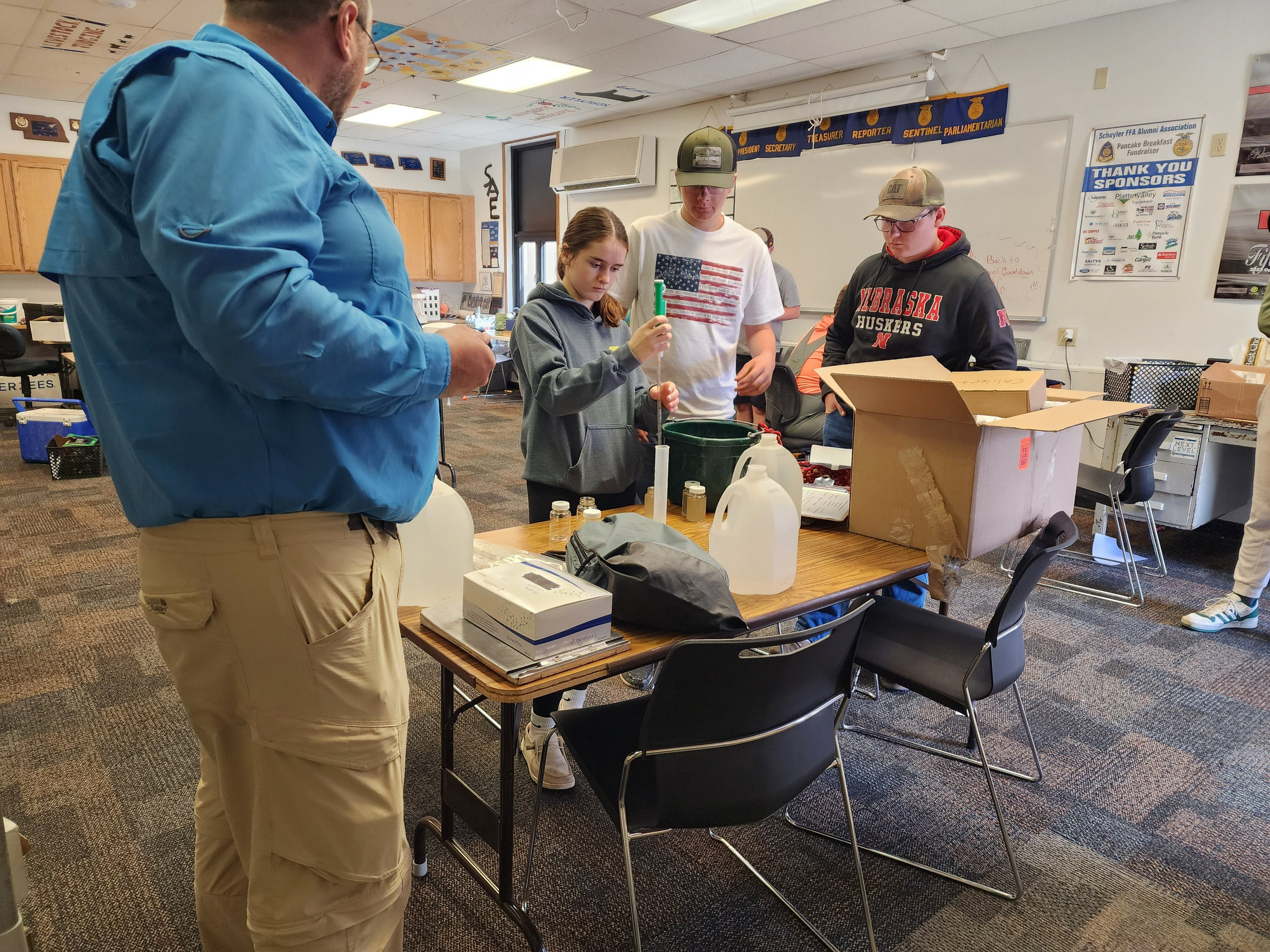
NDEE = will be sampling in the Lower Platte Basin in 2027. E. coli assessment methodology changed which will make segments drop on and off the list rapidly. As such, two segments of the Lower Platte will be delisted soon.

NG&P = Fremont SRA received upgrades
LPS = the Legislature took $2.9 million from their originally appropriated $8.3 million for the Mopac trail connector. LPS has an airboat tour scheduled for June 6th with directors and 4 state senators. They plan to stop at several project including the Highway 34 bridge and Lincoln Water Systems horizontal wells.
National Guard = looking to hire someone in FY26. This person may have some capacity to support the Alliance.

7. MORSE BLUFF LEVEE
   The unicameral funded the project through the Biennial Budget passed on May 15th. The budget states 'Appropriate $2.5 million from JEDI Fund for additional flood control project'.
8. EROSION AND SEDIMENT RULES AND REGULATIONS

9. HAZARD MITIGATION PLAN UPDATE
   The Lower Platte North NRD Hazard Mitigation Plan draft is attached. This draft includes the latest revisions following the second round of meetings. The draft is available for public comment from Monday, May 12 to Monday June 2, 2025. At the end of the Public Review Period, the completed plan will be submitted to the Nebraska Emergency Management Agency (NEMA) and the Federal Emergency Management Agency (FEMA) for final approval. This is our last opportunity to review the plan. The Board will need to adopt the Plan by resolution at our June Board meeting. Attached is a draft resolution.

   JEO has sent the Drought Mitigation Plan draft for the NRD to review. Attached is the plan as well as the invoice and progress report.
10. AUDUBON SOCIETY
    The Wachiska Audubon Society was awarded a 3-year Nebraska Environmental Trust Grant to support prairie habitat preservation efforts. At the August 12, 2024 Board Meeting, the Board passed a motion to "support the Wachiska Audubon Society NET grant and pledge $1,000 for three years beginning July 1, 2025." As such, our first $1,000 pledge is on Bills Pending for the July Board Meeting and we will budget $1,000 for FY27 and FY28.
11. OTHER
    The Village of Colon informed the NRD that the Village's park project is expected to be completed this June. The Board approved up to $2,000 for tree planting and trail development.
12. ADJOURNMENT


PRESIDENT
SECRETARY
TREASURER
REPORTER
SENTINEL
PARLIAMENTARIAN
Schuyler FFA Alumni Association
Pancake Breakfast Fundraiser
THANK YOU SPONSORS
NEBRASKA
HUSKERS
Back to
eurofins



CERTIFICATE OF PAYMENT: 006

Date of Issuance: May 22, 2025

Project: LPNNRD Wahoo Creek Watershed Sites 26A 26B and 27 **Project No.:** 018-3423

Contractor: Thompson Construction

DETAILED ESTIMATE

Description	Unit Price	Extension
Refer to Attached Progress Estimate #6 thru 05-22-2025		
PLEASE REMIT PAYMENT TO: Thompson Construction 2404 N Lincoln Ave Fremont, NE 68025		

Value of Work Completed This Request: $ 873,620.50

Original Contract Value: $ 4,314,772.70

Approved Change Orders:

No. 1 $24,274.50

No. 2

No. 3

Total Contract Value: $ 4,339,047.20

Value of completed work and materials stored to date ..... $ 873,620.50

Less retainage percentage 10% ..... $ 87,362.05

Net amount due including this estimate ..... $ 786,258.45

Less: Estimates previously approved:

No. 1	$153,421.65	No. 2	$107,054.10	No. 3	$167,139.00
No. 4	$34,211.70	No. 5	$116,193.60	No. 6	
No. 7		No. 8		No. 9	
No. 10		No. 11		No. 12	

Total Previous Estimates: $578,020.05

NET AMOUNT DUE THIS ESTIMATE: $ 208,238.40

The undersigned hereby certifies, based upon periodic observations as set forth in scope of work and the data included in all applicable payment applications that, to the best of its knowledge, information and belief: (1) the work has progressed as indicated in the applicable payment applications; (2) the work performed and materials delivered by Contractor are in conformance with the plans and specifications; and (3) the Contractor, in accordance with the contract, is entitled to payment as indicated above.

This certification does not constitute a warranty or guarantee of any type. Client shall hold its Contractor solely responsible for the quality and completion of the Project, including construction in accordance with the construction documents. Any duty or obligation of Olsson hereunder is for the sole benefit of the Client and not for any third party, including the Contractor or any Subcontractor.

cc: Project File
Sean Elliott - LPNNRD
Lance French - Thompson Construction

OLSSON

By: _____

THOMPSON CONSTRUCTION INC.
2404 N LINCOLN AVE FREMONT, NE 68025 - PHONE – 402-704-2008 - FAX – 402-704-2009

PAY APPLICATION NO. 6

To: LOWER PLATTE NORTH NATURAL RESOURCES DISTRICT
From: THOMPSON CONSTRUCTION, INC.
Contract For: WAHOO CREEK WATERSHED DAM STRUCTURES 26A, 26B, AND 27
ENGINEER's Project No. 018-3423
For Work accomplished through the date of: 5/22/25

1. Original Contract Price:			$ 4,314,772.70
2. Net change by Change Orders and Written Amendments (+ or -):			$ 24,274.50
3. Current Contract Price (1 plus 2):			$ 4,339,047.20
4. Total completed and stored to date:			$ 873,620.50
5. Percent of Project Completed	16%		
6. Retainage (per agreement):			
10% of completed Work and Stored Materials:		$ 87,362.05	
(10% of the first 50% of work completed & stored)			
Total Retainage:			$ 87,362.05
7. Total completed and stored to date less retainage (4 minus 6):			$ 786,258.45
8. Less previous Application for Payments:			$ 578,020.05
9. DUE THIS APPLICATION (7 MINUS 8):			**$ 208,238.40**

Accompanying Documentation:

CONTRACTOR'S Certification:

The undersigned CONTRACTOR certifies that (1) all previous progress payments received from OWNER on account of Work done under the Contract referred to above have been applied on account to discharge CONTRACTOR's legitimate obligations incurred in connection with Work covered by prior Applications for Payment numbered 1 through 1 inclusive; (2) title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to OWNER at time of payment free and clear of all Liens, security interests and encumbrances (except such as are covered by a Bond acceptable to OWNER indemnifying OWNER against any such Lien, security interest or encumbrance); and (3) all Work covered by this Application for Payment is in accordance with the Contract Documents and not defective.

Dated: 5/22/25 Thompson Construction

By: Kelly Thompson

Payment of the above AMOUNT DUE THIS APPLICATION is recommended.

Dated: _____ _____

By: _____

APPLICATION APPROVED BY:

By: _____

Title: _____ Date: _____

ATTEST:

By: _____ Title: _____

THOMPSON CONSTRUCTION INC.
2404 N LINCOLN AVE FREMONT, NE 68025 - PHONE – 402-704-2008 - FAX – 402-704-2009

PROGRESS ESTIMATE 6

Owner: LOWER PLATTE NORTH NATURAL RESOURCE DISTRICT
Project: WAHOO CREEK WATERSHED
DAM STRUCTURES 26A, 26B, AND 27
Contractor: THOMPSON CONSTRUCTION INC

TOTAL STORED: $ 163,442.00
TOTAL COMPLETED: $ 710,178.50
TOTAL PLUS STORED: $ 873,620.50

Date: 22-May-25
Estimate No.: 6
Project No.: 018-3423

ITEM NO.	QTY	UNIT	DESCRIPTION	MATERIAL STORED	QTY TO DATE	UNIT PRICE	TOTAL	TOTAL PLUS STORED MATERIAL
SITE 26A								
1	1	LS	MOBILIZATION		0.5	$ 50,000.00	$ 25,000.00	**$ 25,000.00**
2	1	LS	CONSTRUCTION STAKING		0.1	$ 12,000.00	$ 1,200.00	**$ 1,200.00**
3	1	EA	CONSTRUCTION ENTRANCE		1	$ 2,625.00	$ 2,625.00	**$ 2,625.00**
4	1	LS	DEWATERING		0	$ 15,000.00	$ -	$ -
5	12	AC	GENERAL CLEARING AND GRUBBING		8	$ 2,900.00	$ 23,200.00	**$ 23,200.00**
7	86720	CY	EARTHWORK FILL (AT1.2 COMPACTION)		0	$ 3.90	$ -	$ -
8	13543	CY	EARTHWORK CUT AND SPOIL		0	$ 4.00	$ -	$ -
9	1047	TN	AGGREGATE 47B FINE		0	$ 34.00	$ -	$ -
10	8	TN	1" WASHED AGGREGATE		0	$ 105.00	$ -	$ -
11	200	TN	C33 #8 AGGREGATE		0	$ 55.00	$ -	$ -
12	4273	TN	CLASS B RIP RAP - STORED = 688 TONS @$72.00 / TON	$ 49,536.00	0	$ 90.00	$ -	**$ 49,536.00**
13	998	TN	3" CRUSHED AGGREGATE		0	$ 45.00	$ -	$ -
14	1022	LF	6" PERFORATED DUAL WALL PVC		0	$ 23.00	$ -	$ -
15	90	LF	8" GALVANIZED STEEL PIPE		0	$ 25.00	$ -	$ -
16	177	LF	24" RCPP PRINCIPAL SPILLWAY		0	$ 550.00	$ -	$ -
17	2	EA	PRINCIPAL SPILLWAY PIPE SUPPORTS		1.5	$ 4,000.00	$ 6,000.00	**$ 6,000.00**
18	29	CY	STRUCTURAL CONCRETE (CLASS 4000)		0	$ 2,000.00	$ -	$ -
19	5320	LB	REINFORCING STEEL	$ 3,277.00	0	$ 2.50	$ -	**$ 3,277.00**
20	1	LS	METAL FABRICATION	$ 6,063.00	0	$ 11,000.00	$ -	**$ 6,063.00**
21	3	EA	SHEETPILE HEADWALL	$ 2,570.00	0	$ 1,700.00	$ -	**$ 2,570.00**
22	24	LF	18" CCP LOW STAGE INLET PIPE		0	$ 75.00	$ -	$ -
23	1	EA	18" CONCRETE TRASH RACK		0	$ 3,000.00	$ -	$ -
24	53	LF	12" PVC DRAWDOWN PIPE		0	$ 60.00	$ -	$ -
25	1	EA	12" BAR TRASH RACK		0	$ 400.00	$ -	$ -
26	1	EA	12" LINE GATE	$ 6,617.00	0	$ 30,000.00	$ -	**$ 6,617.00**
27	2300	LF	FENCE REMOVAL(ADB ENGINEER)		0	$ 1.00	$ -	$ -
28	1420	LF	FENCE PLACEMENT(ADB ENGINEER)		0	$ 8.00	$ -	$ -
29	2	EA	GATE		0	$ 650.00	$ -	$ -
30	2	EA	BRASS CAP MONUMENTS		0	$ 1,300.00	$ -	$ -
31	7.9	AC	SEEDING		0	$ 2,400.00	$ -	$ -
32	2960	LF	WATTLES		0	$ 4.00	$ -	$ -
33	3	EA	PERMANENT PIEZOMETER(W/ BOLLARDS)		0	$ 8,000.00	$ -	$ -
34	4	EA	SETTLEMENT PLATE		0	$ 2,500.00	$ -	$ -
35	1100	LF	TYPE B DIVERSION		0	$ 2.40	$ -	$ -
36	100	LF	DRAIN TILE REMOVAL (ADB ENGINEER)		0	$ 5.00	$ -	$ -
37	100	LF	DRAIN TILE PLACEMENT(ADB ENGINEER)		0	$ 10.00	$ -	$ -
38	0	EA	SEPTIC TANK AND LATERAL FIELD		0	$ -	$ -	$ -
39	1	LS	QUALITY CNTROL INSPECTION		0	$ 6,500.00	$ -	$ -
40	150	SY	GEOTEXTILE FILTER FABRIC		0	$ 12.00	$ -	$ -
			TOTAL 26A	**$ 68,063.00**			**$ 58,025.00**	**$ 126,088.00**

THOMPSON CONSTRUCTION INC.
2404 N LINCOLN AVE FREMONT, NE 68025 - PHONE - 402-704-2008 - FAX - 402-704-2009

ITEM NO.	QTY	UNIT	DESCRIPTION	MATERIAL STORED	QTY TO DATE	UNIT PRICE	TOTAL	TOTAL PLUS STORED MATERIAL
SITE 26B								
1	1	LS	MOBILIZATION		0.5	$ 50,000.00	$ 25,000.00	**$ 25,000.00**
2	1	LS	CONSTRUCTION STAKING		0.1	$ 12,000.00	$ 1,200.00	**$ 1,200.00**
3	1	EA	CONSTRUCTION ENTRANCE		0	$ 2,560.00	$ -	$ -
4	1	LS	DEWATERING		0	$ 15,000.00	$ -	$ -
5	15	AC	GENERAL CLEARING AND GRUBBING		9	$ 2,000.00	$ 18,000.00	**$ 18,000.00**
7	77628	CY	EARTHWORK FILL (AT1.2 COMPACTION)		0	$ 3.70	$ -	$ -
8	2946	CY	EARTHWORK CUT AND SPOIL		0	$ 4.00	$ -	$ -
9	814	TN	AGGREGATE 47B FINE		0	$ 34.00	$ -	$ -
10	4	TN	1" WASHED AGGREGATE		0	$ 210.00	$ -	$ -
11	205	TN	C33 #8 AGGREGATE		0	$ 55.00	$ -	$ -
12	4888	TN	CLASS B RIP RAP		0	$ 90.00	$ -	$ -
13	855	TN	3" CRUSHED AGGREGATE		0	$ 45.00	$ -	$ -
14	961	LF	6" PERFORATED DUAL WALL PVC		0	$ 23.00	$ -	$ -
15	90	LF	8" GALVANIZED STEEL PIPE		0	$ 25.00	$ -	$ -
16	177	LF	24" RCPP PRINCIPAL SPILLWAY		0	$ 550.00	$ -	$ -
17	2	EA	PRINCIPAL SPILLWAY PIPE SUPPORTS		1.5	$ 4,000.00	$ 6,000.00	**$ 6,000.00**
18	23	CY	STRUCTURAL CONCRETE (CLASS 4000)		0	$ 2,150.00	$ -	$ -
19	4285	LB	REINFORCING STEEL	$ 3,277.00	0	$ 2.50	$ -	**$ 3,277.00**
20	1	LS	METAL FABRICATION	$ 6,063.00	0	$ 11,000.00	$ -	**$ 6,063.00**
21	3	EA	SHEETPILE HEADWALL	$ 2,570.00	0	$ 1,700.00	$ -	**$ 2,570.00**
22	24	LF	18" CCP LOW STAGE INLET PIPE		0	$ 75.00	$ -	$ -
23	1	EA	18" CONCRETE TRASH RACK		0	$ 3,100.00	$ -	$ -
24	64	LF	12" PVC DRAWDOWN PIPE		0	$ 60.00	$ -	$ -
25	1	EA	12" BAR TRASH RACK		0	$ 400.00	$ -	$ -
26	1	EA	12" LINE GATE	$ 6,617.00	0	$ 30,000.00	$ -	**$ 6,617.00**
27		LF	FENCE REMOVAL(ADB ENGINEER)		0		$ -	$ -
28		LF	FENCE PLACEMENT(ADB ENGINEER)		0		$ -	$ -
29		EA	GATE		0		$ -	$ -
30	2	EA	BRASS CAP MONUMENTS		0	$ 1,300.00	$ -	$ -
31	12.5	AC	SEEDING		0	$ 2,400.00	$ -	$ -
32	2985	LF	WATTLES		0	$ 4.00	$ -	$ -
33		EA	PERMANENT PIEZOMETER(W/ BOLLARDS)		0		$ -	$ -
34	4	EA	SETTLEMENT PLATE		0	$ 1,600.00	$ -	$ -
35	1040	LF	TYPE B DIVERSION		0	$ 2.40	$ -	$ -
36	650	LF	DRAIN TILE REMOVAL (ADB ENGINEER)		0	$ 2.00	$ -	$ -
37	100	LF	DRAIN TILE PLACEMENT(ADB ENGINEER)		0	$ 26.00	$ -	$ -
38	1	EA	SEPTIC TANK AND LATERAL FIELD		0	$ 13,000.00	$ -	$ -
39	1	LS	QUALITY CNTROL INSPECTION		0	$ 6,500.00	$ -	$ -
40	150	SY	GEOTEXTILE FILTER FABRIC		0	$ 12.00	$ -	$ -
			TOTAL 26B	**$ 18,527.00**			**$ 50,200.00**	**$ 68,727.00**

THOMPSON CONSTRUCTION INC.
2404 N LINCOLN AVE FREMONT, NE 68025 - PHONE – 402-704-2008 - FAX – 402-704-2009

ITEM NO.	QTY	UNIT	DESCRIPTION	MATERIAL STORED	QTY TO DATE	UNIT PRICE	TOTAL	TOTAL PLUS STORED MATERIAL
SITE 27								
1	1	LS	MOBILIZATION		0.75	$ 80,000.00	$ 60,000.00	**$ 60,000.00**
2	1	LS	CONSTRUCTION STAKING		0.45	$ 12,000.00	$ 5,400.00	**$ 5,400.00**
3	1	EA	CONSTRUCTION ENTRANCE		1	$ 2,650.00	$ 2,650.00	**$ 2,650.00**
4	1	LS	DEWATERING		0	$ 15,000.00	$ -	**$ -**
5	22	AC	GENERAL CLEARING AND GRUBBING		16	$ 3,000.00	$ 48,000.00	**$ 48,000.00**
7	93619	CY	EARTHWORK FILL (AT1.2 COMPACTION)		12085	$ 3.90	$ 47,131.50	**$ 47,131.50**
8	9265	CY	EARTHWORK CUT AND SPOIL		5500	$ 4.00	$ 22,000.00	**$ 22,000.00**
9	990	TN	AGGREGATE 47B FINE		637	$ 34.00	$ 21,658.00	**$ 21,658.00**
10	4	TN	1" WASHED AGGREGATE		0	$ 105.00	$ -	**$ -**
11	210	TN	C33 #8 AGGREGATE		24	$ 55.00	$ 1,320.00	**$ 1,320.00**
12	7829	TN	CLASS B RIP RAP - STORED = 0 TONS @ $72 / TON	$ -	3934	$ 90.00	$ 354,060.00	**$ 354,060.00**
13	788	TN	3" CRUSHED AGGREGATE		201	$ 45.00	$ 9,045.00	**$ 9,045.00**
14	964	LF	6" PERFORATED DUAL WALL PVC		793	$ 23.00	$ 18,239.00	**$ 18,239.00**
15	90	LF	8" GALVANIZED STEEL PIPE		90	$ 25.00	$ 2,250.00	**$ 2,250.00**
16	175	LF	24" RCPP PRINCIPAL SPILLWAY	$ 60,895.00	0	$ 550.00	$ -	**$ 60,895.00**
17	2	EA	PRINCIPAL SPILLWAY PIPE SUPPORTS		2	$ 4,000.00	$ 8,000.00	**$ 8,000.00**
18	23	CY	STRUCTURAL CONCRETE (CLASS 4000)		0	$ 2,150.00	$ -	**$ -**
19	4465	LB	REINFORCING STEEL	$ 3,277.00	0	$ 2.50	$ -	**$ 3,277.00**
20	1	LS	METAL FABRICATION	$ 6,063.00	0	$ 11,000.00	$ -	**$ 6,063.00**
21	3	EA	SHEETPILE HEADWALL	$ -	1	$ 1,700.00	$ 1,700.00	**$ 1,700.00**
22	24	LF	18" CCP LOW STAGE INLET PIPE		0	$ 75.00	$ -	**$ -**
23	1	EA	18" CONCRETE TRASH RACK		0	$ 3,100.00	$ -	**$ -**
24	63	LF	12" PVC DRAWDOWN PIPE		0	$ 60.00	$ -	**$ -**
25	1	EA	12" BAR TRASH RACK		0	$ 400.00	$ -	**$ -**
26	1	EA	12" LINE GATE	$ 6,617.00	0	$ 30,000.00	$ -	**$ 6,617.00**
27	1065	LF	FENCE REMOVAL(ADB ENGINEER)		500	$ 1.00	$ 500.00	**$ 500.00**
28	1170	LF	FENCE PLACEMENT(ADB ENGINEER)		0	$ 10.00	$ -	**$ -**
29		EA	GATE		0		$ -	**$ -**
30	2	EA	BRASS CAP MONUMENTS		0	$ 1,300.00	$ -	**$ -**
31	18.4	AC	SEEDING		0	$ 2,400.00	$ -	**$ -**
32	3735	LF	WATTLES		0	$ 4.00	$ -	**$ -**
33	3	EA	PERMANENT PIEZOMETER(W/ BOLLARDS)		0	$ 8,000.00	$ -	**$ -**
34	4	EA	SETTLEMENT PLATE		0	$ 1,800.00	$ -	**$ -**
35	1402	LF	TYPE B DIVERSION		0	$ 2.50	$ -	**$ -**
36	1500	LF	DRAIN TILE REMOVAL (ADB ENGINEER)		0	$ 2.60	$ -	**$ -**
37	100	LF	DRAIN TILE PLACEMENT(ADB ENGINEER)		0	$ 10.00	$ -	**$ -**
39	1	LS	QUALITY CNTROL INSPECTION		0	$ 6,400.00	$ -	**$ -**
40	150	SY	GEOTEXTILE FILTER FABRIC		0	$ 10.00	$ -	**$ -**
			TOTAL 27	**$ 76,852.00**			**$ 601,953.50**	**$ 678,805.50**




Safety Matters
2
i770

Invoice

olsson

601 P St Suite 200
PO Box 84608
Lincoln, NE 68501-4608
Tel 402.474.6311, Fax 402.474.5063

May 19, 2025
Invoice No: 537919

Invoice Total $9,853.51

Ryan Chapman
Lower Platte North NRD
PO Box 126
Wahoo, NE 68066-0126

Olsson Project # 023-00443 LPNNRD Wahoo Creek Watershed Flood Reduction Project Real Estate Services

Professional services rendered through May 3, 2025 for work completed in accordance with our Agreement dated February 17, 2023.

Phase 100 Real Estate Acquisitions

Labor

	Hours	Amount	
Principal	30.00	7,341.60	
Associate Project Manager	10.00	1,705.70	
CAD Designer	1.00	84.84	
Administrative/Clerical	6.50	497.87	
Totals	47.50	9,630.01	
Total Labor			**9,630.01**

Reimbursable Expenses

Personal Vehicle Mileage	86.10	
Total Reimbursables	**86.10**	**86.10**

Unit Billing

Postage	137.40	
Total Units	**137.40**	**137.40**

Total this Phase $9,853.51

Billing Limits	**Current**	**Prior**	**To-Date**
Total Billings	9,853.51	153,749.12	163,602.63
Limit			210,000.00
Balance Remaining			46,397.37

AMOUNT DUE THIS INVOICE $9,853.51

Outstanding Invoices

Number	Date	Balance
535228	4/23/2025	2,991.67
Total		**2,991.67**

INVOICE PAYMENT IS REQUESTED WITHIN 30 DAYS

Project	023-00443	LPNNRD Wahoo Creek Watershed Flood	Invoice	537919

Billings to Date

	Current	Prior	Total
Labor	9,630.01	135,844.22	145,474.23
Expense	86.10	17,734.30	17,820.40
Internal Unit	137.40	170.60	308.00
Totals	**9,853.51**	**153,749.12**	**163,602.63**

Email invoices to: rchapman@lpnnrd.org; selliott@lpnnrd.org and CC: jbreunig@lpnnrd.org

Authorized By: Danielle Allen

INVOICE PAYMENT IS REQUESTED WITHIN 30 DAYS

Billing Backup

Monday, May 19, 2025

Olsson, Inc. Invoice 537919 Dated 5/19/2025 12:45:45 PM

Olsson Project # 023-00443 LPNNRD Wahoo Creek Watershed Flood Reduction Project Real Estate Services

Phase 100 Real Estate Acquisitions

Labor

			Hours		Amount	
Principal						
04922	Allen, Danielle	4/9/2025	2.50	244.72	611.80	
04922	Allen, Danielle	4/10/2025	.75	244.72	183.54	
04922	Allen, Danielle	4/11/2025	1.25	244.72	305.90	
04922	Allen, Danielle	4/14/2025	1.25	244.72	305.90	
04922	Allen, Danielle	4/15/2025	2.00	244.72	489.44	
04922	Allen, Danielle	4/16/2025	.50	244.72	122.36	
04922	Allen, Danielle	4/17/2025	6.25	244.72	1,529.50	
04922	Allen, Danielle	4/18/2025	1.50	244.72	367.08	
04922	Allen, Danielle	4/21/2025	2.25	244.72	550.62	
04922	Allen, Danielle	4/22/2025	2.00	244.72	489.44	
04922	Allen, Danielle	4/23/2025	5.00	244.72	1,223.60	
04922	Allen, Danielle	4/24/2025	1.25	244.72	305.90	
04922	Allen, Danielle	4/25/2025	.25	244.72	61.18	
04922	Allen, Danielle	4/28/2025	1.75	244.72	428.26	
04922	Allen, Danielle	4/29/2025	.25	244.72	61.18	
04922	Allen, Danielle	5/1/2025	.50	244.72	122.36	
04922	Allen, Danielle	5/2/2025	.75	244.72	183.54	
Associate Project Manager						
07442	Henson, Alexandra	4/16/2025	7.50	170.57	1,279.28	
07442	Henson, Alexandra	4/18/2025	2.00	170.57	341.13	
07442	Henson, Alexandra	4/24/2025	.50	170.57	85.29	
CAD Designer						
06401	Atkinson, Joshua	4/9/2025	.50	84.84	42.42	
06401	Atkinson, Joshua	4/23/2025	.25	84.84	21.21	
06401	Atkinson, Joshua	4/29/2025	.25	84.84	21.21	
Administrative/Clerical						
04288	Mlnarik, Gail	4/17/2025	2.00	77.90	155.79	
04288	Mlnarik, Gail	4/18/2025	2.00	77.90	155.80	
04288	Mlnarik, Gail	4/21/2025	.75	77.90	58.43	
04288	Mlnarik, Gail	4/22/2025	.75	77.90	58.43	
05874	Montgomery, Michelle	4/24/2025	.50	70.96	35.48	
07326	Vondra, Melanie	4/21/2025	.50	67.87	33.94	
	Totals		47.50		9,630.01	
	Total Labor					**9,630.01**

INVOICE PAYMENT IS REQUESTED WITHIN 30 DAYS

Reimbursable Expenses

Personal Vehicle Mileage

EX	000000346653	4/23/2025	Allen, Danielle / 123	86.10	
		Total Reimbursables		**86.10**	**86.10**

Unit Billing

	Postage			137.40	
		Total Units		**137.40**	**137.40**

Total this Phase	**$9,853.51**
Total this Project	**$9,853.51**
Total this Report	**$9,853.51**

Lower Platte River Corridor Alliance FY26 Budget (Prepared May 2025)		**LPSNRD**	**PMRNRD**	**LPNNRD**	**National Guard**	**Game & Parks**	**UNL**	**NeDNR**	**DEE**	**LWS**	**MUD**	**LPRCA expenditure**
Streamgages:	3 Long term sites - Five-Yr agreement expires: June 30, 2030	$39,600	$39,600	-	-	-	-	-	-	-	-	$79,200
	Leshara site - Five-Yr agreement expires: June 30, 2030 (Joint funding agreements between partners expire Dec. 31, 2029)	$8,000	$8,000	$8,000	-	-	-	-	-	$8,000	$8,000	$40,000
Website Hosting		-	-	-	-	-	-	-	-	-	-	$1,920
ESRI Agreement		-	-	-	-	-	-	-	-	-	-	$1,100
WQMP – update completed		-	-	-	-	-	-	-	-	-	-	-
LPRCA Dues - Pays for Website, ESRI & Memberships. (In FY25 was paid by all 8 members: LPSNRD, PMRNRD, LPNNRD, National Guard, Game &Parks, UNL, NeDNR and NDEE for a total of $8,000)		$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	-	-	-
Lower Platte Tour		$500	$500	-	-	-	-	-	-	-	-	$1,000
Memberships		-	-	-	-	-	-	-	-	-	-	$250
Restoration & Resiliency Study		-	-	-	-	-	-	-	-	-	-	$200,000 (from reserves)
USGS Streamgage Trend Analysis		$4,137	$4,137	$4,137	-	$4,137	$4,137	$4,137	*$6,216 From 319 small grant EPA	$4,137	$4,137	$39,312
FY26 BUDGET TOTALS		**$53,237**	**$53,237**	**$13,137**	**$1,000**	**$5,137**	**$5,137**	**$5,137**	*** $1,000**	**$12,137**	**$12,137**	**$351,144**

Regional Planning Team

Name	Title	Jurisdiction
Ryan Chapman	Assistant Manager	Lower Platte North NRD
Drew ten Bensel	GIS/Grants Coordinator	Lower Platte North NRD
Eric Gottschalk	General Manager	Lower Platte North NRD
Mark Doehling	Emergency Manager	Butler County
Tom Smith	Emergency Manager	Dodge County
Terry Miller	Emergency Manager	Saunders County
Tim Hofbauer	Emergency Manager	Platte County
Mark Arps	Emergency Manager	Colfax County
Erin Wendt	Outreach & NFIP Specialist	NeDNR
Daryl Holmberg	City Council	City of Schuyler
Don Glodowski	Floodplain Administrator	City of Schuyler
Theresa Busse	City Clerk/Floodplain Administrator	City of North Bend
*Alyssa Grosse	Hazard Mitigation Planning Specialist	NEMA
*Becky Appleford	Project Manager	JEO Consulting Group
*Karl Dietrich	Planner	JEO Consulting Group
*Anthony Kohel	Planner	JEO Consulting Group
*Ruva Tsoka	Associate Planner	JEO Consulting Group

**Served in an advisory or consultant role.*

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Table of Contents

Regional Planning Team 1
Table of Contents 3
List of Figures 6
List of Tables 6
Section 1: Introduction 8
- Hazard Mitigation Planning 8
- Hazard Mitigation Assistance 8
- Summary of Changes 9
- Goals and Objectives 12
- Participating Jurisdictions 13

Section 2: How to Use This Hazard Mitigation Plan 15
- Introduction 15
- How to Use This Document 15

Section Three: Planning Area Overview 17
- Introduction 17
- Location and Geography 17
- Demographics 17
- Housing 21
- Employment and Economics 22

Section Four: Planning Process Summary 23
- Introduction 23
- Plan Update Process 23
- Public Involvement and Outreach 25

Section Five: Risk Assessment Summary 27
- Introduction 27
- Hazard Identification 27
- Hazard Assessment Summary Tables 27
- FEMA National Risk Index 31
- Historical Disaster Declarations 32
- Hazard Profiles 34

Section Six: Mitigation Strategy 39
- Introduction 39
- Summary of Changes 39
- Selected Mitigation and Strategic Actions 39
- Participant Mitigation and Strategic Actions 40

Section Seven: Plan Implementation and Maintenance 41
- Monitoring, Evaluating, and Updating the Plan 41
- Continued Public Involvement 42
- Unforeseen Opportunities 42
- Incorporation into Existing Planning Mechanisms 42

Section Eight: Participant Profiles 43
- Purpose of Participant Profiles 43
- Community Fact Sheets 43
- Participant Profile Appendices 43

Table of Contents

Participant Profile Appendices
- Butler County Appendix
  - Village of Abie
  - Village of Bruno
  - David City
  - Village of Dwight
  - Village of Garrison
  - Village of Linwood
  - Village of Octavia
  - Village of Rising City
  - Village of Surprise
  - Village of Ulysses
- Dodge County Appendix
  - City of Fremont
  - Village of Inglewood
  - City of North Bend
- Saunders County Appendix
  - Village of Cedar Bluffs
  - Village of Colon
  - Village of Leshara
  - Village of Malmo
  - Village of Mead
  - Village of Morse Bluff
  - Village of Prague
  - City of Wahoo
  - City of Yutan
- Special Jurisdiction Appendix
  - Village of Lindsay
  - Village of Platte Center
  - Village of Richland
  - Village of Rogers
  - City of Schuyler
- Fire District Appendix
  - Cedar Bluffs Suburban Fire Protection District #7
  - Colon Volunteer Fire Department
  - North Bend Volunteer Fire Department
  - Rising City Rural Fire Department
  - Weston Volunteer Fire & Rescue
  - Yutan Volunteer Fire Department
- Special Districts Appendix
  - Ames Diking and Drainage District
  - Cedar Bluffs Public School
  - Cotterell Diking and Drainage District
  - David City Public Schools
  - East Central District Health Department
  - Educational Service Unit #2
  - Lake Ventura SID #3
  - Lower Platte North NRD
  - Mead Public Schools
  - North Bend Central Public Schools
  - North Bend Drainage District

Table of Contents

Platte Township
Platte Valley Drainage District
Pohocco Township
Reading Township
Skull Creek Township
Three Rivers Public Health Department
Ulysses Township
Union Township
Woodcliff Lakes SID #3
Appendix A: Full Risk Assessment
Appendix B: Planning Process Documentation
Appendix C: Planning Area Profile
Appendix D: Mitigation Strategy
Appendix E: Hazard Mitigation Project Funding Guidebook
Appendix F: Guide to Review and Update the Plan
Appendix G: Fremont Flood Risk Open House

List of Figures

Figure 1: Planning Area Population, 1880-2020 17
Figure 2: Planning Area Map 18
Figure 3: Population by Age Cohort and Sex (2020) 19
Figure 4: Housing Age in the Planning Area 22
Figure 5: Project Timeline 24

List of Tables

Table 1: 2020 Plan Comments and Revisions 10
Table 2: Participating Jurisdictions 13
Table 3: School Inventory 20
Table 4: Planning Area Inventory of Care Facilities 20
Table 5: Racial Composition Trends 20
Table 6: Occupied, Vacant, Owner, and Renter Housing 21
Table 7: Selected Housing Vulnerabilities 21
Table 8: Hazards Addressed in the Plan 27
Table 9: Loss Estimation for the Planning Area 29
Table 10: Hazard Occurrences 30
Table 11: National Risk Index 31
Table 12: Presidential Disaster Declarations 32
Table 13: USDA Secretarial Disasters (2012-July 2024) 33
Table 14: Prioritized Hazards of Concern by Jurisdiction 34

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Section 1: 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.

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."

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.

Hazards, such as severe winter storms, drought, severe thunderstorms, terrorism and cyber-attack, tornadoes and high winds, floods, and grass/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 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.

This plan is an update to the Lower Platte North Natural Resources District (LPNNRD) Hazard Mitigation Plan approved in 2020. The plan update was developed in compliance with the requirements of the Disaster Mitigation Act of 2000 (DMA 2000). By preparing this plan, LPNNRD has demonstrated a commitment to reducing risks from hazards and to helping decision makers establish mitigation activities and resources.

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.

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

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.

- **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 *Appendix E: Hazard Mitigation Project Funding Guidebook*.

Summary of Changes

The hazard mitigation planning process undergoes several changes during each plan update to best accommodate the planning area and specific conditions. Changes from the 2020 Hazard Mitigation Plan and planning process in this update included: an updated plan layout, greater efforts to reach and include stakeholder groups, greater effort to include all taxing authorities as participants; a more in-depth funding guidebook; and changes to meet updated FEMA hazard mitigation plan policies. The plan was also updated to reflect changing priorities for each participating jurisdiction. Prioritized hazards of concern were identified by each local planning team along with a review of mitigation actions. Each local planning team reviewed the mitigation actions from 2020 and updated the timeline, priority (high, medium, low), and status. Local planning teams were also able to add new mitigation actions to better fit any changing priorities and concerns. The 2020 LPNNNRD Hazard Mitigation Plan Review Tool was reviewed for possible changes to incorporate into this plan update and were addressed where applicable. These changes are described in the table below.

Table 1: 2020 Plan Comments and Revisions

Comment/Revision from 2020 Review Tool	Location of Revision	Summary of Changes
The way the plan is organized with the base plan and community specific profiles in separate sections makes it difficult to determine how the planning team aligns with the community hazard mitigation teams listed in the profile.	Overall Hazard Mitigation Plan	An updated plan format was implemented to create a better flow of sections and information. Sections of the base plan were moved into respective appendices and referenced in each appendix.
The plan could clarify how opportunities were provided for local and regional agencies involved in hazard mitigation activities or development regulatory agencies. Specifically, how local and regional hazard mitigation-related agencies and development regulatory agencies were provided opportunities to be involved. For example, the mention of Floodplain Administrators in Community Profiles implies specific outreach was conducted to these individuals, but it is not clear if this was a standard practice for communities participating in the NFIP.	Upfront Summary & Appendix B: Planning Process Documentation	Outreach efforts are detailed in the Planning Process section and documentation of materials are provided in Appendix B.
The plan does not clearly identify how stakeholder input was incorporated. Additionally, the plan does not clearly document how public review comments were incorporated.	Upfront Summary, Participant Profiles	Information received from stakeholders is integrated into relevant areas. A summary of public review comments received is provided.
The plan could better identify how public participation will be continued in plan maintenance activities. Identify how the public will "continue participation" in the plan maintenance process beyond the issuance of public notifications for public meetings. Per Element A3, it is not clear how public input was incorporated in this plan, so it is unclear how this will be continued. Section 6, it is also not clear the distinctions between monitoring, evaluation or updating the plan and no further clarifications were provided in the Community Profiles.	Participant Profile Appendices	Information on how the local planning team will notify the public of reviews and updates of the plan in between updates is addressed in participant profiles.
It should be noted that PDM has been discontinued and is being replaced by BRIC.	Upfront Summary & Appendix E: Hazard Mitigation Funding Guidebook	Updated funding mechanisms have been included.
The plan does not consistently relate information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction.	Participant Profile Appendices	Regional information about previous occurrences and the probability of future occurrences can be found in the Risk Assessment Appendix and is referenced in the Participant Profiles.

Comment/Revision from 2020 Review Tool	Location of Revision	Summary of Changes
The plan does not consistently describe the connection of all hazards to each jurisdiction. The base plan describes type, location, and extent for the natural hazards (and selected technological) and relates that information to each county… for many of the jurisdictions, the hazard information provided is limited to the priority lists identified by the Local Planning Team and/or the consultant. It is assumed that all jurisdictions are not vulnerable to all hazards but conversely, jurisdictions may be vulnerable to hazards they have not identified as priorities. Therefore, the addition of a matrix in the base plan and/or county profiles that indicates which hazards are relevant, i.e., "can affect" each specific jurisdiction would provide a clearer connection between the information in Section 4 and the risk faced by "each jurisdiction".	Participant Profile Appendices & Appendix D: Mitigation Strategies	Additional information about hazards was requested in community worksheets to connect hazards that directly impact jurisdictions. Hazards that do not impact the jurisdiction were omitted from the profile and were not given a mitigation action. A hazard prioritization and mitigation strategy matrix has been developed and included in Appendix D: Mitigation Strategies to visualize which hazards participating jurisdictions prioritize and which were omitted.
The plan should address the RL property identified in Saunders County, as part of mitigation strategy for the community.	Appendix A: Full Risk Assessment	Through direct communication with NeDNR and NEMA, repetitive loss structure data is provided in this plan update.
The overall summary of vulnerability should identify structures, systems, populations or other community assets that are susceptible to damage and loss from hazard events and describe the communities chief vulnerabilities to be addressed in the mitigation strategy. There are also a couple areas of conflicting loss.	Participant Profile Appendices	Vulnerability statements are included in Future Development sections of jurisdiction profiles. Participating jurisdictions that identified prioritized concerns or vulnerabilities developed a mitigation action to help reduce impacts from the identified hazard.
The plan does not clearly indicate how hazard impacts were considered by the individual communities. It appears that the work needed to address this element was essentially completed by the Local Planning Committees, but the documentation does not indicate this clearly. Problems statements could also be employed as a succinct method to define an issue and communicate a potential solution.	Participant Profile Appendices	Information about how the hazard impacts each jurisdiction has been asked in this plan update.
The plan should document each jurisdiction's ability to expand on and improve their capabilities, especially where these capabilities are an impediment to plan implementation.	Participant Profile Appendices	Some jurisdictions identified low funding capabilities to implement project development and listed the need for alternative funding mechanisms for some projects to start or continue.

Comment/Revision from 2020 Review Tool	Location of Revision	Summary of Changes
The plan contains conflicting information regarding continued NFIP compliance in the Community Profiles. Several of the Community Profiles include "Maintain Participation in the National Flood Insurance Program" as a "Removed Mitigation Action" with the reason cited: "This project is no longer considered a mitigation action by FEMA". It is not clear why this would be included as element C2 requires the community to address continued compliance with the NFIP. Regardless of the appropriateness of identifying this as a "mitigation action", this citation, in the absence of a statement by the NFIP community to continue compliance creates the appearance of a conflict.	Participant Profile Appendices	Updated and more comprehensive information about NFIP participation is provided in the Capability Assessment section in applicable jurisdiction's profile. This includes information on whether the community will remain in compliance with the NFIP or whether there is interest in joining if they are not a part of the program.
The plan does not consistently clearly identify what alternatives were examined and evaluated to arrive at the indicated mitigation actions.	Participant Profile Appendices	The FEMA *Mitigation Ideas* guidebook was provided to jurisdictions to choose applicable mitigation actions. Outreach efforts were conducted to ensure hazards had a mitigation action, where consultants provided catered mitigation actions to jurisdictions based on their profile.
The plan does not describe a process for how communities will integrate the mitigation plan into other planning mechanisms. Discussion of Plan Integration in Section 6 on pages 182 and 183 identifies how Local Planning Teams were asked to identify existing planning mechanisms, and how they currently overlap with the HMP. However, neither the base plan nor the Community Profiles indicate how the results of this current planning effort will be integrated moving forward.	Participant Profile Appendices	Updated plan integration information is provided in the Plans and Studies section in each participating jurisdiction's profile, including whether the hazard mitigation plan has or has not been integrated into the various planning mechanisms. The local planning team is committed to reviewing the hazard mitigation plan for opportunities to incorporate relevant data into future plans and studies.

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 jurisdictions participating in this plan. The driving motivation behind 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 Regional Planning Team reviewed and approved goals which helped guide the process of identifying both broad-based and jurisdictional-specific mitigation strategies and projects that will, if implemented, reduce their vulnerability and help build stronger, more resilient communities.

Goals from the 2020 hazard mitigation plan were reviewed, and the Regional Planning Team agreed that most are still relevant and applicable for this plan update. Goal 5 that stated "Pursue

Multi-Objective Opportunities (wherever possible)" and the objectives with it were removed. The updated goals and objectives for this plan update are as follows.

Goal 1: Protect the Health and Safety of Residents

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

Objective 1.2: Improve real-time monitoring of hazards with stream gauges, weather stations, and other technology where data gaps are identified.

Goal 2: Reduce Future Losses from Hazard Events

Objective 2.1: Provide protection for existing structures, future development, community lifelines, infrastructure, services, utilities, and trees.

Objective 2.2: Develop hazard specific plans, conduct studies or assessments, and retrofit buildings and facilities to mitigate hazards and minimize their impact.

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 Vulnerabilities to Hazards

Objective 3.1: Develop and provide information to the public, visitors, and property owners about their risk and vulnerability to hazards.

Goal 4: Improve Emergency Management Capabilities

Objective 4.1: Develop or update City and/or County Emergency Response Plan(s) and procedures and increase the capability to respond.

Objective 4.2: Develop or improve Evacuation Plans and procedures.

Objective 4.3: Improve warning systems and ability to communicate with the public before, during, and following a disaster or emergency.

Goal 5: Enhance Overall Resilience and Promote Sustainability

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

Participating Jurisdictions

Jurisdictions that participated in the LPNNRD Hazard Mitigation Plan are listed in the table below. These jurisdictions met all the requirements for participation by attending required meetings, assisting in data collection, identifying mitigation actions, reviewing plan drafts, and either adopting the plan by resolution or planning to adopt the plan by resolution.

Table 2: Participating Jurisdictions

Participating Jurisdictions			
Village of Abie	Village of Lindsay	Village of Ulysses	Union Township
Village of Bellwood	Village of Linwood	City of Wahoo	Colon Volunteer Fire District

Participating Jurisdictions			
Village of Bruno	Village of Malmo	Woodcliff Lakes SID #8	Rising City Rural Fire Department
Butler County	Village of Mead	Ames Diking and Drainage District	Weston Volunteer Fire and Rescue
Village of Cedar Bluffs	Village of Morse Bluff	Cotterell Diking and Drainage District	Cedar Bluffs Public School
Village of Colon	City of North Bend	North Bend Drainage District	David City Public Schools
David City	Village of Octavia	Platte Valley Drainage District	Educational Service Unit #2
Dodge County	Village of Prague	Morse Bluff Township	Mead Public Schools
Village of Dwight	Village of Richland	Platte Township	North Bend Central Public Schools
City of Fremont	Village of Rogers	Pohocco Township	Four Corners Health Department
Village of Garrison	Saunders County	Reading Township	Methodist Health System
Village of Inglewood	City of Schuyler	Skull Creek Township	Three Rivers Public Health Department
Village of Leshara	Village of Surprise	Ulysses Township	Lower Platte North NRD

Section 2: How to Use This Hazard Mitigation Plan

Introduction

This hazard mitigation plan was developed for anyone that lives, works, owns a business, owns land, or visits Butler, Dodge, or Saunders Counties and the remaining communities in the partial counties. Different sections of the plan will be helpful to different people. This section is designed to help guide readers to the most relevant information.

How to Use This Document

Jurisdiction that Participated in the Plan

I am a governing official from a participating jurisdiction and want to learn more about the hazards that could impact my jurisdiction, identified strategies to reduce vulnerability to those hazards, how to secure funding for those strategies, and how to keep the plan up to date. I would review:

- **Section Three: Planning Area Overview, Participant Profile Appendices, and Appendix C: Planning Area Profile:** To learn about demographics, at-risk populations, housing, employment, economics, social vulnerability, rural capacity index, and historical sites.

- **Section Five: Risk Assessment Summary and Appendix A: Full Risk Assessment:** To learn about the hazards that could impact the planning area, where those hazards are likely to occur, how often they are likely to occur, the possible extent of the hazards, how changes in extreme weather will impact the hazards, and regional vulnerabilities.

- **Section Seven: Plan Implementation and Maintenance and Appendix F: Guide to Review and Update the Hazard Mitigation Plan:** To learn about plan maintenance and how to update your participant section.

- **Section Eight: Participant Profiles, Participant Profile Appendices, and Special Districts Appendix:** To learn jurisdictional specific information about the three counties, local communities, and other local jurisdictions. Each participant section contains information about prioritized hazards, community lifelines, and mitigation action and strategies.

- **Appendix E: Hazard Mitigation Funding Guidebook:** To learn about various federal, state, and other funding sources to help pay for identified mitigation strategies.

Resident, Landowner, Visitor, or Business

I am a resident, landowner, visitor, or business and want to learn about my county, my community, and protecting my family, home, and property from natural and human-caused hazards. I would review:

- **Section Three: Planning Area Overview, Participant Profile Appendices, and Appendix C: Planning Area Profile:** To learn about demographics, at-risk populations, housing, employment, economics, social vulnerability, rural capacity index, and historical sites.

- **Section Five: Risk Assessment Summary and Appendix A: Full Risk Assessment:** To learn about the hazards that could impact the planning area, where those hazards are likely to occur, how often they are likely to occur, the possible extent of the hazards, how changes in extreme weather will impact the hazards, and regional vulnerabilities.

- **Section Eight: Participant Profiles and Participant Profile Appendices:** To learn jurisdictional specific information about the three counties, local communities, and other local jurisdictions. Each participant section contains information about prioritized hazards, community lifelines, and mitigation action and strategies.

State or Federal Agency

I am with a state or federal agency and want to learn more about the planning process, hazard risks, and mitigation strategies across all jurisdictions in Butler, Dodge, and Saunders Counties. I would review:

- **Section One: Introduction:** To learn about the goals and objectives of the Lower Platte North Hazard Mitigation Plan.

- **Section Three: Planning Area Overview, Participant Profile Appendices, and Appendix C: Planning Area Profile:** To learn about demographics, at-risk populations, housing, employment, economics, social vulnerability, rural capacity index, and historical sites.

- **Section Four: Planning Process Summary and Appendix B: Planning Process Documentation:** To learn about the planning process, who attended meetings, and who was invited to participate.

- **Section Five: Risk Assessment Summary and Appendix A: Full Risk Assessment:** To learn about the hazards that could impact the planning area, where those hazards are likely to occur, how often they are likely to occur, the possible extent of the hazards, how changes in extreme weather will impact the hazards, and regional vulnerabilities.

- **Appendix D: Mitigation Strategy, Participant Profile Appendices:** To learn about the mitigation strategies identified by each participating jurisdiction.

Section Three: Planning Area Overview

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 Butler County, Dodge County, and Saunders County. A more detailed profile broken down by community is covered in *Appendix C: Planning Area Profile*, including demographics, at-risk populations, employment, economics, and housing.

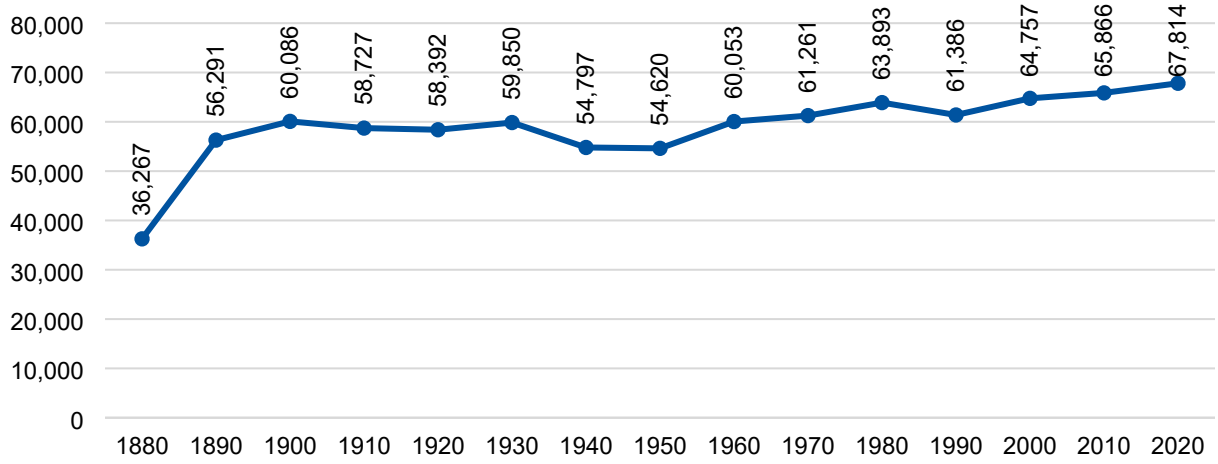
Location and Geography

The Lower Platte North NRD hazard mitigation planning area is located in eastern Nebraska. It includes most of Butler and Saunders Counties, as well as portions of Dodge, Boone, Colfax, Madison, and Platte Counties. The planning area covers approximately 1,894 square miles. There are 33 incorporated communities in the district. Major transportation routes include U.S. Highways 30, 77, 81, 275 and State Highways 15, 32,45, 63, 64, 66, 79, 91, 92, and 109. Major waterways in the district include the Big Blue River, North Branch Big Blue River, Elkhorn River, and the Platte River. There are 82 creeks and tributaries within the planning area, which include Pebble Creek, Shell Creek, and Wahoo Creek. Other bodies of water include Czechland Lake, Homestead Lake, and Lake Wanahoo. Figure 2 shows planning area, incorporated communities, major transportation routes, major waterways, and location within the state.

Demographics

The U.S. Census Bureau collects specific demographic information for the three counties. The estimated population of the three-county planning area is 67,814.[1]

Figure 1: Planning Area Population, 1880-2020

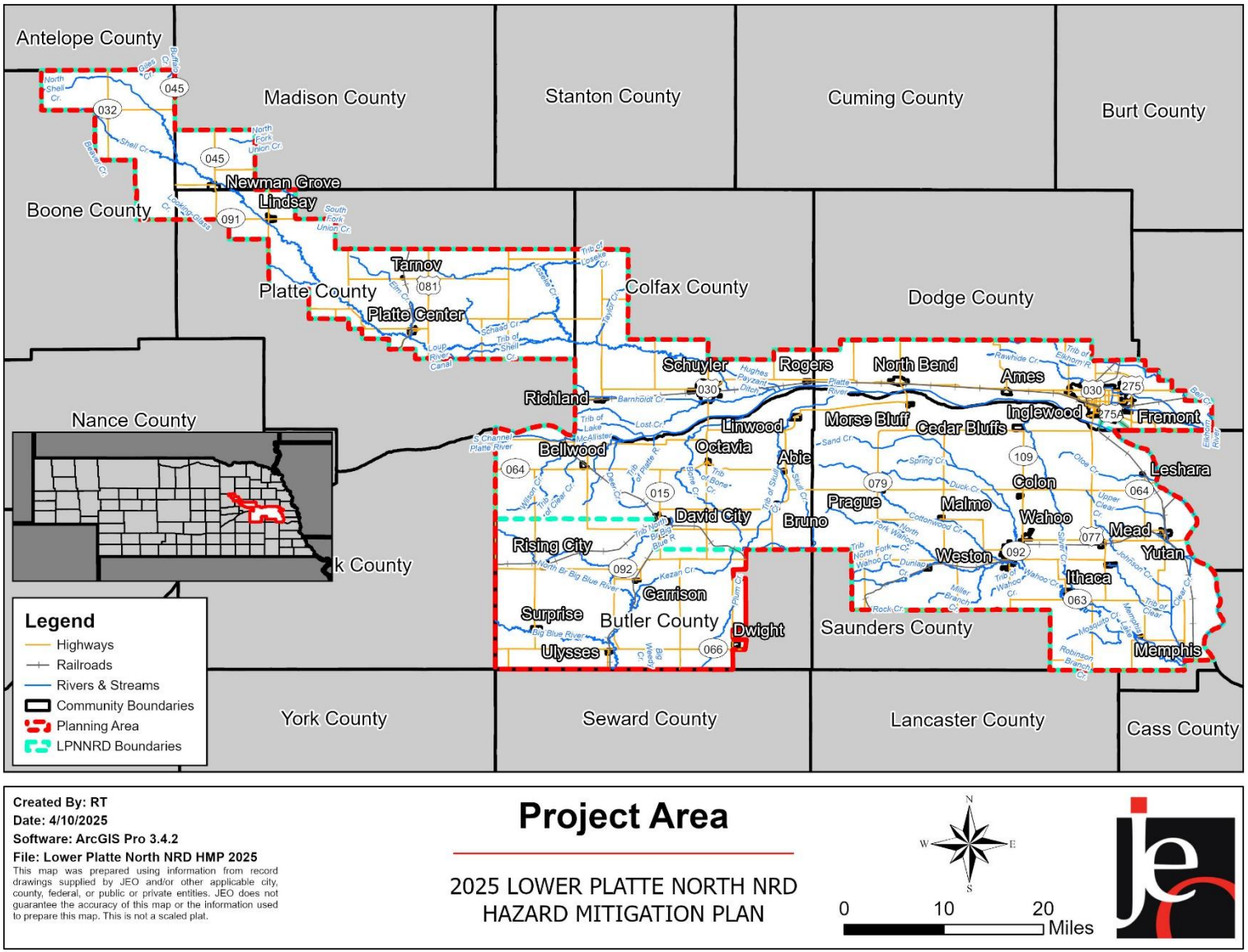


Source: U.S. Census Bureau[2]

[1] United States Census Bureau. "2020 Census Bureau Decennial Census: P1: Race." https://data.census.gov/.

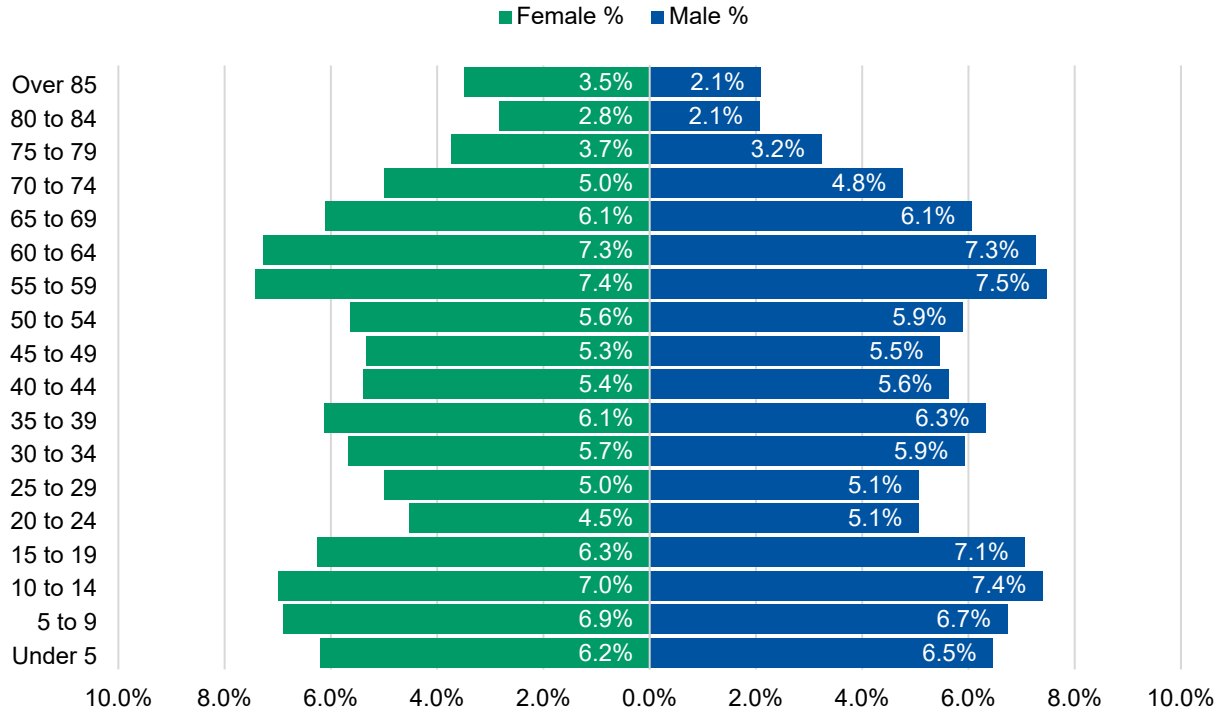
[2] United States Census Bureau. "2020 Census Bureau Decennial Census: P1: Race." https://data.census.gov/.

Figure 2: Planning Area Map



Community and regional vulnerability are impacted by growing or declining populations. The planning area has grown slowly since 1950 with periods where the population has declined and periods where the population has increased. Looking at the age cohort breakdown of the planning area, there is a large majority of the population between the ages 0 to 19, 35 to 39, and 55 to 69. This suggests a steady population and a need for elderly care, childcare, and schools in the future. Additional population vulnerability information can be found in *Appendix C: Planning Area Profile*.

Figure 3: Population by Age Cohort and Sex (2020)



Source: U.S. Census Bureau[3]

In general, certain populations may have increased vulnerability due to difficulty with medical issues, extremes in age, and communication issues due to language barriers. Several at-risk populations have been identified in the planning area. These include:

- Schools
- Medical/Elderly Care Facilities
- Racial Minorities

The tables on the next page list the at-risk populations in the county. For addition information about at-risk populations see *Appendix C: Planning Area Profile.*

[3] United States Census Bureau. "2020 Census Bureau Decennial Census: P1: Race." https://data.census.gov/.

Table 3: School Inventory

School District	Total Enrollment (2022-2023)
Ashland-Greenwood Public Schools	1,099
Cedar Bluffs Public School	469
David City Public Schools	676
East Butler Public Schools	297
Fremont Public Schools	5,217
Logan View Public Schools	590
Mead Public Schools	283
Newman Grove Public Schools	219
North Bend Central Public Schools	591
Scribner-Snyder Community Schools	171
Wahoo Public Schools	1,085
Yutan Public Schools	506
Total	**11,203**

Source: Nebraska Department of Education[4]

Table 4: Planning Area Inventory of Care Facilities

County	Hospitals	Long Term Care Facilities	Assisted Living Homes
Butler County	1	2	1
Dodge County	1	4	6
Saunders County	1	2	2
Total	3	8	9

Source: Nebraska Department of Health and Human Services[5]

Table 5: Racial Composition Trends

Race	2010		2020		% Change
	Number	% of Total	Number	% of Total	
White, Not Hispanic	61,730	93.7%	59,170	87.3%	-4.15%
Black	300	0.5%	355	0.5%	1.67%
American Indian and Alaskan Native	244	0.4%	457	0.7%	87.3%
Asian	301	0.5%	299	0.4%	-0.66%
Native Hawaiian and Other Pacific Islander	76	0.1%	26	0.0%	-65.79%
Other Races	2,417	3.7%	3,699	5.5%	53.04%
Two or More Races	798	1.2%	3,808	5.6%	377.19%
Total Population	**65,866**	-	**67,814**	-	**2.96%**

[4] Nebraska Department of Education. October 2023. "Nebraska Education Profile". https://nep.education.ne.gov/.

[5] Nebraska Department of Health and Human Services. December 2023. "Rosters of Facilities And Services". https://dhhs.ne.gov/licensure/Pages/Rosters-of-Facilities-and-Services.aspx.

Source: U.S. Census Bureau[6,7]

Housing

The U.S. Census Bureau provides information related to housing units and potential areas of vulnerability. Potentially vulnerable housing characteristics include vacant housing, rental properties, mobile homes, older housing, those with no internet, and homes with no vehicles available. The tables below show vulnerable housing characteristics in the planning area. Additional housing vulnerability information can be found in *Appendix C: Planning Area Profile*.

Table 6: Occupied, Vacant, Owner, and Renter Housing

Total Housing Units					Occupied Housing Units			
Occupied		Vacant			Owner		Renter	
#	%	#	%		#	%	#	%
26,921	**88.5%**	**3,491**	**11.5%**		**19,538**	**72.6%**	**7,383**	**27.4%**

Source: U.S. Census Bureau[8]

Table 7: Selected Housing Vulnerabilities

Housing Characteristics	Butler County	Dodge County	Saunders County	Total
Occupied Housing Units	3,508 (87.0%)	14,624 (89.5%)	8,789 (87.6%)	**26,921**
Lacking Complete Plumbing Facilities	1.0%	0.2%	0%	**59 (0.2%)**
Lacking Complete Kitchen Facilities	2.4%	1.9%	0.1%	**363 (1.4%)**
Broadband Internet Subscription	85.0%	85.8%	89.5%	**23,394 (86.9%)**
No Vehicles Available	2.7%	4.8%	3.5%	**1,111 (4.1%)**
Mobile Homes	7.1%	4.8%	4.0%	**1,465 (4.8%)**

Source: U.S. Census Bureau[9,10]

6 United States Census Bureau. "2010 Census Redistricting Data (Public Law 94-171): P1: Race." https://data.census.gov.

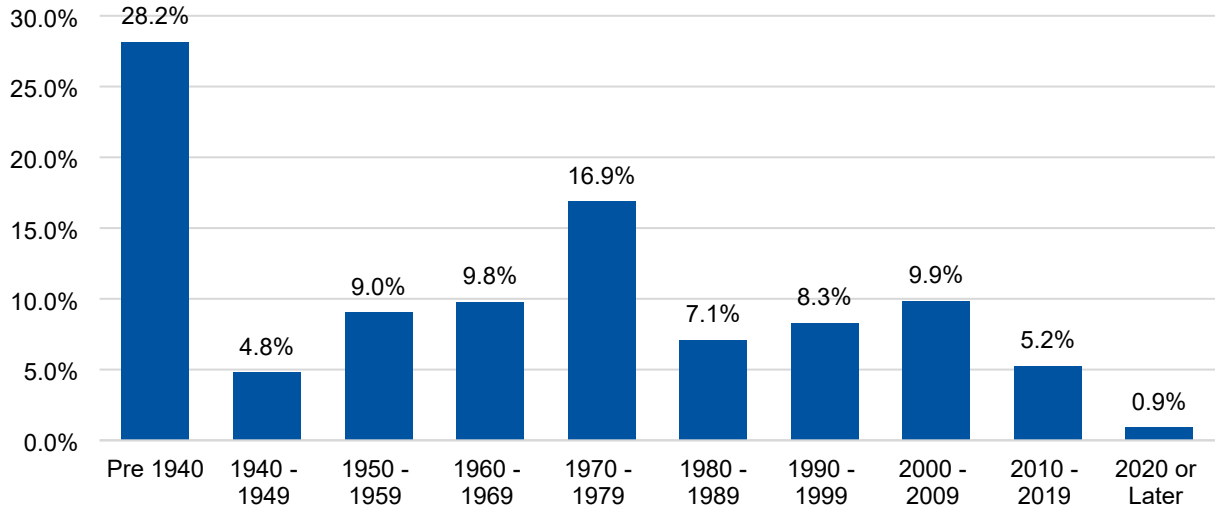
7 United States Census Bureau. "2020 Census Redistricting Data (Public Law 94-171): P1: Race." https://data.census.gov/.

8 United States Census Bureau. "2022 Census Bureau American Community Survey: DP04: Selected Housing Characteristics." https://data.census.gov/.

9 United States Census Bureau. "2022 Census Bureau American Community Survey: DP04: Selected Housing Characteristics." https://data.census.gov/.

10 United States Census Bureau. "2022 Census Bureau American Community Survey: DP02: Selected Social Characteristics in the United States." https://data.census.gov/.

Figure 4: Housing Age in the Planning Area



Source: U.S. Census Bureau[11]

Employment and Economics

The U.S. Census Bureau provides information related to employment and economic indicators. Low-income populations and the unemployed may be more vulnerable to certain hazards like flooding and severe winter weather. Additional employment and economic vulnerability information can be found in *Appendix C: Planning Area Profile*.

Employment and Economic Characteristics	Butler County	Dodge County	Saunders County	Total
Percent of People Living Below the Poverty Line	7.9%	9.1%	6.7%	**8.2%**
Median Household Income	$75,690	$66,793	$84,474	**$ 75,652**
Unemployment Rate	0.7%	4.1%	2.4%	**3.2%**

Source: U.S. Census Bureau[12]

[11] United States Census Bureau. "2022 Census Bureau American Community Survey: DP04: Selected Housing Characteristics". https://data.census.gov/.

[12] United States Census Bureau. "2022 Census Bureau American Community Survey: DP03: Selected Economic Characteristics." https://data.census.gov/.

Section Four: Planning Process Summary

Introduction

The process utilized to develop a hazard mitigation plan is often as important as the final planning document. For this planning process, LPNNRD adapted the four-step hazard mitigation planning process outlined by FEMA to fit the needs of the participating jurisdictions. The following pages give a summary of the planning process that took place during the plan update.

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.

Plan Update Process

Once LPNNRD was awarded a FEMA grant for their hazard mitigation plan update, JEO Consulting Group, Inc. (JEO) was contracted to assist, guide, and facilitate the planning process and plan assembly.

To be a participant in the development of this plan update, jurisdictions were required to attend required meetings or have meetings with the Regional Planning Team, assist in data collection, identify mitigation actions, review plan drafts, and either adopt the plan by resolution or plan to adopt the plan by resolution.

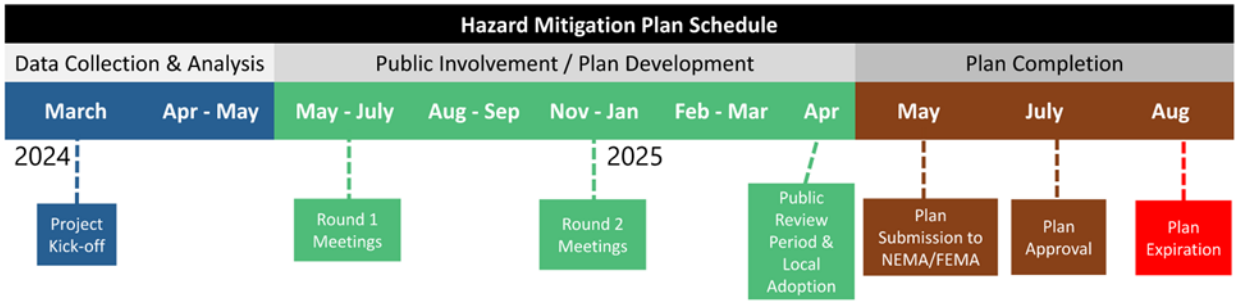
Kick Off Meeting

To start the project, a meeting was held between LPNNRD staff, county emergency managers, community representatives, and JEO to discuss the planning process and a general schedule for the plan update (Figure 5). Key takeaways from the meeting include the following.

- Clarification of potential participants in the plan.
- Roles and responsibilities for the regional planning team.
- Goals and objectives for the plan.
- Identification of hazards for the plan.

- Discussion of vulnerable populations.

Figure 5: Project Timeline



Round 1 Meetings: Hazard Identification & Plan Integration

The intent of the Round 1 Meeting was to familiarize jurisdictional representatives (i.e., the local planning teams), stakeholders, and the public with the plan update process, expected actions for the coming months, the responsibilities of being a participant, and to collect preliminary information to update the plan. After the meeting the attendees conducted risk and vulnerability assessments based on local capabilities, previous occurrences of hazards, and potential exposure. In addition, local planning team members evaluated potential integration of the hazard mitigation plan alongside other local planning mechanisms.

The Round 1 Meetings were held as a hybrid and a virtual meeting where participants, stakeholders, and the public could either join in-person or online via Zoom. Meeting dates, times, and location are given below. Virtual and in-person sign-in sheets can be found in *Appendix B: Planning Process Documentation*.

- **Monday, June 17, 2:00pm at the Lake Wanahoo NRD Education Building, 1655 County Road 16, Wahoo, NE**
- **Thursday, June 20, 6:30pm at the David City Library, 399 N 5th St, David City, NE**
- **Wednesday, June 26, 10:00am via Zoom**

Round 2 Meetings: Mitigation Strategies, NFIP, & Plan Maintenance

Round 2 Meetings are designed to identify and prioritize new mitigation measures, update previous mitigation actions from the 2020 hazard mitigation plan, update NFIP information, and identify when the plan would be reviewed and by whom. Attendees were also asked to review the information collected from the Round 1 meeting related to their jurisdiction through this planning process for accuracy.

The Round 2 Meetings were held as one virtual and two hybrid meetings where participants, stakeholders, and the public could either join in-person or online via Zoom. Meeting dates, times, and locations are listed below. Virtual and in-person sign-in sheets can be found in *Appendix B: Planning Process Documentation*.

- **Tuesday, January 7, 2:00pm at the Lake Wanahoo NRD Education Building, 1655 County Road 16, Wahoo, NE**
- **Thursday, January 16, 6:30pm at the David City Library, 399 N 5th St, David City, NE**
- **Tuesday, January 21, 10:00am via Zoom**

Public Review

Once the hazard mitigation plan draft was completed, a public review period was opened to allow local planning teams, stakeholders, and community members at large to review the plan, provide comments, and request changes. The public review period was open from May 12, 2025, through June 1, 2025. Participating jurisdictions were emailed a letter notifying them of this public review period. The draft plan was also made available on the project website (https://jeo.com/lower-platte-north-nrd-hazard-mitigation-plan-update/) to download the document. Jurisdictions, stakeholders, and the public could provide comments via mail or email. A review of the comments and who they were from can be found in *Appendix B: Planning Process Documentation*. All changes and comments were reviewed and incorporated into the plan as applicable.

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 provided to participating jurisdictions is located in *Appendix B: Planning Area Documentation*.

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

Public Involvement and Outreach

To notify and engage the public in the planning process, a wide range of stakeholder groups, State of Nebraska agencies, neighboring jurisdictions, and the general public were contacted and encouraged to participate in the plan update. Lists of the notified stakeholders, agencies, and neighboring jurisdictions can be found in *Appendix B: Planning Area Documentation*.

The Regional Planning Team was asked to identify any underserved communities or vulnerable populations in the planning area not already identified in the stakeholder list, so they could have the opportunity to be involved in the planning process. The City of Schuyler and southern Fremont were identified as they have a large Spanish-speaking population. Public outreach materials were offered in Spanish and English to better reach these communities.

Stakeholder Groups

There were 53 stakeholder groups that were identified and emailed or mailed invitations to participate in the planning process by attending meetings. Representatives from Omaha Steel, Methodist Health System, Dodge County, Farm Service Agency, DNR Floodplain, Nebraska Extension, NEMA, and FEMA attended meetings and/or provided input for their respective participant profiles.

Neighboring Jurisdictions

Neighboring jurisdictions were notified and invited to participate in the planning process by attending meetings. Representatives from Colfax County attended a Round 1 Meeting.

Vulnerable and Underserved Populations

During the project kickoff meeting with the county emergency managers, the Lower Platte North NRD, and the attendees were asked to identify vulnerable and underserved populations within the planning area, as well as the best methods to engage them. Vulnerable populations identified by the attendees included the very young, elderly, and those with low income. The City of Schuyler and southern Fremont were also identified as they have a large Spanish-speaking population. The Regional Planning Team felt that utilizing the participating jurisdiction's local planning teams and stakeholders that support vulnerable populations to represent and reach out to those groups would be the best course of action. Local planning teams were asked during meetings to reach out directly (i.e. meetings, phone calls, emails) to vulnerable populations and organizations that represent them and invite them to participate through the public survey and communication with their local planning team.

Public Survey

The general public was encouraged to participate in the planning process through a public survey that was available online and by hard copy. The survey was shared with the public by the local planning teams, NRD press release and social media, county social media, and county emails. Copies of the survey along with outreach documentation can be found in *Appendix B: Planning Process Documentation*. The purpose of the survey was to collect specific concerns related to hazards and projects the public have a vested interest in. It was available beginning after the Round 1 meeting and closed a week prior to the Round 2 meeting. In total there were 80 responses to the survey from members of the public.

Results of the public survey were shared with participating jurisdictions during the Round 2 meeting. Due to the low number of responses, the results could only be used by a few communities to help influence hazard prioritization and mitigation actions selected by local planning teams.

The most commonly experienced hazard events for residents included tornadoes and high winds, flooding, severe thunderstorms, and severe winter storms. This was the same for the ranked level of concern for hazard events. Alert sirens, levee construction or improvements, stormwater system improvements, water and sanitary sewer system protective measures, and backup generators were the most popular mitigation projects of importance for the public. The full results of the public survey can be found in *Appendix B: Planning Process Documentation*.

Fremont Flood Risk Open House

As part of the hazard mitigation planning process, the City of Fremont partnered with JEO Consulting Group and UNL's Master of Community and Regional Planning students to host a Flood Risk Open House. The purpose of this open house was to educate the public about the city's risk of flooding and to obtain public input on problem areas and possible solutions. Information about the Flood Risk Open House can be found in *Appendix G: Fremont Flood Risk Open House*.

Section Five: Risk Assessment Summary

Introduction

The ultimate purpose of this hazard mitigation plan is to minimize the loss of life and property across the planning area due to natural and human-caused hazards. The basis for the planning process is the regional and local risk assessment. This section contains a summary 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. This section is meant to provide a summary of the risk assessment for the planning area. The full risk assessment can be found in *Appendix A: Full Risk Assessment*.

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 8: Hazards Addressed in the Plan

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

Hazards identified in the 2021 Nebraska State Hazard Mitigation Plan that were not identified in the LPNNRD Hazard Mitigation Plan update include Human Infectious Disease and Power Failure.[13] 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.

Hazard Assessment Summary Tables

Table 9 and Table 10 provide an overview of the data contained in the hazard profiles. These tables are intended to be a quick reference for people using the plan and do not contain full source information. Source information and a full discussion of individual hazards are included in *Appendix A: Full Risk Assessment*. There are five main pieces of data used within these tables.

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

- **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.

- **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:

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

- **Future Likelihood:** This is the probability that a hazard will occur in the future. Future likelihood takes into account historical probability, changes in extreme weather , 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. Detailed descriptions of major events are included in *Appendix A: Full Risk Assessment* and *Participant Profile Appendices*. 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.

Table 9: Loss Estimation for the Planning Area

Hazard Type		Count	Property Damage	Crop Damage[2]
Animal & Plant Disease	Animal Disease[1]	84	3,141 Animals	N/A
	Plant Disease[2]	55	N/A	$306,967
Dam Failure[5]		2	$0	N/A
Drought[6]		441 out of 1,548 Months	$55,000	$159,863,886
Extreme Temperatures	Extreme Heat[7]	Avg. 5 Days a Year	N/A	$20,194,663
	Extreme Cold[7]	Avg. 32 Days a Year	$0	$320,710
Flooding[8]	Flash Flood	58	$492,500	$5,736,483
	Flood	127	$58,763,000	
Grass/Wildfires[9] *2 Injuries, 2 Fatalities*		1,086	6,366 Acres Burned	$70,739
Hazardous Materials Release	Fixed Site[3] 6 Injuries 1 Fatality	84	$0	N/A
	Transportation[4] 1 Injury	35	$100,104	N/A
Levee Failure[11]		3	$12,130,000	N/A
Severe Thunderstorms[8]	Hail Range: 0.75-4.5 Inches Average: 1.2 Inches	549	$14,251,000	$25,485,345
	Thunderstorm Wind Range: 50-100 mph Average: 56 mph	366	$850,000	$37,666,301
	Heavy Rain	12	$0	
	Lightning	6	$303,000	
Severe Winter Storms[8]	Blizzard	27	$0	$1,837,180
	Heavy Snow	16	$,3000,000	
	Ice Storm	11	$0	
	Winter Storm	148	$0	
	Winter Weather	40	$0	
Terrorism & Cyber Attack[10]		1	$0	N/A
Tornadoes and High Winds[8]	High Winds Range: 35-58 mph Average: 49 mph	64	$5,000	$6,825,252
	Tornadoes Range: EFU-EF2 Average: EF0	44	$2,093,000	$18,612
Total		**2,818**	**$89,042,604**	**$258,326,138**

N/A: Data not available
1 – NDA, 2014 – 2023
2 - USDA RMA, 2000 –2023
3 – NRC, 1990 – December 2023
4 – PHSMA, 1971 – June 2024
5 – Stanford University NPDP, December 2023
6 – NOAA, 1895 – December 2023
7 – NOAA Regional Climate Center, 1893 – 2024
8 – NCEI, 1996 - December 2023
9 – NFS, 2000 - 2023
10 – University of Maryland, 1970 – 2017
11 – USACE, 2019-2021

Table 10: Hazard Occurrences

Hazard	Previous Occurrence Events/Years of Record	Historical Probability	Future Likelihood	Likely Extent
Animal Disease[1]	84/10	90%	Very Likely	Range: 1-2,650 animals
Plant Disease[2]	55/24	83%	Very Likely	Crop damage or loss
Dam Failure[5]	2/136	1.5%	Very Unlikely	Varies by structure and event
Levee Failure[11]	3/53	6%	Unlikely	Varies by structure and event
Drought[5]	441/1,548 months	57%	Very Likely	D1-D4
Extreme Cold[7]	Avg 14 days a year $\leq 0°F$	100%	Very Likely	$\leq 0°F$
Extreme Heat[7]	Avg 5 days a year $\geq 100°F$	76%	Very Likely	$\geq 100°F$
Flooding[8]	185/28	93%	Very Likely	Some inundation of structures (15% of structures) and roads near streams. Some evacuations of people may be necessary
Grass/Wildfire[9]	1,086/24	100%	Very Likely	Avg: 6 acres burned Some homes and structures threatened or lost
Hazardous Materials Release: Fixed Site[3]	84/34	88%	Very Likely	Range: 1-2,000 gallons and <1-20,000 pounds
Hazardous Materials Release: Transportation[4]	35/54	37%	Likely	Range: 1-1,000 gallons, <1-800 pounds
Severe Thunderstorms[8]	933/28	100%	Very Likely	Avg: 56 mph winds Avg: 1.2-inch hail Range: 50-100 mph winds Range: 0.75-4.5-inch hail
Severe Winter Storms[6,8]	242/28	100%	Very Likely	15°-30° below zero (wind chill) Range: 1-9 inches snow
Terrorism & Cyber-Attack[10]	2/55	4%	Unlikely	Varies by event
High Winds[8]	64/28	50%	Very Likely	Avg: 49 mph Range: 35-58 mph

Hazard	Previous Occurrence Events/Years of Record	Historical Probability	Future Likelihood	Likely Extent
Tornadoes[8]	44/28	71%	Very Likely	Avg: EF0 Range: EFU-EF2

1 – NDA, 2014 - 2023
2 – USDA RMA, 2000 - 2023
3 – NRC, 1990 – December 2023
4 – PHSMA, 1971 – June 2024
5 – NPDP, 1890 – 2024
6 – NOAA, 1991 – 2020
7 – NOAA RCC, 1897 - 2024
8 – NCEI, 1996 – December 2023
9 – NFS, 2000 - 2023
10 – University of Maryland, 1970 – 2020, Local Planning Teams Communication
11 – USACE, 2024

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 Butler County, Dodge County, and Saunders 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 11: National Risk Index

Hazard	Butler County	Dodge County	Saunders County
Avalanche	N/A	N/A	N/A
Coastal Flooding	N/A	N/A	N/A
Cold Wave	Very Low (30)	Relatively Moderate (78.94)	Very Low (30.8)
Drought	Relatively Low (80.97)	Relatively Moderate (84.6)	Relatively Moderate (84.06)
Earthquake	Very Low (15.18)	Very Low (29.78)	Very Low (18.36)
Hail	Relatively Moderate (95.26)	Relatively High (97.74)	Relatively Low (56.86)
Heat Wave	Relatively Low (32.07)	Relatively Moderate (75.15)	Relatively Low (31.15)
Hurricane	N/A	N/A	N/A
Ice Storm	Relatively Moderate (70.09)	Relatively High (87.28)	Relatively Low (58.79)
Landslide	Relatively Low (12.4)	Relatively Low (45.04)	Relatively Low (23.03)
Lightning	Very Low (24.39)	Relatively Low (44.82)	Very Low (20.95)
Riverine Flooding	Very Low (22.78)	Relatively Moderate (92.97)	Relatively Moderate (84.76)

Hazard	Butler County	Dodge County	Saunders County
Strong Wind	Relatively Low (39.83)	Relatively Moderate (68.22)	Relatively Moderate (75.41)
Tornado	Relatively Low (53.01)	Relatively Moderate (89.31)	Relatively Low (67.67)
Tsunami	N/A	N/A	N/A
Volcanic Activity	N/A	N/A	N/A
Wildfire	Very Low (18.74)	Very Low (37.58)	Very Low (26.66)
Winter Weather	Relatively Low (43.75)	Relatively Moderate (85.05)	Relatively Low (47.34)
Overall Score	**Very Low (38.56)**	**Relatively Low (79.48)**	**Relatively Low (50.11)**

Source: FEMA[14]

Historical Disaster Declarations

Presidential Disaster Declarations

Presidential disaster declarations by county are available via FEMA from 1960 to July 2024. The following table describes the presidential disaster declarations within the planning area for the period of record. There have been 32 presidential disaster declarations in the planning area.

Table 12: Presidential Disaster Declarations

Disaster Declaration Number	Declaration Date	Title	County
228	7/18/1967	Severe Storms, Flooding	Butler, Dodge, Saunders
303	2/23/1971	Floods	Dodge, Saunders
406	10/20/1973	Severe Storms, Flooding	Saunders
500	4/8/1976	Ice Storms, High Winds	Butler, Saunders
552	3/24/1978	Storms, Ice Jams, Snowmelt, Flooding	Dodge, Saunders
716	7/3/1984	Tornadoes & Flooding	Dodge, Saunders
873	7/4/1990	Severe Storms, Tornadoes, Flooding	Dodge
908	5/28/1991	Severe Storms, Flooding	Dodge
983	4/2/1993	Ice Jams, Flooding	Butler, Dodge, Saunders
998	7/19/1993	Severe Storms, Flooding	Butler, Dodge, Saunders
1190	11/1/1997	Severe Snow Storms, Rain, Strong Winds	Butler, Dodge, Saunders
1480	7/21/2003	Severe Storms & Tornadoes	Butler
1517	5/25/2004	Severe Storms, Flooding, Tornadoes	Butler, Dodge, Saunders
3245	9/13/2005	Hurricane Katrina Evacuees	Butler, Dodge, Saunders
1674	1/7/2007	Severe Winter Storms	Butler

[14] FEMA. April 2025. "The National Risk Index". https://hazards.fema.gov/nri/map.

Disaster Declaration Number	Declaration Date	Title	County
1706	6/6/2007	Severe Storms, Flooding, Tornadoes	Saunders
1770	6/20/2008	Severe Storms, Flooding, Tornadoes	Butler, Saunders
1779	7/18/2008	Severe Storms, Straight-line Winds, Flooding	Dodge, Saunders
1878	2/25/2010	Severe Winter Storms, Snowstorm	Butler, Dodge, Saunders
1902	4/21/2010	Severe Storms, Ice Jams, Flooding	Butler
1924	7/15/2010	Severe Storms, Flooding	Dodge, Saunders
1945	10/21/2010	Severe Storms, Flooding, Tornado, Straight-Line Winds	Saunders
4014	8/12/2011	Severe Storms, Tornadoes, Straight Line Winds, and Flooding	Dodge
4179	6/17/2014	Severe Storms, Tornadoes, Straight Line Winds, and Flooding	Saunders
4185	7/28/2014	Severe Storms, Tornadoes, Straight Line Winds, and Flooding	Butler
4225	6/25/2015	Severe Storms, Tornadoes, Straight Line Winds, and Flooding	Saunders
4325	8/1/2017	Severe Storms, Tornadoes, Straight-Line Winds	Butler, Dodge, Saunders
4420	3/21/2019	Severe Winter Storm, Straight-Line Winds, and Flooding	Butler, Dodge, Saunders
3483	3/13/2020	COVID-19	Butler, Dodge, Saunders
4521	4/4/2020	COVID-19 Pandemic	Butler, Dodge, Saunders
4616	9/6/2021	Severe Storms and Straight-Line Winds	Saunders
4641	2/23/2022	Severe Storms, Straight-Line Winds, Tornadoes	Saunders

Source: Federal Emergency Management Agency, 1960-June 2024[15]

USDA Secretarial Disasters

Several USDA Secretarial Disasters for the planning area have occurred since 2012. Table 13 lists these disaster events. All of the disasters were for drought.

Table 13: USDA Secretarial Disasters (2012-July 2024)

Year	Type	Declaration Number	County
2012	Drought	S3315	Butler
2012	Drought	S3330	Butler, Dodge, Saunders
2012	Drought	S3343	Butler, Dodge, Saunders
2013	Drought	S3505	Butler, Dodge, Saunders
2020	Drought	S4789	Dodge, Saunders
2020	Drought	S4799	Butler, Dodge, Saunders

[15] Federal Emergency Management Agency. July 2024. "Disaster Declarations". https://www.fema.gov/openfema-data-page/disaster-declarations-summaries-v2.

Year	Type	Declaration Number	County
2020	Drought	S4816	Butler
2022	Drought	S5163	Butler
2022	Drought	S5207	Butler, Dodge
2022	Drought	S5275	Butler, Dodge, Saunders
2022	Drought	S5304	Butler, Dodge, Saunders
2022	Drought	S5297	Dodge
2022	Drought	S5319	Butler
2023	Drought	S5392	Saunders
2023	Drought	S5405	Butler, Saunders
2023	Drought	S5427	Saunders
2023	Drought	S5392	Butler

Source: USDA, 2012-March 2025[16]

State Emergency Declarations

The Regional Planning Team reached out to NEMA in July 2024 for a list of State Emergency Declarations in the planning area that did not reach the level of a Presidential Disaster Location. At this time NEMA does not track State Disaster Declarations and there is no other site or organization that tracks this information. This has been identified by NEMA as a need and they are currently developing a list of State Disaster Declarations. Once this information is available, it will be added to the plan.

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. Profiles for each identified hazard in the plan were created to examine their risk and potential impact in the planning area. These full profiles can be found in *Appendix A: Full Risk Assessment*. Hazards of local concern or events which have deviated from the norm are discussed in greater detail in each respective participant profile (see *Participant Profile Appendices* of this plan).

Local planning teams prioritized hazards of concern from the hazard list based on historical hazard occurrences, potential impacts, and local capabilities. The table below lists the participants along with their prioritized hazards of concern. It is important to note that while a jurisdiction may not have selected a specific hazard as prioritized, hazard events can impact any jurisdiction at any time and their selection is not a full indication of risk.

[16] U.S Department of Agriculture. 2025. "Disaster Designation Information" https://www.fsa.usda.gov/programs-and-services/disaster-assistance-program/disaster-designation-information/index.

Table 14: Prioritized Hazards of Concern by Jurisdiction

Jurisdiction	Animal and Plant Disease	Dam Failure	Drought	Extreme Temperatures	Flooding	Grass/Wildfire	Hazardous Materials Release	Levee Failure	Severe Thunderstorms	Severe Winter Storms	Terrorism & Cyber-Attack	Tornadoes & High Wind
Lower Platte North NRD		X	X		X			X				
Butler County					X		X					X
Abie							X		X	X		X
Bruno			X		X				X	X		X
David City					X				X		X	X
Dwight			X						X	X		X
Garrison										X		
Linwood					X	X			X	X		X
Octavia									X			X
Surprise					X				X	X		X
Ulysses					X				X			X
Dodge County	X	X			X		X	X				X
Fremont					X		X	X	X	X		X
Inglewood					X			X	X	X		X
North Bend					X			X	X	X		X
Saunders County	X	X			X			X	X			
Cedar Bluffs		X	X		X				X	X		X
Colon					X							X
Leshara					X			X	X	X		X
Malmo		X							X	X		X
Mead				X					X	X	X	X
Morse Bluff					X				X	X		

Jurisdiction	Animal and Plant Disease	Dam Failure	Drought	Extreme Temperatures	Flooding	Grass/Wildfire	Hazardous Materials Release	Levee Failure	Severe Thunderstorms	Severe Winter Storms	Terrorism & Cyber-Attack	Tornadoes & High Wind
Prague		X	X		X				X	X	X	X
Wahoo		X			X				X	X		X
Lindsay					X				X	X		X
Newman Grove												
Platte Center												
Richland							X		X	X		X
Rogers					X		X			X		X
Schuyler								X	X			
Colon Volunteer Fire Department					X		X		X	X		X
North Bend Volunteer Fire Department					X	X	X					X
Rising City Rural Fire Department						X	X		X			X
Weston Volunteer Fire & Rescue					X	X	X		X	X		X
Cedar Bluffs Public School									X		X	X
David City Public Schools			X		X				X	X	X	

Jurisdiction	Animal and Plant Disease	Dam Failure	Drought	Extreme Temperatures	Flooding	Grass/Wildfire	Hazardous Materials Release	Levee Failure	Severe Thunderstorms	Severe Winter Storms	Terrorism & Cyber-Attack	Tornadoes & High Wind
Mead Public Schools				X	X		X		X	X	X	X
North Bend Central Public Schools			X		X				X	X		X
Morse Bluff Township					X					X		
Platte Township					X				X	X		
Pohocco Township					X					X		X
Reading Township					X					X		
Skull Creek Township					X					X		
Ulysses Township					X					X		
Union Township					X		X			X		
Ames Diking and Drainage District		X			X			X	X			
Cotterell Diking and Drainage District					X			X				
North Bend Drainage District					X			X				

Jurisdiction	Animal and Plant Disease	Dam Failure	Drought	Extreme Temperatures	Flooding	Grass/Wildfire	Hazardous Materials Release	Levee Failure	Severe Thunderstorms	Severe Winter Storms	Terrorism & Cyber-Attack	Tornadoes & High Wind
Platte Valley Drainage District					X			X				
Woodcliff Lakes SID #8					X		X		X	X		X
Educational Service Unit #2									X		X	
Four Corners Health Department			X		X				X		X	X
Methodist Health System – Fremont					X		X			X	X	X
Three Rivers Public Health Department	X	X			X		X	X	X			X

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Section Six: Mitigation Strategy

Introduction

The primary focus of the mitigation strategy is to identify action items to reduce the effects of hazards on existing infrastructure and property based on the established goals and objectives of the hazard mitigation plan. These actions should consider the most cost effective and technically feasible options to address risk.

FEMA Mitigation Strategy Requirements

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, 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.

Summary of Changes

The development of the mitigation strategy for this plan update includes the addition of new mitigation actions, updated status or removal of past mitigation actions, and revisions to descriptions for consistency across the planning area.

Selected Mitigation and Strategic Actions

After establishing the goals, the local planning teams evaluated mitigation and strategic actions. These actions included: the mitigation and strategic actions identified by each participating jurisdiction in the previous plan and additional actions discussed during the update planning process. The Regional Planning Team provided each participant a link to the FEMA Mitigation Ideas document to be used as a starting point to review a wide range of potential mitigation actions. Participants were also encouraged to think of actions that may need FEMA grant assistance and to review their hazard prioritization section for potential mitigation and strategic actions. Members of the Regional County Planning Team were also available to help local jurisdictions identify additional action alternatives. These suggestions helped participants

determine which actions would best assist their respective jurisdiction in alleviating damage in the event of a disaster.

During the update of previous identified actions and the identification of new actions, local planning teams prioritized each identified mitigation and strategic action as high, medium, or low. 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 and strategic action's priority may change very quickly as circumstances change.

The mitigation and strategic actions are the core of a hazard mitigation plan. The local planning teams were instructed that each hazard identified in the plan must have an action that addresses it. Mitigation and strategic actions were evaluated based on referencing the community's risk assessment and capability assessment. Jurisdictions were encouraged to choose actions that were realistic and relevant to the concerns identified.

It is important to note that not all the mitigation and strategic 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.

Participant Mitigation and Strategic Actions

Mitigation and strategic actions identified by participants of the HMP are found in the Mitigation and Strategic Actions Matrix in *Appendix D: Mitigation Strategy*. Additional information about selected actions can be found in the participant profiles in the *Participant Profile Appendices.* Each action includes the following information in the respective community profile.

- **Action:** General title of the action item.
- **Description & Location:** Brief summary of what the action item(s) will accomplish and the location of the project where applicable.
- **Hazard(s) Addressed:** Which hazard the mitigation action aims to address.
- **Estimated Cost:** General cost estimate for implementing the mitigation action for the appropriate jurisdiction.
- **Local Funding:** A list of any potential local funding mechanisms to fund the action.
- **Timeline:** General timeline as established by the local planning teams.
- **Priority:** General description of the importance and workability in which an action may be implemented (high/medium/low).
- **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. Establishing 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, kept, and new mitigation actions for each participating jurisdiction can be found in the *Participant Profile Appendices*.

Section Seven: Plan Implementation and Maintenance

Monitoring, Evaluating, and Updating the Plan

Each participating jurisdiction in the LPNNRD Hazard Mitigation Plan will be responsible for monitoring, evaluating, and updating the plan during its five-year lifespan. Hazard mitigation projects will be prioritized by each participant's governing body with support and suggestions from the public and business owners. Each local planning team will be responsible for plan maintenance, the frequency of review, and how the public will be involved. This information can be found in each participant's profile under the Local Planning Team section. During the review, the local planning team can report on the status of projects and include which implementation processes worked well, any difficulties encountered, how coordination efforts are proceeding, and which strategies should be revised.

In addition, each local planning team will be responsible for ensuring that the plan's goals are incorporated into applicable revisions of their jurisdiction's relevant planning documents. The hazard mitigation plan will also consider any changes in planning documents and incorporate the information accordingly in its next update. *Appendix F: Guide to Review and Update the Hazard Mitigation Plan* may also be used to assist with plan updates.

The FEMA required update of this plan will occur at least every five years, to reduce the risk of the plan expiring. Updates may be incorporated more frequently, especially in the event of a major hazard. LPNNRD will start meetings to discuss mitigation plan updates at least nine months prior to the deadline for completing the plan update. LPNNRD staff and county emergency managers will review the goals and objectives of the previous plan and evaluate them to determine whether they are still pertinent and current. Among other questions, they may want to consider the following.

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.

- 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 current resources appropriate to implement the plan?
- Were the outcomes as expected?
- Did the plan partners participate as originally planned?
- Are there other agencies which should be included in the revision process?

If deemed necessary, a private consulting firm or individual will be hired to help facilitate the plan update process.

Continued Public Involvement

To ensure continued plan support and input from the public and stakeholders, public involvement should remain a top priority for each participating jurisdiction. Every participant identified ways the public will be involved in the update process including the following.

- Social Media
- Websites
- Board/Council Meetings
- Newsletters
- Letters
- Bulletin Postings

Unforeseen Opportunities

If new, innovative mitigation options 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. LPNNRD, as the plan sponsor, provides an opportunity for jurisdictions to compile proposed amendments and send them to NEMA, and subsequently to FEMA, for a plan amendment. Such amendments should include all applicable information for each proposal including description of changes, identified funding, responsible agencies, etc.

Incorporation into Existing Planning Mechanisms

The Regional 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. Utilizing FEMA's *Integrating the Local Natural Hazard Mitigation Plan into a Community's Comprehensive Plan*[17] guidance, each jurisdiction engaged in a plan integration discussion. This discussion was facilitated by a Plan Integration Worksheet or set of questions, created by the Regional Planning Team. This offered an easy way for participants to notify the Regional Planning Team of existing planning mechanisms, and if they interface with the hazard mitigation plan.

Each jurisdiction referenced all relevant existing planning mechanisms and provided information on how these did or did not address hazards and vulnerability. Summaries of plan integration are found in each individual participant profile. For jurisdictions that lack existing planning mechanisms, especially smaller communities, the plan may be used as a guide for future activity and development in the jurisdiction.

[17] 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/sites/default/files/2020-07/integrating-hazard-mitigation-local-plan.pdf.

Section Eight: Participant Profiles

Purpose of Participant Profiles

Participant profiles contain information specific to jurisdictions participating in the LPNNRD Hazard Mitigation Plan planning effort. Participant profiles were developed with the intention of highlighting each jurisdiction's unique characteristics that affect its vulnerability to hazards. These 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 jurisdictions was collected at public and one-on-one meetings and used to establish their section of the plan. Participant profiles may include the following elements:

- Community Fact Sheet
- Local Planning Team
- Capability Assessment
- Plans and Studies
- Future Development Trends
- Community Lifelines
- Hazard Prioritization and Mitigation Strategy

Community Fact Sheets

Community fact sheets were added at the beginning of the participant profiles for all counties and communities. These fact sheets provide demographic, housing, economic, and employment information specific to that community or county. To learn more about how these factors can impact vulnerability see *Appendix C: Planning Area Profile*.

Participant Profile Appendices

Individual participant profiles can be found in the *Butler County Appendix, Dodge County Appendix, Saunders County Appendix, Partial Counties Appendix, Fire Districts Appendix,* or *Special Districts Appendix*. The location of the profiles is given below.

Participant Profile Appendices
- Butler County Appendix
  - Village of Abie
  - Village of Bruno
  - David City
  - Village of Dwight
  - Village of Garrison
  - Village of Linwood
  - Village of Octavia
  - Village of Rising City
  - Village of Surprise

- Village of Ulysses
- Dodge County Appendix
  - City of Fremont
  - Village of Inglewood
  - City of North Bend
- Saunders County Appendix
  - Village of Cedar Bluffs
  - Village of Colon
  - Village of Leshara
  - Village of Malmo
  - Village of Mead
  - Village of Morse Bluff
  - Village of Prague
  - City of Wahoo
  - City of Yutan
- Partial Counties Appendix
  - Village of Lindsay
  - Village of Platte Center
  - Village of Richland
  - Village of Rogers
  - City of Schuyler
- Fire District Appendix
  - Colon Volunteer Fire Department
  - North Bend Volunteer Fire Department
  - Rising City Rural Fire Department
  - Weston Volunteer Fire & Rescue
- Special Districts Appendix
  - Ames Diking and Drainage District
  - Cedar Bluffs Public School
  - Cotterell Diking and Drainage District
  - David City Public Schools
  - Educational Service Unit #2
  - Lower Platte North NRD
  - Mead Public Schools
  - North Bend Central Public Schools
  - North Bend Drainage District
  - Platte Township
  - Platte Valley Drainage District
  - Pohocco Township
  - Reading Township
  - Skull Creek Township
  - Three Rivers Public Health Department
  - Ulysses Township
  - Union Township
  - Woodcliff Lakes SID #3

Appendix A: Full Risk Assessment

Table of Contents

Appendix A: Full Risk Assessment 1Animal and Plant Disease 6Dam Failure 16Drought 23Extreme Temperatures 40Flooding 49Grass/Wildfire 72Hazardous Materials Release 91Levee Failure 101Severe Thunderstorms 109Severe Winter Storms 116Terrorism and Cyber-Attack 123Tornadoes and High Winds 127

Terms and Definitions

The following table defines terms that will be used throughout the Full Risk Assessment Appendix.

Risk Assessment Definitions

Term	Definition
Hazard	A potential source of injury, death, or damages
Asset	People, structures, facilities, and systems that have value to the community
Risk	The potential for damages, loss, or other impacts created by the interaction of hazards and assets
Vulnerability	Susceptibility to injury, death, or damages to a specific hazard
Impact	The consequence or effect of a hazard on the community or assets
Historical Occurrence	The number of hazard events reported during a defined period of time
Extent	The strength or magnitude relative to a specific hazard
Historical Probability	Likelihood of a hazard occurring based on historical occurrences
Future Likelihood	The probability of a hazard occurring based on historical occurrences, changing extreme weather, and future development

Methodology

The risk assessment methodology utilized for this appendix follows the same methodology as 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 appendix 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 vulnerabilities and vulnerable assets will be conducted across the entire planning area, *Section Eight* will discuss jurisdictional-specific vulnerabilities and assets at risk for relevant hazards. Analysis for planning area 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).

For each of the hazards profiled, the best and most current appropriate data available have been considered. Further discussion relative to each hazard is discussed in the hazard profile portion of this appendix. Unless specifically stated otherwise, each hazard's extent scale(s) apply to all jurisdictions within the planning area.

Hazard Identification

The identification of relevant hazards for the planning area 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.

Hazards Addressed in the Plan

HAZARDS ADDRESSED IN THE PLAN		
ANIMAL AND PLANT DISEASE	Flooding	Severe Thunderstorms
DAM FAILURE	Grass/Wildfires	Severe Winter Storms
DROUGHT	Hazardous Materials Release	Terrorism & Cyber-Attack
EXTREME TEMPERATURES	Levee Failure	Tornadoes & High Winds

FEMA Risk Assessment Requirements

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

Requirement §201.6(c)(2)(i): The risk assessment must 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 must 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 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.

Average Annual Damages, Historical Probability, & Future Likelihood

Average Annual Damages

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 are 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 which there is a robust historic record and for which monetary damages are recorded. There are two main pieces of data used for this formula.

- **Total Damages in Dollars:** This is the total dollar amount of all property damages and crop damages 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.

An example of the Event Damage Estimate is found below:

$$Annual\ Damages\ (\$) = \frac{Total\ Damages\ in\ Dollars\ (\$)}{Total\ Years\ Recorded\ (\#)}$$

FEMA Standard Economic Values

As part of FEMA's Benefit-Cost Analysis Toolkit, standard economic values were developed to help better estimate the avoided loss of services when implementing a hazard mitigation project. These standard economic values can also be used to help estimate potential future economic impacts from a hazard event. The table below gives the economic value for traffic delays for roads and bridges, loss of electric services, loss of wastewater services, loss of potable water services, and loss of communications/IT services. The assumed damages do not consider physical damage to utility equipment and infrastructure but do consider the impact on economic activity and impact on residential customers. To learn more about how these values were calculated visit https://www.fema.gov/sites/default/files/documents/fema-standard-economic-values-methodology-report-v13-2024.pdf.pdf.

FEMA Standard Economic Values

Service Lost	Economic Value
Traffic Delays on Roads and Bridges	$36.63/Vehicle/Hour
Loss of Electric Services	$213/Person/Day
Loss of Wastewater Services	$71/Person/Day
Loss of Potable Water Services	$150/Person/Day
Loss of Communications/IT Services	$151/Person/Day

Source: FEMA, 2024[1]

FEMA's standard economic values will not be used to determine average annual damages and average damage per event estimates for each hazard profile. Past hazard events do not list the total number of people or vehicles impacted, and thus it is impossible to retroactively calculate the total economic impact using these values. The values are provided in this plan so that participants can better estimate potential losses and determine the benefits of potential future mitigation actions.

Historical Probability

Historical probability can be calculated based on the total years of record and the total number of years in which an event occurred. It is important to note for this formula that the number of total events is not used because multiple events may take place in a single year. This would skew the

[1] FEMA. September 2024. "Benefit-Cost Analysis Sustainment and Enhancement". https://www.fema.gov/sites/default/files/documents/fema-standard-economic-values-methodology-report-v13-2024.pdf.pdf.

historical probability higher than it is. An example of the historical probability estimate is found below:

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

Future Likelihood

Future likelihood is the probability that a hazard will occur in the future. While historical probability tells us how often a hazard occurred in the past, it does not provide a full picture of what could happen in the future. Future conditions are likely to change the probability of hazard events. Changes in extreme weather and future changes in development will bring changes to probability, risk, and vulnerability. For this hazard mitigation plan historical probability, extreme weather changes, and future development will be considered when determining the future likelihood of a hazard event occurring. Because future conditions are difficult to quantify with percentages, future likelihood is broken down into the four categories 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.

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 planning area. Hazards of local concern or events which have deviated from the norm are discussed in greater detail in each respective jurisdictional profile (see *Section Eight*).

Animal and Plant 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. An outbreak of animal-to-animal disease would have significant economic implications that could result in a serious public health risk. Some diseases may be easily contained geographically, while others, due to longer incubation times, may spread due to transfer and sale of livestock between facilities.[2]

The State of Nebraska's and the planning area's economy is heavily invested in both livestock and crop sales. According to the 2022 Census of Agriculture, the market value of agricultural products sold in Nebraska was estimated at over $29 billion; this total is split between crops (estimated $14 billion) and livestock (estimated $15 billion). For the planning area, the market value of sold agricultural products was nearly $750 million.[3] The table below shows the population of livestock and the value of livestock sales within the planning area.

Livestock Inventory

County	Market Value of 2022 Livestock Sales	Cattle and Calves	Hogs and Pigs	Poultry Egg Layers	Sheep and Lambs
Butler	$377,129,000	48,777	59,663	543,468	858
Dodge	$187,304,000	47,195	50,665	855	465
Saunders	$184,203,000	55,262	3,774	2,089	955
Total	**$748,636,000**	**151,234**	**114,102**	**546,412**	**2,278**

Source: U.S. Census of Agriculture, 2022

The following tables provide the value and acres of land in farms for the planning area. Saunders County has both the highest number of farms and the largest number of farm acres in the planning area. Corn is the most prevalent crop type in the region followed by soybeans.

Land and Value of Farms in the Planning Area

County	Number of Farms	Land in Farms (acres)	Market Value of 2022 Crop Sales
Butler	534	296,811	$257,401,000
Dodge	540	303,096	$272,319,000
Saunders	971	404,181	$330,729,000
Total	**2,045**	**1,004,088**	**$860,449,000**

Source: U.S. Census of Agriculture, 2022

[2] Nebraska Emergency Management Agency. 2021. "2021 Nebraska State Hazard Mitigation Plan". https://nema.nebraska.gov/sites/nema.nebraska.gov/files/doc/hazmitplan2021.pdf.

[3] US Department of Agriculture, National Agricultural Statistics Service. 2022. "2022 Census of Agriculture". https://www.nass.usda.gov/Publications/AgCensus/2022/.

Crop Values

County	Corn		Soybeans		Wheat	
	Acres Planted	Value (2022)	Acres Planted	Value (2022)	Acres Planted	Value (2022)
Butler	160,044	$176,988,000	123,068	$76,390,000	923	$12,000
Dodge	156,906	$185,313,000	139,477	$83,291,000	582	(D)
Saunders	205,137	$205,407,000	179,590	$111,254,000	3,276	$1,776,000
Total	**522,087**	**$567,708,000**	**442,135**	**$270,935,000**	**4,781**	**$1,788,000**

Source: U.S. Census of Agriculture, 2022
**(D) Withheld to avoid disclosing data for individual farms.*

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. The primary land uses where animal and plant disease will be observed include agricultural lands, range or pasture lands, and feedlots.

There are two cattle feeders in Butler County, one near David City and another near Osceola. Combined there are nearly 13,600 head of cattle. In Saunders County there is a cattle feed near Mead that has about 30,000 head of cattle. There is one cattle feed in Dodge County that has nearly 9,000 head of cattle. In total there are about 52,600 head of cattle in the planning area.[4]

Extent

There is no standard for measuring the magnitude of animal and plant disease. Historical events have impacted livestock ranging from a single animal to 500 animals. The planning area is heavily dependent on the agricultural economy. Any severe plant or animal disease outbreak which may impact this sector would negatively impact the local economy.

Historical Occurrences

Animal Disease

The NDA provides reports on diseases occurring in the planning area. There were 84 instances of animal disease reported between 2014 and 2023. These outbreaks affected 3,141 animals.

Livestock Diseases Reported in the Planning Area

Disease	Year	County	Population Impacted
Anaplasmosis	2014	Saunders	2
	2016	Butler	2
	2016	Dodge	1
	2017	Dodge	3

[4] Nebraska Department of Agriculture. 2020. "2019-2020 Cattle Feeders Directory". https://nda.nebraska.gov/publications/promotion/cattle_feeders/cattle_feeders.pdf.

Disease	Year	County	Population Impacted
	2019	Butler	6
	2020	Butler	3
	2020	Saunders	1
	2022	Saunders	1
	2023	Butler	2
	2023	Saunders	1
Bluetongue	2014	Saunders	7
	2016	Saunders	3
	2017	Saunders	5
	2018	Saunders	1
	2020	Butler	1
	2023	Dodge	1
Bovine Viral Diarrhea	2017	Saunders	1
	2018	Dodge	1
	2019	Butler	1
	2023	Saunders	1
Caprine Arthritis/Encephalitis	2017	Dodge	1
	2020	Butler	3
Enzootic Bovine Leukosis	2014	Saunders	6
	2016	Saunders	2
	2017	Saunders	2
	2018	Butler	301
	2020	Butler	1
Epizootic Hemorrhagic Disease	2017	Saunders	1
	2023	Dodge	1
Equine Herpesvirus	2022	Butler	1
Equine Influenza	2016	Dodge	1
Highly Pathogenic Avian Influenza	2022	Butler	1
Leptospirosis	2014	Saunders	4
	2016	Saunders	4
	2017	Saunders	1
Maedi-Visna/Ovine Progressive Pneumonia	2016	Saunders	1
Paratuberculosis	2014	Butler	4
	2014	Dodge	1
	2015	Butler	300
	2016	Butler	2
	2016	Dodge	1

Disease	Year	County	Population Impacted
	2016	Saunders	1
	2017	Butler	2
	2017	Saunders	101
	2018	Butler	50
	2018	Dodge	3
	2018	Saunders	1
	2019	Butler	3
	2019	Dodge	4
	2020	Butler	1
	2020	Dodge	1
	2020	Saunders	1
	2022	Butler	5
	2022	Dodge	5
	2023	Butler	4
	2023	Dodge	1
	2023	Saunders	1
Porcine Circovirus	2014	Butler	51
	2016	Dodge	1
Porcine Circovirus Type 2	2014	Saunders	1
	2017	Butler	260
Porcine Delta Coronavirus	2015	Dodge	500
Porcine Epidemic Diarrhea	2015	Dodge	500
	2016	Butler	1
	2016	Dodge	1
	2017	Dodge	2
	2018	Dodge	1
Porcine Reproductive and Respiratory Syndrome	2014	Butler	1
	2014	Dodge	4
	2015	Dodge	650
	2016	Butler	2
	2016	Dodge	10
	2016	Saunders	1
	2017	Butler	260
	2017	Dodge	7
	2017	Saunders	1
Q Fever	2016	Saunders	1
Seneca Valley Virus	2017	Butler	4
	2017	Dodge	10

Disease	Year	County	Population Impacted
	2019	Butler	1
	2023	Butler	1
West Nile Virus	2016	Saunders	1
	2023	Dodge	1
	2023	Saunders	1

Source: NDA, 2014-2023[5]

In addition to the viral and bacterial diseases that could impact crops, pests can also result in crop loss or detract from crop quality. Possible pests include the following.

- Japanese Beetles
- Grasshoppers
- Western Bean Cutwork
- European Corn Borer
- Corn Rootworm
- Corn Nematodes
- Soybean Aphids
- Rootworm Beetles
- Emerald Ash Borer

The RMA provides data on plant disease events and plant losses in the planning area. There were 45 instances of plant diseases reported from 2000-2023 by the RMA. These outbreaks caused $206,434 in crop losses.[6]

Emerald Ash Borer

The spread and presence of the Emerald Ash Borer (EAB) have 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. Confirmed cases of EAB have been found in 39 US states, primarily in the eastern, southern, and midwestern regions. Nebraska's first confirmed cases occurred on private land in Omaha and Greenwood in 2016.[7]

The figure on the next page shows the locations of Nebraska's confirmed EAB cases as of March 2024. Additional confirmed cases have likely occurred and many communities across the state are prioritizing the removal of ash trees to help curb potential infestations and tree mortality. Dodge and Saunders counties have reported confirmed cases of EAB, and parts of Butler County are in a treatment consideration zone. 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.

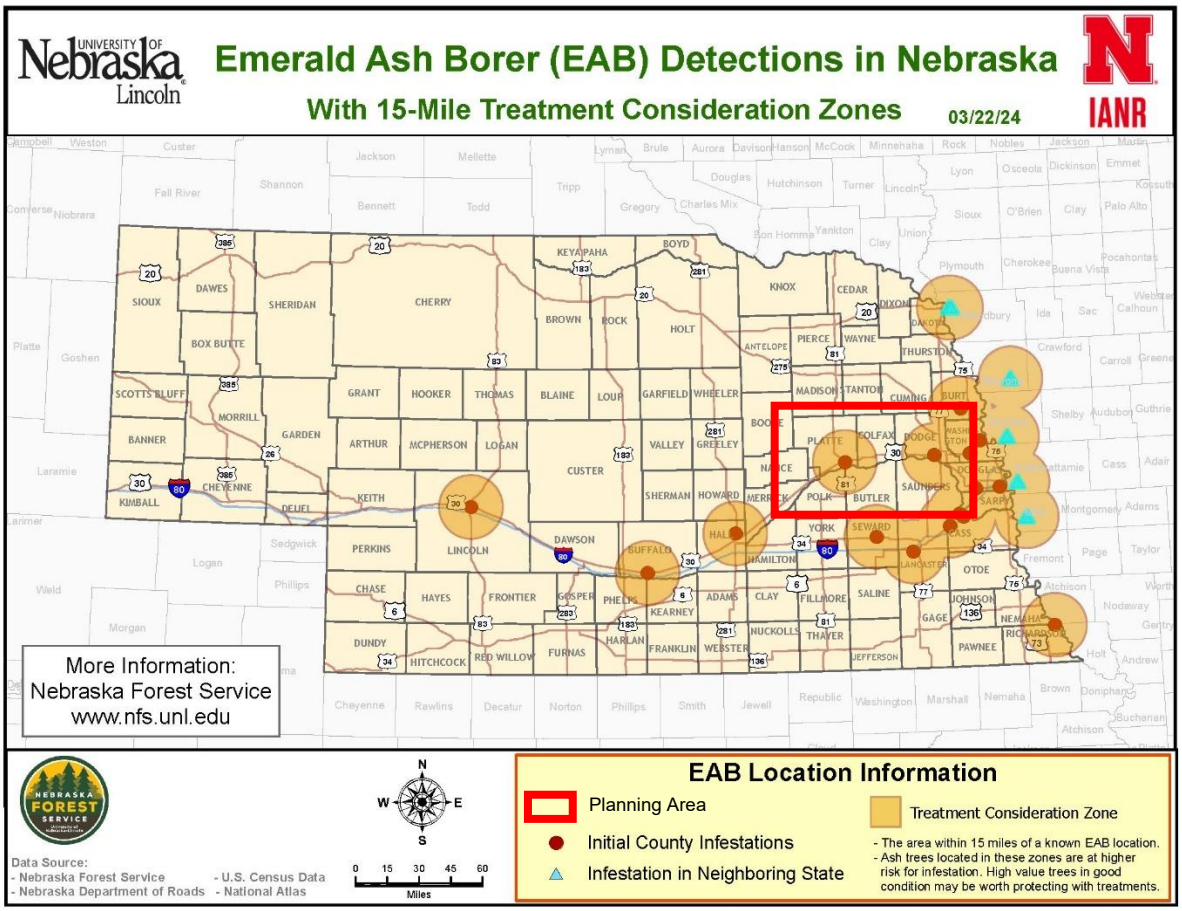
[5] Nebraska Department of Agriculture. 2023. "Livestock Disease Reporting". http://www.nda.nebraska.gov/animal/reporting/index.html.

[6] U.S. Department of Agriculture. 2023. "Cause of Loss Historical Data Files: 2000-2023". https://www.rma.usda.gov/data/cause.html.

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

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 and mature trees three to four years after infestation.[8] Estimated economic impacts to Nebraska's 44 million ash trees exceed $961 million.[9] 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.

EAB Detections in Nebraska



Source: Nebraska Forest Service[10]

Japanese Beetles

Japanese beetles are a rising concern in Nebraska. Japanese beetles are highly destructive invasive pests found in many counties across Nebraska. The figure on the next page shows counties declared as infested by the beetles. All three counties were declared infested prior to

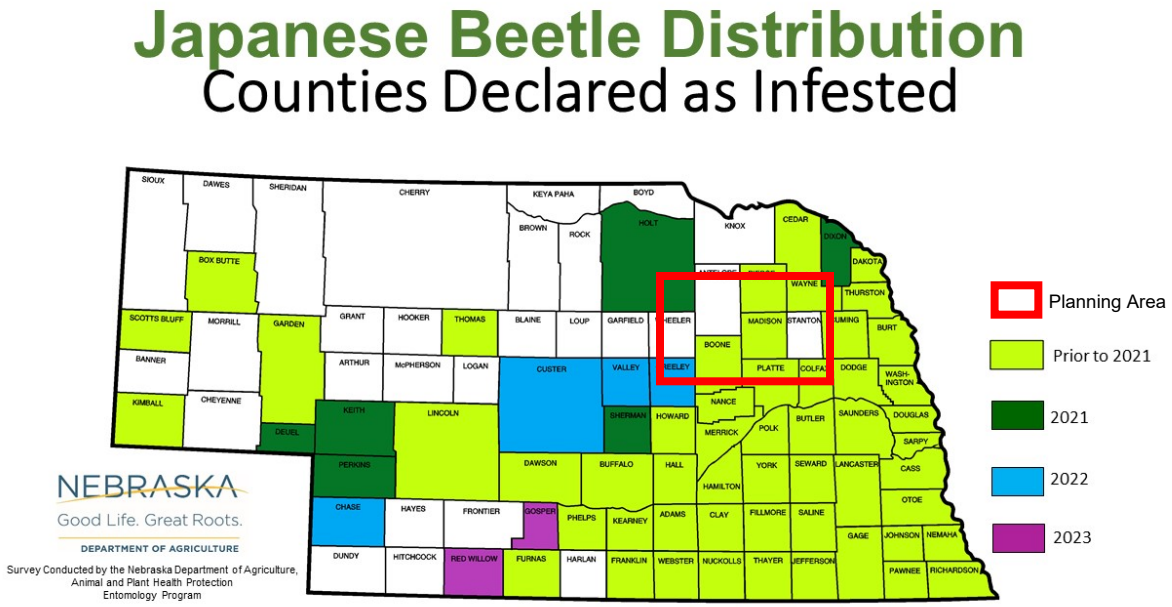
[8] Arbor Day Foundation. 2015. "Emerald Ash Borer." https://www.arborday.org/trees/health/pests/emerald-ash-borer.cfm.

[9] "Nebraska Emerald Ash Borer Response Plan." May 2015. https://nfs.unl.edu/NebraskaEABResponsePlan.pdf.

[10] Nebraska Forest Service. March 2024. "Emerald Ash Borer (EAB) Detections in Nebraska". https://nda.nebraska.gov/plant/entomology/eab/EABmap_03-22-24-1.pdf.

2021. These beetles cause 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.

Japanese Beetle Distribution



Source: Nebraska Department of Agriculture[11]

Average Annual Losses

According to the USDA RMA (2000-2023) there were 55 plant disease events in the planning area. While the RMA does not track losses for livestock, annual crop losses from plant disease can be estimated. Agricultural livestock disease losses are determined by the Nebraska Department of Agriculture.

Plant Disease Losses

Hazard Type	Number of Events	Events per Year	Total Crop Loss	Average Annual Crop Loss
Plant Disease	55	2.3	$306,967	$12,790

Source: USDA, 2000-2023[12]

Animal Disease Losses

Hazard Type	Number of Events	Events per Year	Total Animal Losses	Average Animal Losses per Event

[11] Nebraska Department of Agriculture. 2023. "Japanese Beetle Distribution". https://nda.nebraska.gov/plant/entomology/pest_survey/index.html#:~:text=NDA%20continues%20to%20track%20the,the%20results%20of%202022%20survey.&text=Karnal%20Bunt%20sampling%20occurred%20in%20July%202022.

[12] U.S. Department of Agriculture. 2023. "Cause of Loss Historical Data Files: 2000-2023". https://www.rma.usda.gov/data/cause.html.

ANIMAL DISEASE	84	8.4	3,141	314.1

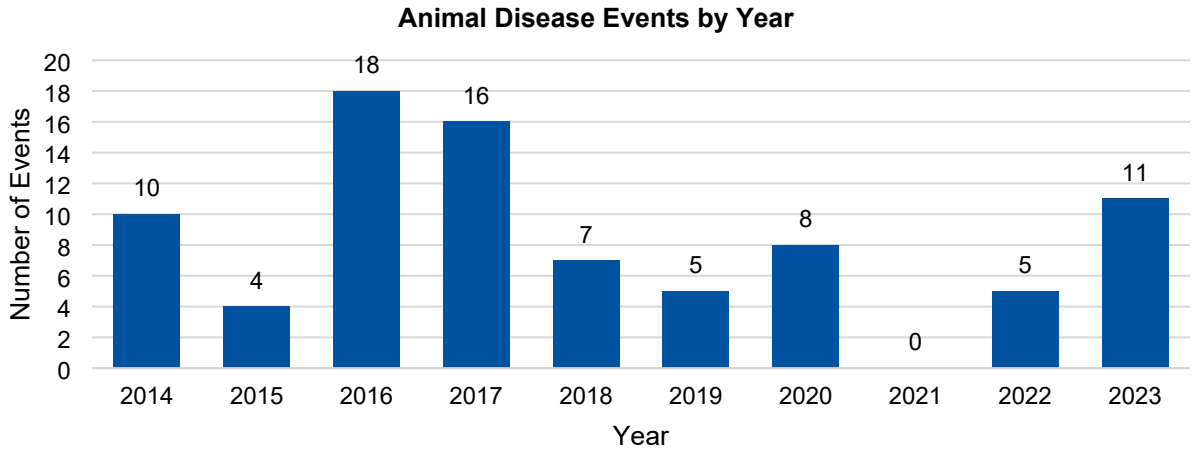
Source: NDA, 2014-2023[13]

Historical Probability & Future Likelihood

Given the historic record of the occurrence of animal disease as shown in the figure below (nine out of ten years), for the purposes of this plan, the historical probability of animal disease occurrence is 90 percent. Given the historic record of occurrence for agricultural plant disease events as shown in the figure below (20 out of 24 years with a reported event), for the purposes of this plan, the historical probability of agricultural plant disease occurrence is 83%. Due to the anticipated impacts of changing extreme weather and future development, the future likelihood of an agricultural disease event is very likely.

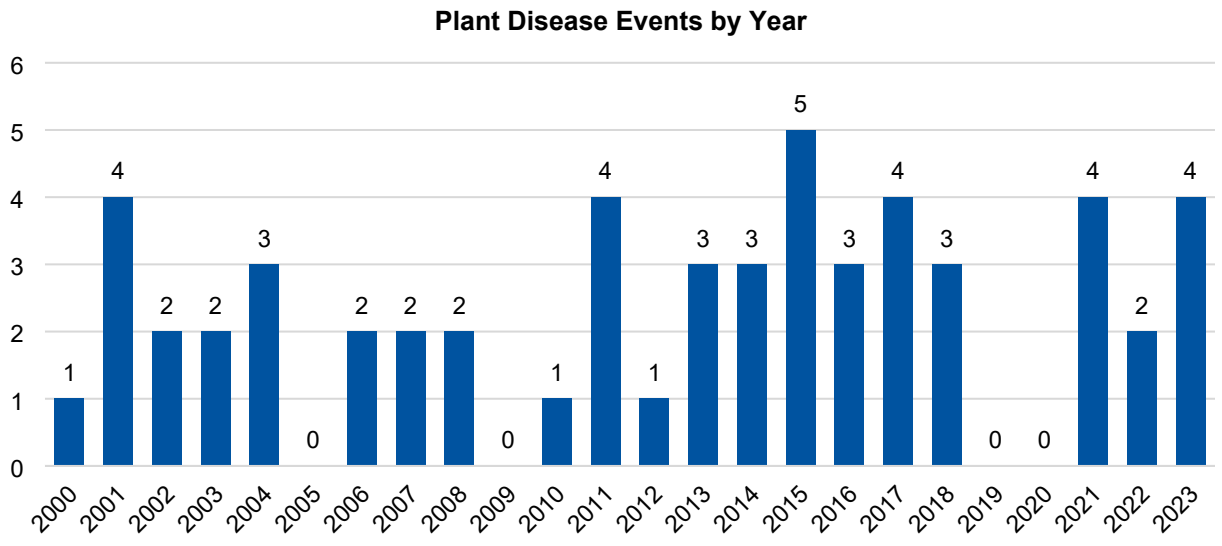
Historical Probability & Future Likelihood – Animal and Plant Disease

HAZARD	HISTORICAL PROBABILITY	EXTREME WEATHER CHANGES IMPACT	FUTURE DEVELOPMENT IMPACT	FUTURE LIKELIHOOD
ANIMAL DISEASE	90%	Increase in Frequency and Extent	Increase in Frequency	**Very Likely**
PLANT DISEASE	83%	Increase in Frequency and Extent	Increase in Frequency	**Very Likely**



Source: NDA

[13] Nebraska Department of Agriculture. 2023. "Livestock Disease Reporting". http://www.nda.nebraska.gov/animal/reporting/index.html.



Source: USDA[14]

Changing Extreme Weather

The distribution and severity of animal and plant disease outbreaks will likely increase alongside extreme weather change impacts. Shifting conditions will stress existing agricultural populations and plant species, creating vulnerability for new diseases to take hold. Changes in temperature and precipitation will likely increase the spread and types of insects and weeds, which can cause additional stressors to plants and animals.[15] The trend toward higher average temperatures and increased periods of drought[16] increases the stress levels on animal populations, increasing the risk of disease taking hold. Additionally, uncommon diseases may return at higher numbers as changes in the environment cause the release of previously contained diseases or promote the mutation of diseases.

Future Development

The likelihood of agricultural disease outbreaks is likely to remain consistent or increase as future development occurs; particularly if agricultural production remains the 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. 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.

Regional Vulnerabilities

The following table provides information related to regional vulnerabilities; for jurisdictional-specific vulnerabilities, refer to *Section Eight*.

[14] U.S. Department of Agriculture. 2023. “Cause of Loss Historical Data Files: 2000-2023”. https://www.rma.usda.gov/data/cause.html.

[15] EPA. September 2024. “Climate Change Impacts on Agriculture and Food Supply.” https://www.epa.gov/climateimpacts/climate-change-impacts-agriculture-and-food-supply.

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

Regional Agricultural Disease 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	-Local and regional economy is reliant on 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	- Loss of trees and other vegetation
COMMUNITY LIFELINES	-Transportation routes can be closed during quarantine

Jurisdictions Ranking Agricultural Disease as a Prioritized Hazard of Concern

The following lists jurisdictions and stakeholders which identified agricultural disease as a prioritized hazard of concern.

- Dodge County
- Saunders County
- Three Rivers Public Health Department

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 have one of the following elements.

- 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.

- 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 the following.

- 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.

- Water storage or evaporation ponds regulated by the United States Nuclear Regulatory Commission.[17]

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 the following list.

- 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

[17] 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.

- Erosion, landslide, seepage, settlement, and cracks in the dam or area
- Earthquakes
- Vandalism/Terrorism

NeDNR regulates dam safety in Nebraska. Dams are classified 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 would likely result in no economic loss beyond the cost of the dam 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

According to the Nebraska Dam Inventory, there are a total of 102 dams located within the planning area, with classifications ranging from minimal to high hazard.[18] The figure on the next page maps the location of these dams in the planning area.

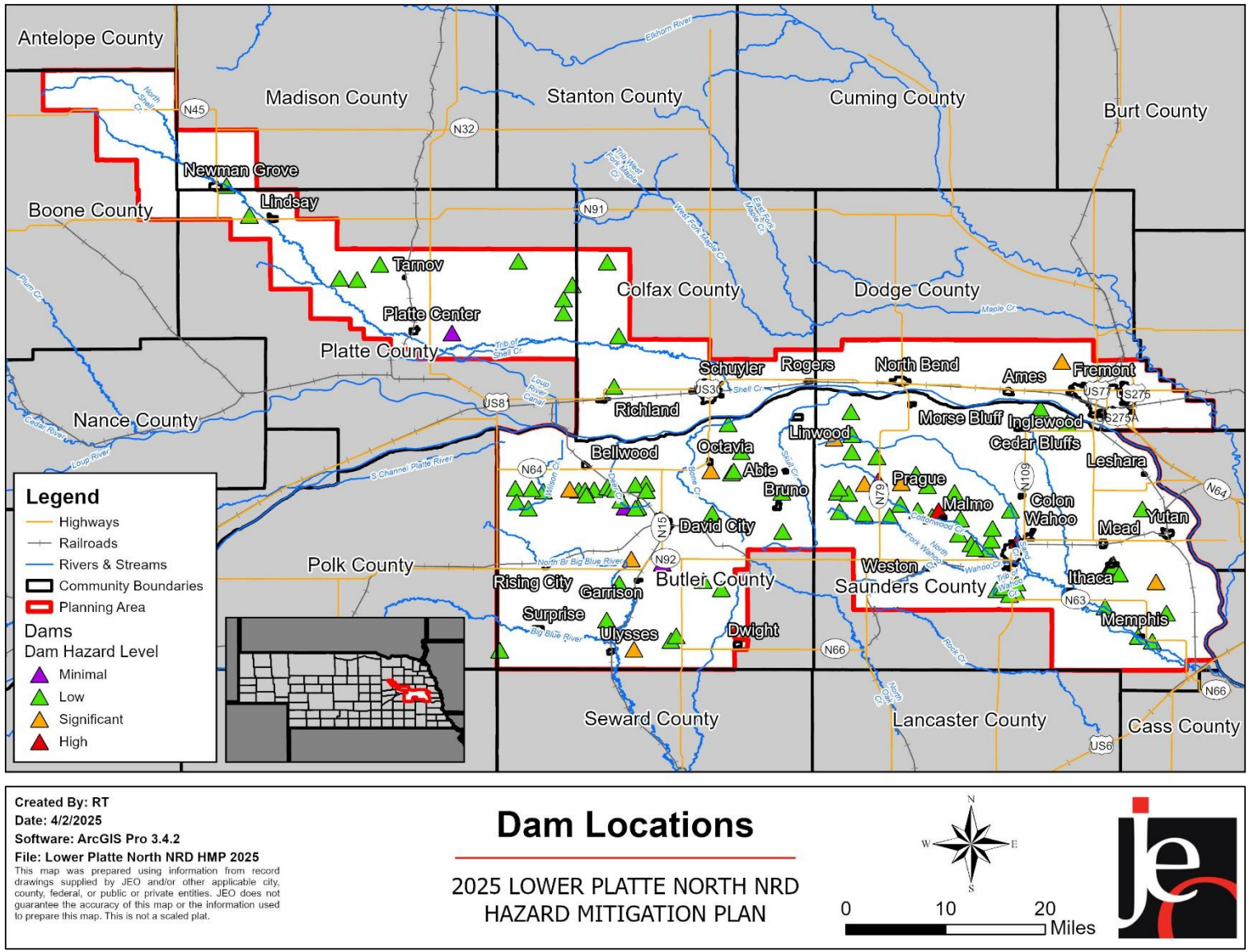
Dams in the Planning Area

County	Minimal Hazard	Low Hazard	Significant Hazard	High Hazard
Butler	2	32	4	0
Colfax	0	3	0	0
Dodge	0	0	1	0
Madison	0	1	0	0
Platte	1	8	0	0
Saunders	0	43	4	3
Total	**3**	**87**	**9**	**3**

Source: NeDNR
Note: only including dams that fall within the planning area boundaries.

[18] Nebraska Department of Natural Resources. December 2023. "Nebraska Dam Inventory". https://gis.ne.gov/portal/apps/webappviewer/index.html?id=2aab04a13817421992dc5398ad462e22.

Dam Locations



Created By: RT
Date: 4/2/2025
Software: ArcGIS Pro 3.4.2
File: Lower Platte North NRD HMP 2025

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.

Dam Locations

2025 LOWER PLATTE NORTH NRD HAZARD MITIGATION PLAN

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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 can occur at any time; however, emergencies are more likely to happen when extreme conditions are present. There are five high hazard dams located within the planning area, two in Dodge County and three in Saunders County.

High Hazard Dams in the Planning Area

Dam Name	NID ID	Dam Height (Feet)	Max Storage (Acre Ft)	Last Inspection Rating
Cottonwood Creek 21-A	NE01887	37	1043	4/20/2023
Cottonwood Creek 7-A	NE02321	58	2984	4/20/2023
Dodge Dam	NE02637	19	119	4/25/2023
Hooper Dam	NE01277	31	19	10/1/2024
Lake Wanahoo Dam	NE03108	53	27356	8/22/2024

Source: NeDNR

Upstream Dams Outside the Planning Area

According to the Butler and Saunders County Local Emergency Operations Plans, there is one upstream dam (Kingsley Dam) that could impact the planning area. The Kingsley Dam would impact the Platte River in the planning area and would inundate an area slightly greater than the 100-year floodplain.[19,20] The Dodge County LEOP indicated that the county will be affected by any upstream dams.[21]

Upstream Dams Outside the Planning Area

County	Dam Name	NID ID	Dam Height (Feet)	Max Storage (Acre Ft)	Last Inspection Rating
Keith	Kingsley Dam	NE01048	163	2,160,970	4/30/2024

Source: NeDNR

Extent

Areas (i.e., agricultural land, out buildings, county roads, and communities) directly downstream of dams are at greatest risk in the case of dam failure. The potential for damage following dam failure is indicated by its hazard classification and is dependent on the dam's size and location. Note that hazard classification does not indicate the likelihood of a dam failure event to occur, but rather the extent of potential damage that may occur in case of a failure. Thus, the high hazard dams in the planning area would have the greatest impact if they were to fail. Inundation maps are not publicly available due to concerns of vandalism and terrorism but can be requested from County Emergency Management. Key facilities located in inundation areas are discussed in each county's LEOP.

[19] Butler County Emergency Management Agency. 2021. "Butler County Local Emergency Operations Plan."

[20] Saunders County Emergency Management Agency. 2019. "Saunders County Local Emergency Operations Plan."

[21] Dodge County Emergency Management Agency. 2021. "Dodge County Local Emergency Operations Plan."

Historical Occurrences

According to the NeDNR, there were two reported dam failures within the planning area. No damage from these events were recorded.

Dam Failures

Dam Name	Hazard Class	County	Failure Year	Failure Mode	Downstream Damage
Hurt Dam	Low	Butler	1995	Seepage; Piping	No Damages Were Reported
Hurt Dam	Low	Butler	2000	Seepage; Piping	No Damages Were Reported

Source: NPDP, 1890-2024[22]

All dams should be inspected by the owner on a regular basis and after heavy rainfall events. If problems are found during an inspection, the dam should be repaired to ensure the structural integrity of the dam is preserved. NeDNR provides periodic inspections of dams and recommendations for repair to the dam owners.

Average Annual Losses

No damage was reported from the dam failure events. In general, dam failure events would be confined to damage in the inundation area. Residents in the planning area that wish to quantify and evaluate the threat of dam failure should contact their County Emergency Management, local NRD, or the NeDNR to view EAPs and breach inundation area maps.

Historical Probability & Future Likelihood

Based on the historic record of reported incidents, there is a 1.5 percent historical probability (2 out of 136 years with an occurrence) that dam failure will occur annually in the planning area. Due to the potential impacts from changes in extreme weather and future development, the future likelihood of future dam events is very unlikely.

Historical Probability & Future Likelihood – Dam

Hazard	Historical Probability	Extreme Weather Changes Impact	Future Development Impact	Future Likelihood
Dam Failure	1.5%	Increase in Frequency	Neither Increase nor Decrease in Frequency. Increase in Exposure	**Very Unlikely**

Changing Extreme Weather

While extreme weather changes do not directly affect dam events, changes in precipitation and temperature swings can affect them. Projected increased rainfall events, either in frequency or in magnitude[23], will lead to exacerbated stress on infrastructure systems including dams. Additionally, historical streamflow records are typically used to design or determine dam

[22] Stanford University National Performance of Dams Program. 2018. "NPDP Dam Incident Database." [datafile]. https://npdp.stanford.edu/dam_incidents.

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

construction requirements and maintenance requirements. Extreme weather changes may impact these systems in the following ways:

- Drought: land subsidence, erosion, embankment settling, or foundation cracking.
- Flooding: increased embankment erosion, sloughing, overtopping risk, or damage from ice jams.

Future Development

Any future growth in dam inundation areas increases the impacts from these events. 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 could implement requirements for any new development or substantial improvements in dam inundation like floodplain ordinances to minimize the number of people and property impacted during a failure event.

Regional Vulnerabilities

Regional vulnerabilities to dam failure vary based on surrounding development and other flood control measures. The following table provides information related to regional vulnerabilities; for jurisdictional-specific vulnerabilities, refer to *Section Eight*.

Dam Failure Vulnerabilities

SECTOR	VULNERABILITY
PEOPLE	-Those living downstream of any dam -Those at recreational sites situated near dams -Evacuation needs likely with failure events -Hospitals, nursing homes, and the elderly at greater risk due to low mobility -Those without adequate notification may be at greater risk -Butler County: LEOP estimated 40% of the population could be affected -Dodge County: LEOP estimated 40% of the population could be affected -Saunders County: LEOP estimated 8% of the population could be affected
ECONOMIC	-Loss of downstream agricultural land -Businesses or recreation sites located in inundation areas would be impacted and closed for an extended period -Employees of closed businesses may be out of work for an extended period of time
BUILT ENVIRONMENT	-Damage to buildings, recreation areas, and roads
COMMUNITY LIFELINES	-Transportation routes could be closed for extended period -Any community lifelines in inundation areas are vulnerable to damages

Jurisdictions Ranking Dam Failure as a Prioritized Hazard of Concern

The following lists jurisdictions which identified dam failure as a prioritized hazard of concern.

- Ames Diking and Drainage District
- City of Wahoo

- Dodge County
- Lower Platte North NRD
- Village of Cedar Bluffs
- Village of Malmo
- Village of Prague
- Saunders County
- Three Rivers Public Health Department

Drought

Drought is generally defined as a natural hazard that results from a substantial period of below normal precipitation. Although many inaccurately consider drought a rare and random event, it is actually a normal, recurring feature of climate. Drought can occur in virtually all climatic zones, but its characteristics can 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 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

Drought is typically a slow onset, creeping phenomenon that can affect a wide range of people, vegetation, livestock, and industries. However, in some cases "flash droughts" can occur quickly and last for shorter periods of time. While many impacts of these hazards are non-structural, there is the potential that during prolonged drought events structural impacts like foundation cracking can occur from dry soil. Drought normally affects more people than other natural hazards, and its impacts are spread over a larger geographical area. Detection and early warning signs of drought conditions have improved recently but are still more difficult to identify than that of quick-onset natural hazards (e.g., flood, winter storms, tornadoes). According to the National Drought Mitigation Center (NDMC), droughts are classified into four major types.[24]

- **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, frequencies (norms), and winds vary.

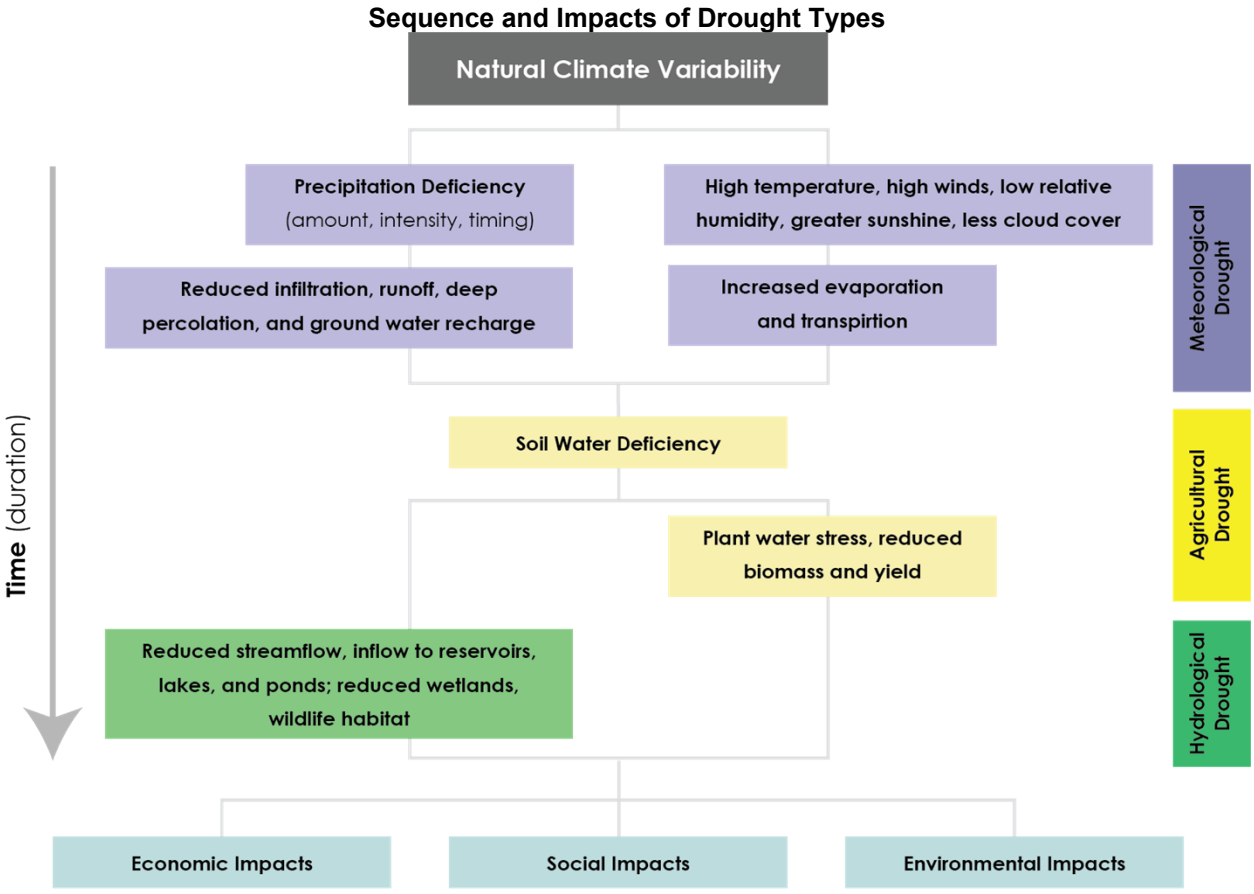
- **Agricultural Drought** occurs when there is deficient moisture that hinders planting germination, leading to low plant population per hectare and a reduction of final yield. Agricultural drought is closely linked with meteorological and hydrological drought, as agricultural water supplies are contingent 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 is not limited to, water, forage, food grains, fish, and hydroelectric power.

[24] National Drought Mitigation Center. 2017. "Drought Basics". https://drought.unl.edu/.

The figure on the next page presents the different types of droughts, their temporal sequence, and the various types of effects they can have.



Source: National Drought Mitigation Center, University of Nebraska-Lincoln[25]

Location

The entire planning area is susceptible to drought impacts.

Extent

The Palmer Drought Severity Index (PDSI) is utilized by climatologists to standardize global long-term drought analysis. The table below shows the details of the Palmer classifications. The figure on the next page shows drought data from a station that covers the planning area. The negative Y axis represents the extent of a drought, for which '-2' indicates a moderate drought, '-3' a severe drought, and '-4' an extreme drought.

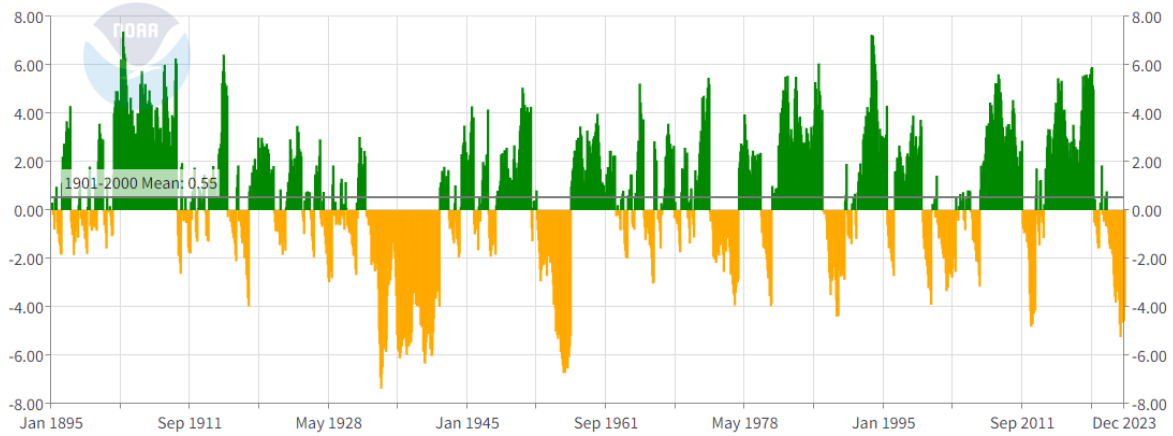
[25] National Drought Mitigation Center. 2017. "Types of Drought". https://drought.unl.edu/.

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[26]

Historical Palmer Drought Severe Index – Lower Platte North NRD Planning Area



Source: NCEI, 1895-2023[27]

The U.S. Drought Monitor (USDM) shows where drought is and its extent across the United States. The map uses six classifications shown in the table below. The USDM is produced jointly between the National Drought Mitigation Center, NOAA, and USDA. It uses physical data at multiple scales, drought impacts, and feedback from local experts.[28] Communities and jurisdictions across the planning area are likely to experience similar extent impacts from drought.

United States Drought Monitor Classification

Category	Description	PDSI Ranges	Possible Impacts
None	Normal or wet conditions	-0.49 or above	
D0	Abnormally Dry	-0.5 to 0.79	Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered.

[26] National Weather Service. 2017. "Climate Prediction Center". https://www.cpc.ncep.noaa.gov/.

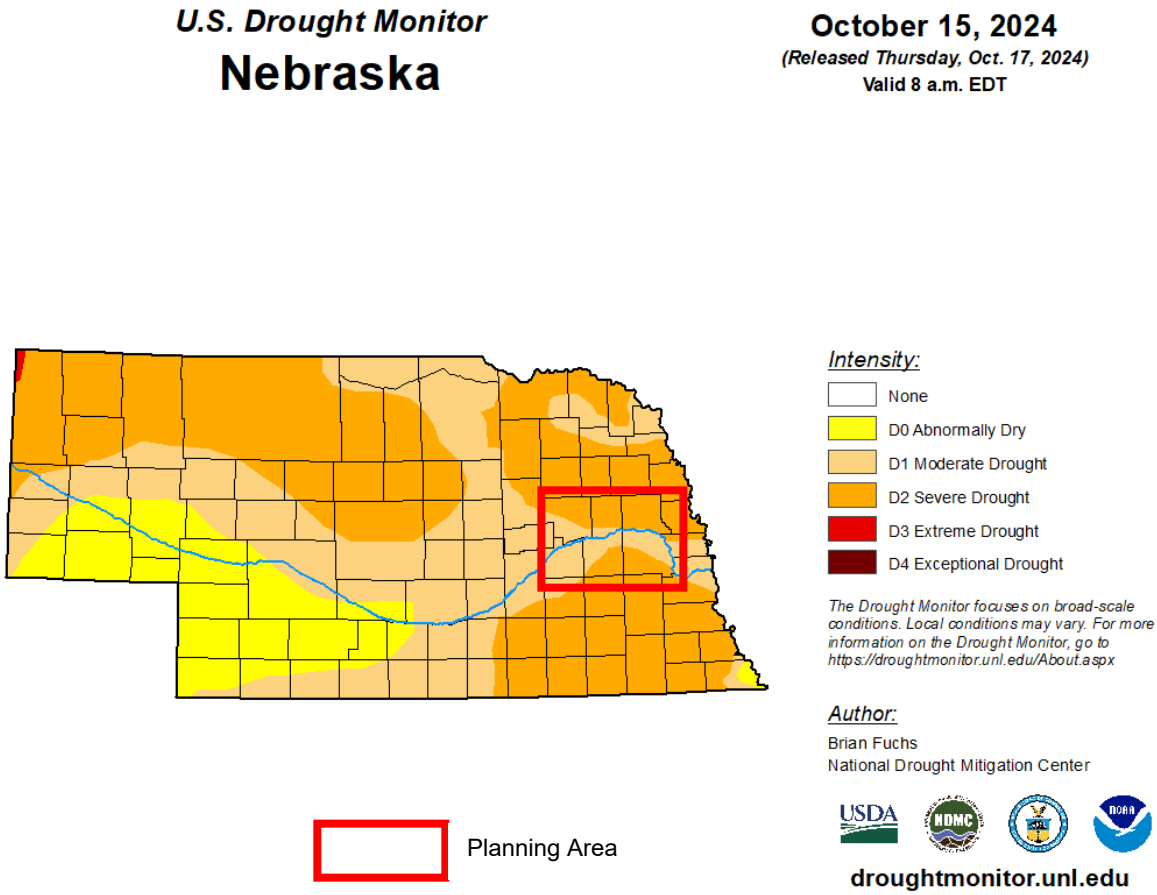
[27] National Centers for Environmental Information. 1895-Sept 2023. "County Time Series". https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/county/time-series/CO-037/pdsi/all/9/1895-2023?base_prd=true&begbaseyear=1901&endbaseyear=2000.

[28] National Drought Mitigation Center. 2023. "What is the USDM?". https://droughtmonitor.unl.edu/About/WhatistheUSDM.aspx.

Category	Description	PDSI Ranges	Possible Impacts
D1	Moderate Drought	-0.8 to -1.29	Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested.
D2	Severe Drought	-1.3 to -1.59	Crop or pasture losses likely, water shortages common; water restrictions imposed.
D3	Extreme Drought	-1.6 to -1.99	Major crop/pasture losses; widespread water shortages or restrictions.
D4	Exceptional Drought	-2.0 or less	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams and wells creating water emergencies.

Source: USDM, 2024[29]

U.S. Drought Monitor for Nebraska

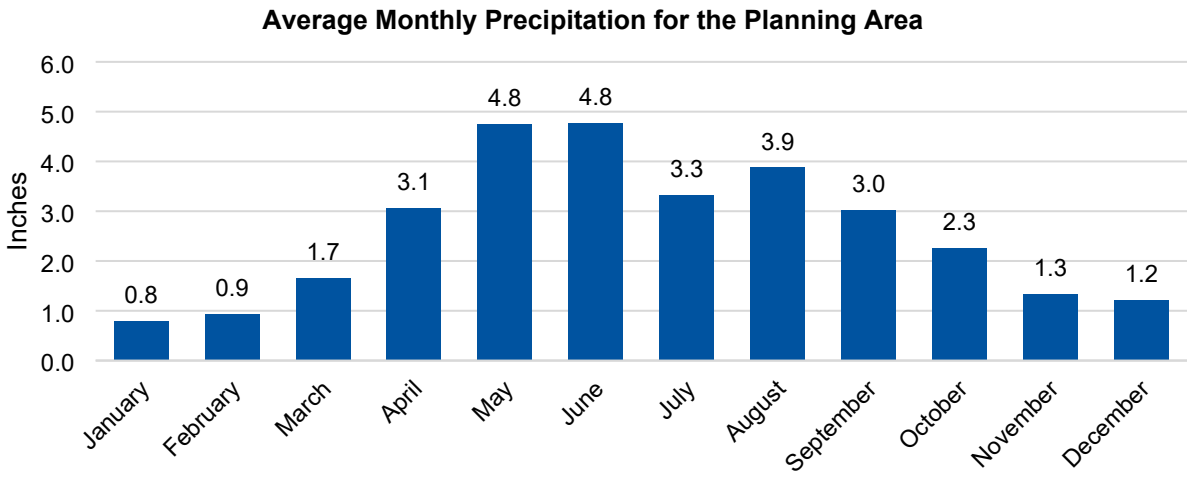


Source: National Drought Mitigation Center[30]

[29] National Drought Mitigation Center. 2017. "Drought Classification." https://droughtmonitor.unl.edu/About/AbouttheData/DroughtClassification.aspx.

[30] National Drought Mitigation Center. June 2024. "U.S. Drought Monitor Nebraska". https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?NE.

The figure on the next page 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 possible drought conditions. The average annual precipitation for the planning area is approximately 31.02 inches according to the NCEI.[31]



Source: NCEI, 1991-2020[32]

Historical Occurrences

The table below indicates it is reasonable to expect extreme drought to occur 6.3% of the time for at least some portion of the county (97 extreme drought months in 1,548 months). Severe drought occurred in 57 months of the 1,548 months of record (3.7% of months). Moderate drought occurred in 104 months of the 1,548 months of record (6.7% of months), and mild drought occurred in 183 of the 1,548 months of record (11.8% of months). Non-drought conditions occurred in 1,107 months, or 71.5% percent of months. These statistics show that the drought conditions of the county are highly variable.

Historical Droughts

Drought Magnitude	Total Months
-1 Magnitude (Mild)	183
-2 Magnitude (Moderate)	104
-3 Magnitude (Severe)	57
-4 Magnitude or Greater (Extreme)	97
Total Months in Drought	**441**
Total Months Not in Drought	**1,107**

Source: NCEI, 1895-2023[33]

[31] NOAA National Centers for Environmental Information. 2023. "U.S. Climate Normals Quick Access". https://www.ncei.noaa.gov/access/us-climate-normals/.

[32] NOAA National Centers for Environmental Information. 2024. "U.S. Climate Normals Quick Access". https://www.ncei.noaa.gov/access/us-climate-normals/.

[33] NOAA National Centers for Environmental Information. 1895-2023. “Divisional Time Series”. https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/divisional/time-series.

The 2012 drought was one of the worst recent historical droughts for the planning area and Nebraska; however, it did not warrant a presidential disaster declaration. 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 voluntary 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. The images below show a general timeline of worsening drought conditions from the 2012 drought in Nebraska from the state's 2012 Annual Report.[34]

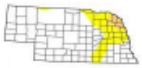
2012 Drought Timeline

Drought Severity

- D0 - Abnormally Dry
- D1 Drought – Moderate
- D2 Drought – Severe
- D3 Drought – Extreme
- D4 Drought - Exceptional



January 2012 -- 72% of the State had no drought conditions. Drought was evident in the Northeast ¼ of the state.



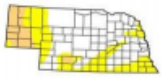
February 2012 – There was a slight improvement. 80% of the state had no signs of drought.



March 2012 -- Abnormally dry conditions appeared in the northeast ¼ and southwest portion of the state.



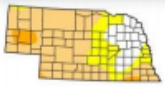
April 2012 -- Drought conditions increased to moderate in the northeast and west.



May 2012 -- The west and south parts of the state developed mostly moderate drought conditions.

[34] Nebraska 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.

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.

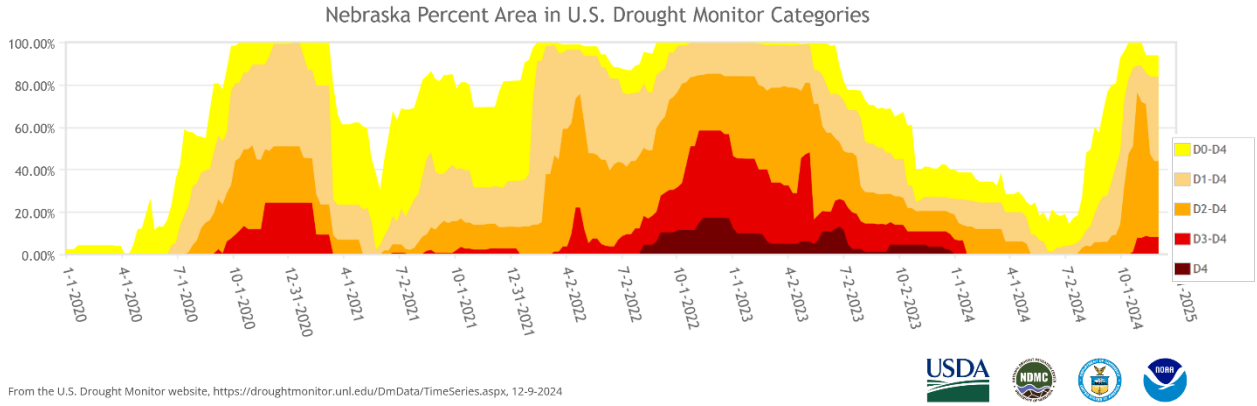


Nov & Dec 2012 – Conditions remained the same.

Source: Nebraska Department of Health and Human Services

The September 2020 - June 2024 drought was one of the worst droughts to impact Nebraska since the 2012 drought. From March 2022 until January 2024 parts of the planning area were in either D3 Extreme Drought or D4 Exceptional Drought. The U.S. Drought Monitor progression from January 2020 to December 2024 in Nebraska is shown in the image below.

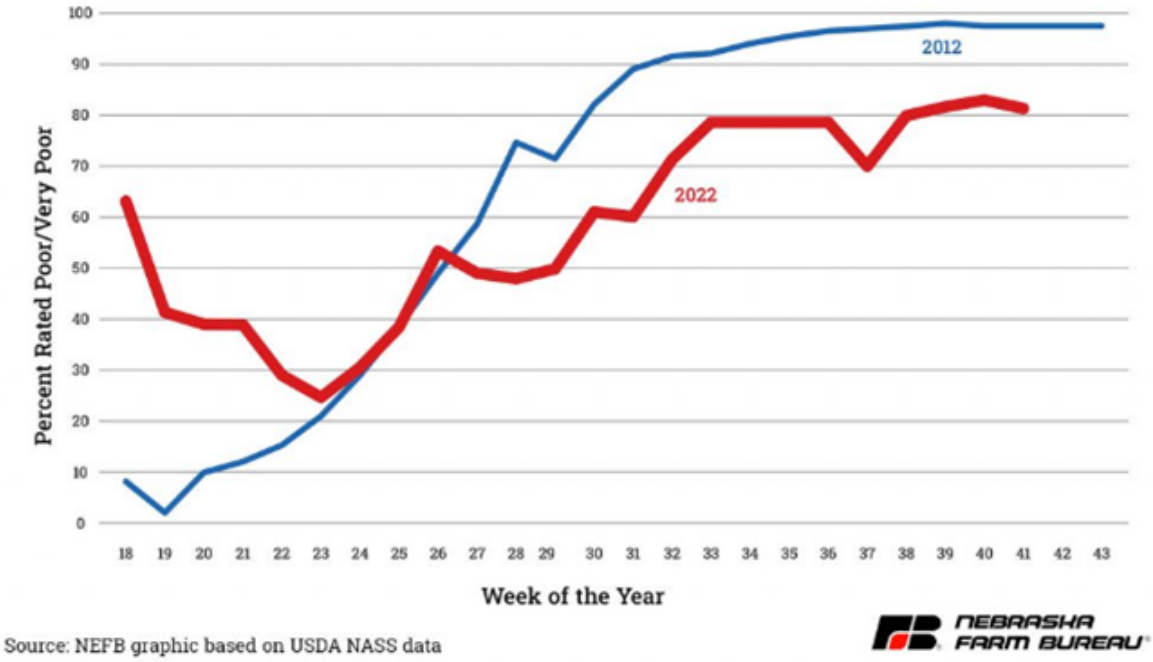
Nebraska Drought Progression 2020 to 2024



Source: National Drought Mitigation Center

As shown in the image above, the most extreme levels of drought can be traced to 2022 and 2023. In 2022, 73 Nebraska counties received a USDA Disaster Designation. When compared to the 2012 drought, this drought differed with cooler temperatures in the spring and early summer, helping alleviate and delay some of the drought impacts as shown in the figure below.

Nebraska Pasture Conditions 2012 & 2022



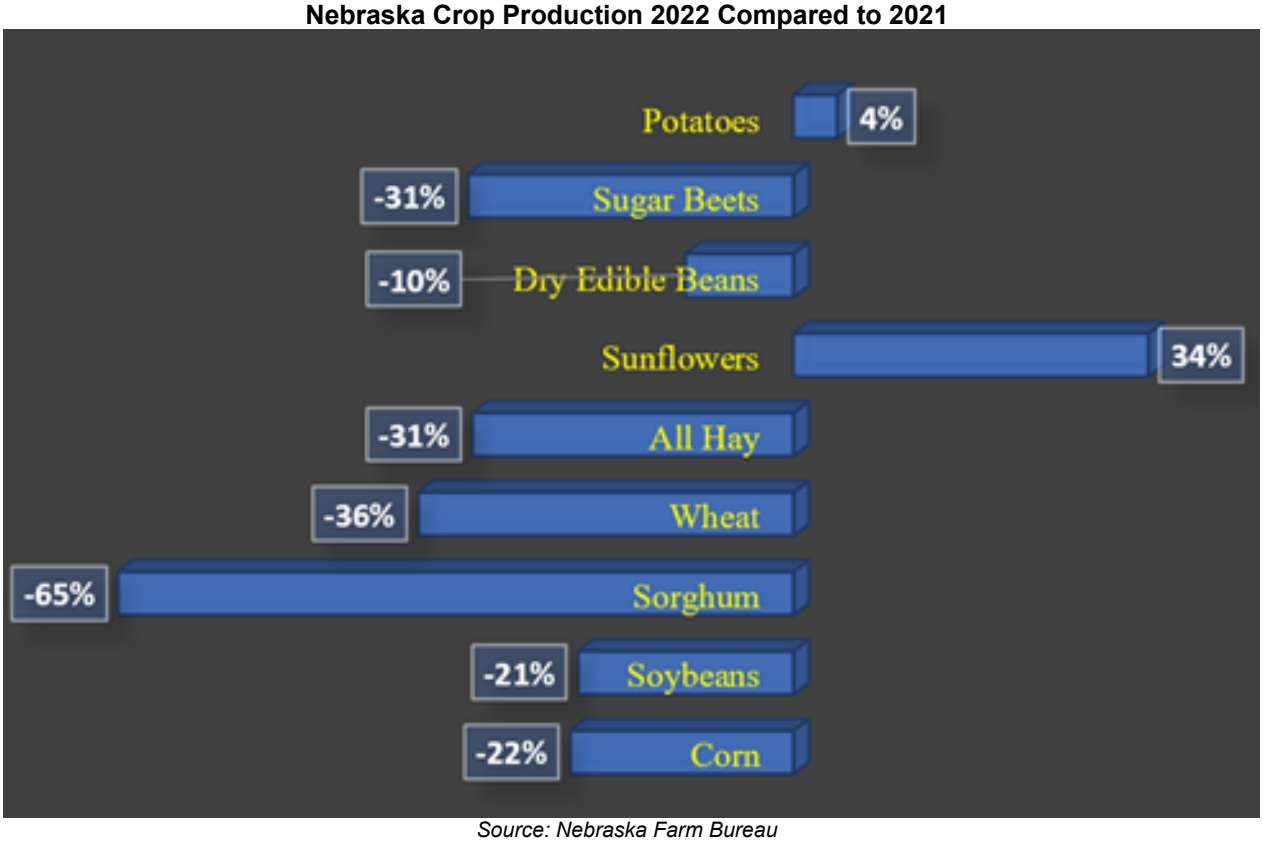
Source: Nebraska Farm Bureau[35]

Despite the cooler temperatures, 2022 was Nebraska's fourth driest year on record and was the driest state in the nation when compared to average annual precipitation, according to the NCEI Climate Monitoring database. The majority of the state was in a stage of drought throughout the year. In addition, over 10% of the state was in D4 (Exceptional Drought) for the last three months of 2022. The Nebraska Farm Bureau reported that, except for potatoes and sunflowers, all other

[35] Nebraska Farm Bureau. October 27, 2022. "Crop Input Costs, Drought, Top Concerns For Nebraska Farmers, Ranchers." https://www.nefb.org/10/27/2022/crop-input-costs-drought-top-concerns-for-nebraska-farmers-ranchers/.

crops produced in Nebraska were 10-65% lower than 2021 harvests.[36] Crop production in 2022 compared to 2021 is shown below, with sorghum having the largest drop of 65% and wheat 36%, despite the same number of acres being planted. Neither crop is typically irrigated and was heavily impacted by the drought.

Nebraska Crop Production 2022 Compared to 2021



Source: Nebraska Farm Bureau

According to Nebraska Public Media, in 2022 farmers have seen harvests drop by half and ranchers weaned calves early, relying on more hay and other feed for their cattle.[37] Along with significant impacts on the farming and ranching industries, the drought has also caused extremely dry vegetation leading to an increase in wildland fires. The 2022 wildfire season was Nebraska's second worst in terms of acres burned with 200,000 acres having been burned.[38]

As of October 15, 2024, the planning area is experiencing either severe drought (D2), moderate drought (D1), or D0 Abnormally Dry per the US Drought Monitor.

The Drought Impact Reporter is a database of drought impacts throughout the U.S. with data going back to 2000. The more impacts that are reported to the National Drought Mitigation Center

[36] Nebraska Farm Bureau. 2023. "Nebraska Crop Production Off". https://www.nefb.org/01/23/2023/nebraska-crop-production-off/.

[37] Nebraska Public Media. 2022. "Some of the worst I've ever seen, Nebraska ranchers, farmers struggle against 5th worst drought on record". https://nebraskapublicmedia.org/en/news/news-articles/some-of-the-worst-ive-ever-seen-nebraska-ranchers-farmers-struggle-against-5th-worst-drought-on-record/.

[38] Omaha World-Herald. 2023. "Nebraska's drought among nation's billion-dollar weather disasters". https://omaha.com/news/state-and-regional/nebraskas-drought-among-nations-billion-dollar-weather-disasters/article_ba26ca52-8ddf-11ed-ac57-8b2fd8286d3d.html.

the more severe the drought. Recent examples of reported drought impacts include the following.[39]

- Lower corn yields, earlier harvest along the Platte River in Nebraska (June 2022)
- Brown dryland crops and pastures in northeast Nebraska (September 2022)
- Drought driving up costs, cutting into profits for Nebraska farmers (May 2023)
- Lower Platte River Consortium encourages water conservation as drought conditions worsen (June 2023)

The Drought Impact Reporter has recorded a total of 63 drought-related impacts throughout the three counties. This is not a comprehensive list of droughts which may have impacted the planning area, but only those with reported impacts. The following are the categories and reported number of impacts. Note that some impacts have been assigned to more than one category.

- Agriculture: 32
- Fire: 15
- Plants & Wildlife: 12
- Relief, Response & Restrictions: 35
- Society & Public Health: 7
- Tourism & Recreation: 8
- Water Supply & Quality: 29

Some of these impacts are summarized in the following table:

Drought Impacts in the Planning Area

Category	Date	Title
Agriculture & Relief, Response, and Restrictions	8/30/1953	Nebraska's corn yield estimate revised downward
Fire & Relief, Response, and Restrictions	6/28/2012	Nebraskans urged to leave the fireworks to the professionals
Society and Public Health	9/25/2013	Drought alleviated some of the flooding that would have otherwise occurred along the Platte River in southern Nebraska
Relief, Response, and Restrictions & Water Supply and Quality	12/14/2013	Moratorium on new irrigation in Lower Platte North Natural Resources District in eastern Nebraska
Fire & Relief, Response, and Restrictions	2/6/2022	Burn bans in eastern Nebraska
Agriculture & Plants and Wildlife	5/24/2023	Drought hurting Nebraska farmers, cattlemen

[39] National Drought Mitigation Center. October 2024. "Drought Impact Reporter". https://droughtreporter.unl.edu/advancedsearch/impacts.aspx.

Category	Date	Title
Fire & Relief, Response, and Restrictions & Tourism and Recreation	10/4/2024	Temporary campfire ban at Nebraska state park areas and wildlife management areas

Source: NDMC, 1970-October 2024[40]

Average Annual Losses

The direct and indirect effects of drought are difficult to quantify. Potential losses such as power outages could affect businesses, homes, and community lifelines. High demand and intense use of air conditioning or water pumps can overload the electrical systems and cause damage to infrastructure. The annual property estimates for the planning was determined based upon NCEI Storm Events Database since 1996. Annual crop loss for the county was determined based upon the RMA Cause of Loss Historical Database from 2000 to 2023.

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	$55,000	$1,954	$159,863,886	$6,660,995

Source: 1 Indicates data is from NCEI (1996 to Nov. 2023)[41]*; 2 Indicates data is from RMA (2000 to 2023)*[42]

Historical Probability & Future Likelihood

The following table summarizes the magnitude of drought and monthly historical probability of occurrence. Annually, the planning area has experienced a drought 74 out of the 129 years on record, causing the annual historical probability 57.4 percent. Due to the anticipated impacts from changes in extreme weather and future development, the future likelihood of drought events is very likely in the planning area.

Drought Probability

PDSI Value	Magnitude	Drought Occurrences by Month	Monthly Historical Probability
4 or more to -0.99	No Drought	1,107/1,548	71.5%
-1.0 to -1.99	Mild Drought	183/1,548	11.8%
-2.0 to -2.99	Moderate Drought	104/1,548	6.7%
-3.0 to -3.99	Severe Drought	57/1,548	3.7%
-4.0 or less	Extreme Drought	97/1,548	6.3%

Source: NCEI, 1895-2023[43]

[40] National Drought Mitigation Center. July 2024. “Drought Impact Reporter”. https://droughtreporter.unl.edu/advancedsearch/impacts.aspx.

[41] National Centers for Environmental Information. December 2023. “Storm Events Database”. https://www.ncdc.noaa.gov/stormevents/.

[42] U.S. Department of Agriculture Risk Management Agency. 2023. "Cause of Loss Historical Data Files: 2000-2023." https://www.rma.usda.gov/tools-reports/summary-business/cause-loss.

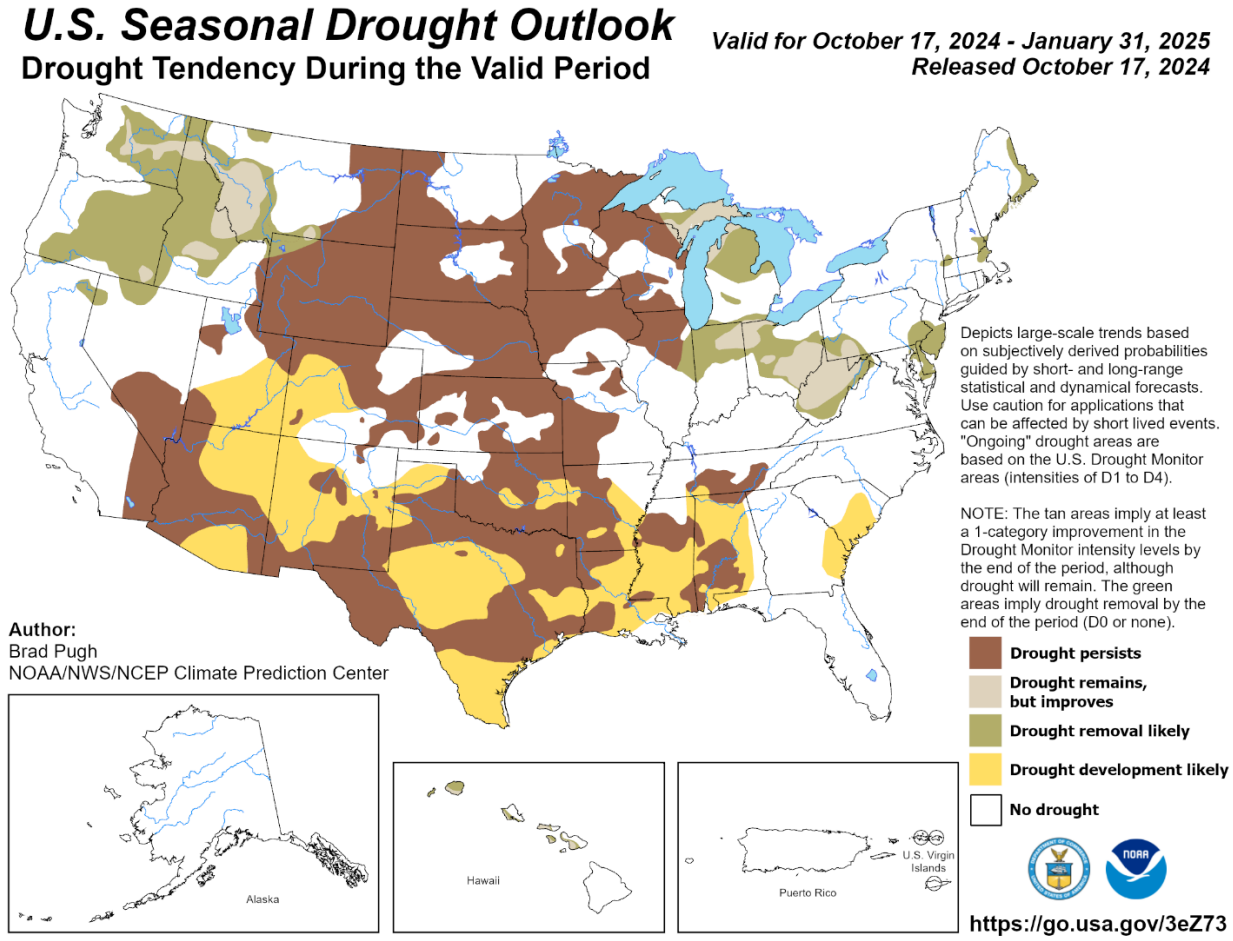
[43] National Centers for Environmental Information. 1895-Oct 2023. “County Time Series”. https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/divisional/time-series.

Historical Probability & Future Likelihood – Drought

Annual Historical Probability	Extreme Weather Changes Impact	Future Development Impact	Future Likelihood
57%	Increase in Frequency and Extent	Neither Increase nor Decrease in Frequency. Increase Exposure	**Very Likely**

The U.S. Seasonal Drought Outlook provides a short- term drought forecast that can be utilized by local officials and residents to examine the likelihood of drought developing or continuing within three months as based on existing conditions. The drought outlook is updated consistently throughout the year and should be reviewed on an ongoing basis. The following figure provides the drought outlook from October 17, 2024, to January 31, 2025, as an example.

U.S. Seasonal Drought Outlook



Source: NOAA[44]

Changing Extreme Weather

[44] NOAA. December 2023. "U.S. Seasonal Drought Outlook". https://www.cpc.ncep.noaa.gov/products/expert_assessment/sdo_summary.php.

An increase in average temperatures and evaporation rates will likely contribute to the rise in the frequency and intensity of drought, especially during the summer months.[45] 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 becomes drier. The table below shows the likelihood of a year-plus drought and year-plus extreme drought in three-county region with different warming scenarios.

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

Likelihood of Drought with Different Warming Scenarios

Likelihood of	Warming Scenarios				
	0.5° C	1° C	2° C	2.5° C	3° C
Year-Plus Drought	11-33%	11-33%	11-33%	11-33%	11-50%
Year-Plus Extreme Drought	0-10%	0-10%	0-10%	0-20%	0-20%

Source: Probable Futures[46]

The U.S. Global Change Research Program has created the Climate Mapping for Resilience and Adaptation tool that looks at how different emission scenarios affect climatological hazards. The table below shows that the annual number of dry days is projected to increase as time goes on in both the lower emissions and higher emissions scenario.

Annual Number of Dry Days

County	Emission Scenario	Historical (1976-2005)	Early Century (2015-2044)	Mid Century (2035-2064)	Late Century (2070-2099)
Butler	Lower Emissions (RCP 4.5)	227.0 Days	228.3 Days	229.5 Days	230.4 Days
	Higher Emissions (RCP 8.5)	227.0 Days	229.2 Days	230.6 Days	232.7 Days
Dodge	Lower Emissions (RCP 4.5)	221.0 Days	222.4 Days	223.7 Days	224.6 Days
	Higher Emissions (RCP 8.5)	221.0 Days	223.3 Days	224.8 Days	227.1 Days
Saunders	Lower Emissions (RCP 4.5)	220.3 Days	221.6 Days	222.8 Days	223.8 Days
	Higher Emissions (RCP 8.5)	220.3 Days	222.5 Days	224.0 Days	226.3 Days

Source: USGCRP, 2024[47]

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.

Regional Vulnerabilities

The three-county planning area is largely agriculturally based, and any type of drought is likely to have large impacts on the local economy. Although agriculture and ranching are the major sectors affected, impacts on rural and municipal water supplies, fish and wildlife, water-based recreation, water quality, soil erosion, mental health, and the incidence of wildland fires are also significant. Similarly, the indirect impacts of drought on personal and business incomes, tax revenues,

[46] Probable Futures. "Maps of Dryness". October 2024. https://probablefutures.org/.

[47] USGCRP. October 2024. "Climate Mapping for Resilience and Adaptation". https://livingatlas.arcgis.com/assessment-tool/explore/details.

unemployment, and other areas are also important. In general, drought produces a complex web of impacts that ripple through many sectors of the economy. This is largely due to the dependence of so many sectors on water for producing goods and providing services.

As part of the Hazard Mitigation Plan, a Drought Risk and Resiliency Report was created for the LPNNRD. The purpose of the Drought Risk and Resiliency Report was to better understand drought risks on community water systems within the NRD and establish proactive measures to reduce impacts from drought. During the planning process, the NRD met with every community water system in the district to better understand their water systems and vulnerabilities to drought. Based on those conversations, local plan analysis, and a drought risk assessment, the table on the next page was created. This community water system drought risk matrix table shows different indicators of risk and each water system's rating (high = good, medium, low = bad) for each indicator. This is useful in identifying which communities are at higher risk from drought and the specific areas where improvements can be made. Information about how the ratings were determined can be found in the Drought Risk and Resiliency Report Annex. Drought mitigation strategies were created based on the outcomes of the drought risk analysis and meetings with communities. These strategies were integrated into the mitigation actions identified for each participating community in Section Eight. The drought risk and resiliency report also included a community engagement materials kit and sample drought ordinances for communities to utilize and update to fit their local needs. The Lower Platte North NRD Drought Risk and Resiliency Report has been added as an annex to this plan.

The following table provides information related to regional vulnerabilities. For jurisdictional-specific vulnerabilities, refer to *Section Eight*.

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.) -Short-term interruption of business -Decrease in cattle prices -Decrease of land prices jeopardizes educational funds -Decrease in recreational outdoor activities
Built Environment	-Cracking foundations (residential and commercial structures) -Damages to landscapes
Community Lifelines	-Damages to waterlines below ground -Damages to roadways (prolonged extreme events) -Loss of power

Community Water System Drought Risk Matrix

Community	Water Quantity	Water Quality	Capabilities (Ordinances / Plans)	Capabilities (Staff)	Local Drought Monitoring	Regional Drought Monitoring	Emergency Supply	Local Funding Ability
Abie	High	High	Low	Medium	High	Low	Medium	Low
Bellwood	High	Medium	Medium	Low	High	Low	Medium	Medium
Cedar Bluffs	Low	Low	Low	Medium	Medium	Low	Low	High
David City	Medium	Medium	Medium	High	High	Low	Medium	Medium
Fremont	High	Medium	Low	High	Medium	Low	Medium	Medium
Ithaca	High	Medium	Low	Medium	Medium	Low	Medium	Medium
Lindsay	High	Medium	High	High	High	Medium	Low	Medium
Malmo	High	High	Low	Medium	Medium	Low	Low	Medium
Mead	High	Medium	High	High	High	Low	Medium	Medium
Memphis	High	High	Low	Medium	Medium	Low	Low	Medium
Morse Bluff	High	High	High	Medium	Medium	Low	Medium	Medium
Newman Grove	High	High	High	Medium	Low	Low	Medium	Medium
North Bend	Medium	Medium	Low	High	Medium	Low	Medium	Medium
Platte Center	High	High	Low	Medium	Low	Low	Medium	Medium
Prague	Medium	Medium	Medium	High	Medium	Low	Medium	Medium
Rogers	High	High	Low	Low	Low	Low	Low	Medium
Schuyler	High	Medium	Medium	High	High	Low	Medium	High
Wahoo	High	High	Low	High	High	Low	Medium	Medium
Weston	High	High	Low	Medium	Medium	Low		Medium
Yutan	Medium	High	Low	High	High	Low		Medium

Jurisdictions Ranking Drought as a Prioritized Hazard of Concern

The following lists jurisdictions and stakeholders which identified drought as a prioritized hazard of concern.

- David City Public Schools
- Four Corners Health Department
- Lower Platte North NRD
- North Bend Central Public Schools
- Schuyler Volunteer Fire Department
- Village of Bruno
- Village of Cedar Bluffs
- Village of Dwight
- Village of Prague

Extreme Temperatures

Extreme temperatures include durations of time at both the low and high ends of the thermometer. What constitutes extreme temperatures varies from region to region but is generally accepted as being temperatures that are significantly lower or higher than the average. For the purposes of this plan, extreme cold is defined as the high temperature being at or below 0°F, while extreme heat is defined as low temperatures being 100°F or higher.

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, stop 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.

Along with humans, animals also can be affected by extreme temperatures and humidity. Cattle and other farm animals respond to heat by reducing feed intake, increasing their respiration rate, and increasing their body temperature. These responses assist the animal in cooling itself, but this is usually not sufficient. When animals overheat, they will begin to shut down body processes not vital to survival, such as milk production, reproduction, or muscle building.

Location

The entire planning area is susceptible to extreme temperature impacts.

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.[48,49]

- **Heat Advisories** are issued for dangerous heat conditions that are not expected to reach warning criteria. Consider postponing or rescheduling outdoor activities, especially during the heat of the day. If you must be outside, be sure to drink plenty of water and take

[48] National Weather Service. 2025. "Understanding Cold Weather Alerts." https://www.weather.gov/safety/cold-ww.

[49] National Weather Service. 2025. "Understanding Heat Alerts." https://www.weather.gov/safety/heat-ww.

frequent breaks in the shade. Stay in a cool place, especially during the heat of the day and evening.

- **Cold Weather Advisory** is issued for dangerously cold conditions that are not expected to reach warning criteria. Be sure you and your loved ones dress appropriately and cover exposed skin when venturing outdoors.

- **Frost Advisory** means areas of frost are expected or occurring, posing a threat to sensitive vegetation.

- **Extreme Heat Watches** are issued when conditions are favorable for an extreme heat event but its occurrence and timing is still uncertain. Plan to suspend all major outdoor activities if a warning is issued. If you do not have air conditioning, locate the nearest cooling shelter or discuss staying with nearby family or friends who have air conditioning.

- **Extreme Cold Watch** is issued when extremely dangerous cold conditions or wind chill values are possible, but the occurrence, location, and/or timing is still uncertain. 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.

- **Freeze Watch** is issued when there is a potential for significant, widespread freezing temperatures within the next 24-36 hours. A Freeze Watch is issued in the autumn until the end of the growing season and in the spring at the start of the growing season.

- **Extreme Heat Warnings** are issued when extremely dangerous heat conditions are expected or occurring. Avoid outdoor activities, especially during the heat of the day. If you must be outside, be sure to drink plenty of water and take frequent breaks in the shade. Stay indoors in an air-conditioned space as much as possible, including overnight. Check on family and neighbors.

- **Extreme Cold Warning** is issued when extremely dangerous cold conditions 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.

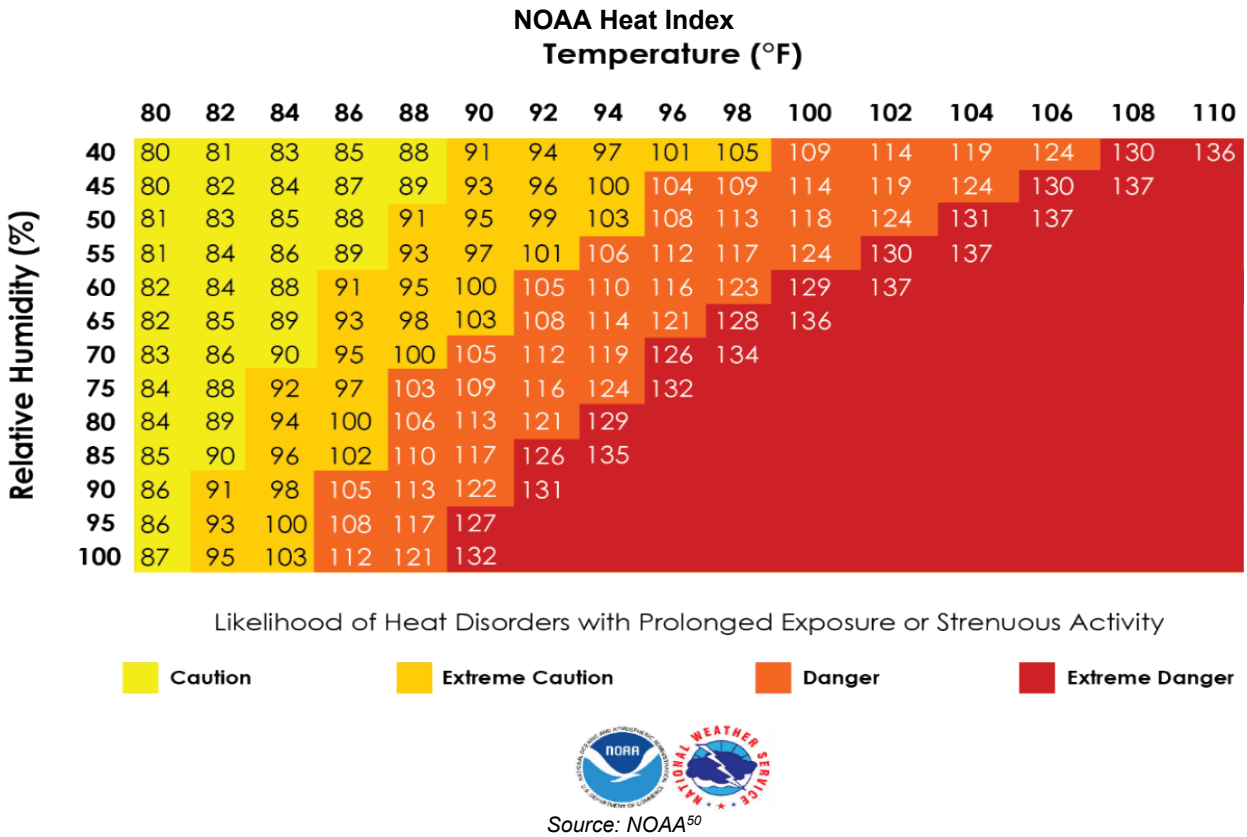
- **Freeze Warnings** are issued when temperatures are forecasted to go below 32°F for a long period of time. This temperature threshold kills some types of commercial crops and residential plants, while temperatures below 28°F for an extended period of time can kill most types of commercial crops and residential plants.

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 96°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 frostbite as it gets lower. The figure on the next page shows the Wind Chill Index used by the NWS.

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 temperature events.



Source: NOAA[50]

[50] National Oceanic and Atmospheric Administration, National Weather Service. 2020. "Heat Index". https://www.weather.gov/ama/heatindex.

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

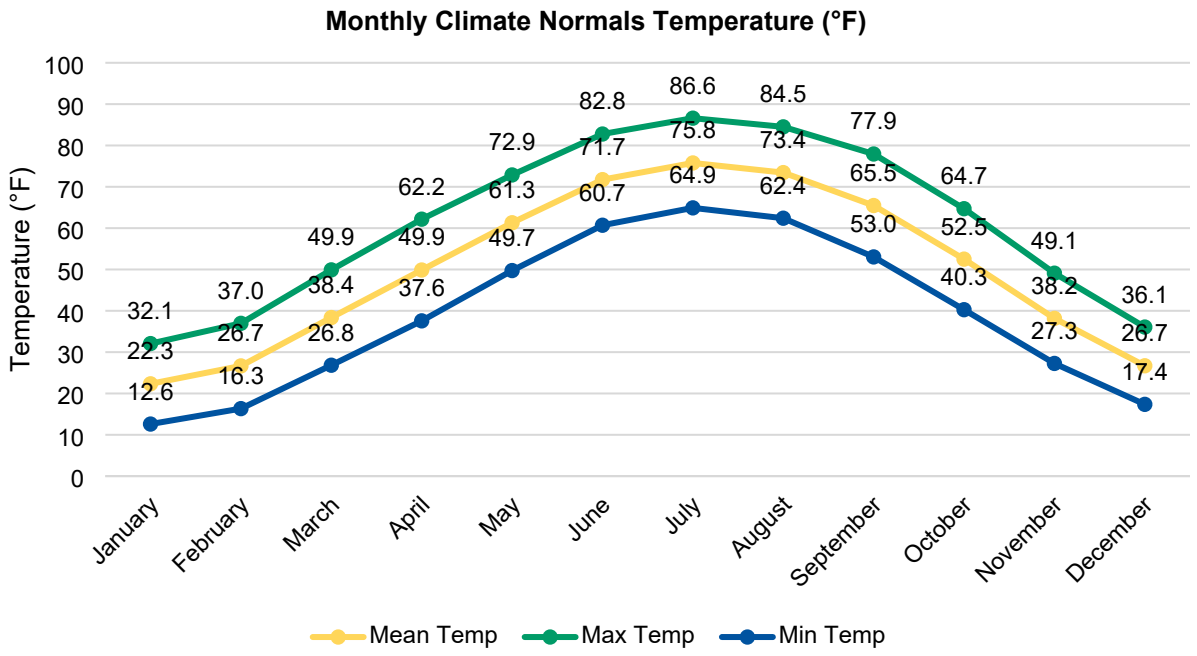
Wind Chill (°F) = 35.74 + 0.6215T - 35.75($V^{0.16}$) + 0.4275T($V^{0.16}$)

T = Air Tempurature (°F) **V** = Wind Speed (mph)

Source: NWS[51]

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 15.4°F). The average high temperature for these months is 35.0°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 84.6°F while the average low temperature for these months is 62.7°F.

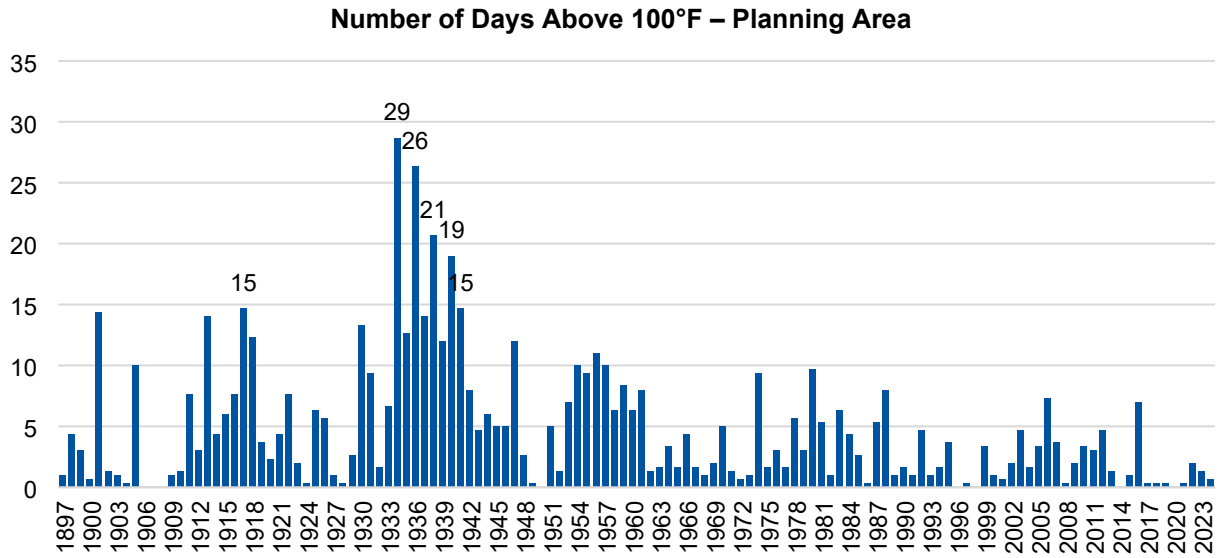
[51] NOAA National Weather Service. 2001. "Wind Chill Chart". https://www.weather.gov/safety/cold-wind-chill-chart.



Source: NOAA, 1991-2020[52]

Historical Occurrences

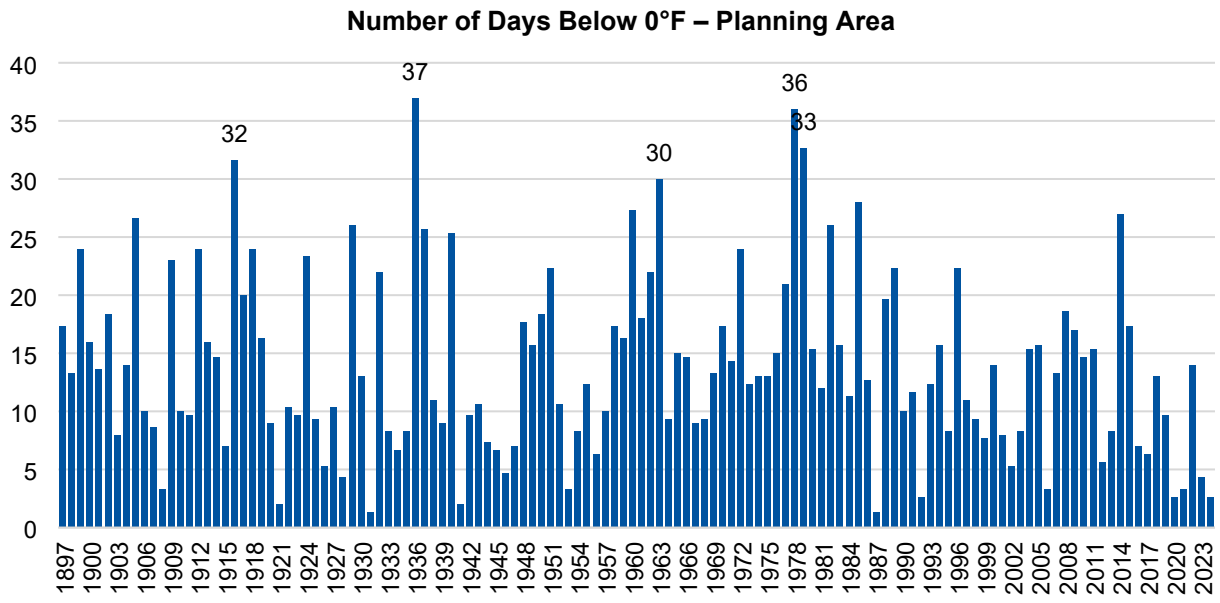
According to the NOAA Northeast Regional Climate Center (NOAA RCC), on average, the planning area experiences five days above 100°F per year. The planning area experienced the most days on record above 100°F in 1934 with 29 days. On average, the planning area experiences 14 days with high temperatures below 0°F per year. The planning area experienced the most days on record below 0°F in 1936 with 37 days.



Source: NOAA RCC, 1897-2024[53]

[52] NOAA National Centers for Environmental Information. 2023. "U.S. Climate Normals Quick Access". https://www.ncei.noaa.gov/access/us-climate-normals/.

[53] NOAA Regional Climate Centers. December 2024. "SC ACIS, 1897-2024." [datafile]. https://scacis.rcc-acis.org/.



Source: NOAA RCC, 1897-2024[54]

Average Annual Losses

Average annual property loss is not available through the NCEI Storm Events Database or other sources. The annual crop loss was determined based on the RMA Cause of Loss Historical Database from 2000 to 2023. This does not include losses from displacement, functional downtime, economic loss, injury, or loss of life. The direct and indirect effects of extreme temperatures are difficult to 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.

Loss Estimate for Extreme Temperatures

Hazard Type	Avg. Number of Days Above 100°F or Below 0°F[1]	Total Crop Loss[2]	Average Annual Crop Loss[2]
Extreme Heat	5 days	$20,194,663	$1,841,444
Extreme Cold	14 days	$320,710	$13,363

Source: 1 NOAA RCC (1897-2024)[55]*; 2 Indicates data is from USDA RMA (2000 to 2023)*[56]

Historical Probability & Future Likelihood

Extreme temperatures are a regular part of the climate for the planning area. With 97 years out of 128 having at least one day of 100°F temperatures, the historical probability for extreme heat is 76%. Every year out of 128 has had at least one day of high temperatures less than 0°F temperatures, the historical probability for extreme cold is 100%. Due to the anticipated impacts from changes in extreme weather and future development, the future likelihood of extreme temperature events is very likely in the planning area.

[54] NOAA Regional Climate Centers. December 2024. "SC ACIS, 1897-2024." [datafile]. https://scacis.rcc-acis.org/.

[55] NOAA Regional Climate Centers. December 2024. "SC ACIS, 1897-2024." [datafile]. https://scacis.rcc-acis.org/.

[56] U.S. Department of Agriculture Risk Management Agency. 2023. "Cause of Loss Historical Data Files: 2000-2023." https://www.rma.usda.gov/tools-reports/summary-business/cause-loss.

Historical Probability & Future Likelihood – Extreme Temperatures

Hazard	Historical Probability	Extreme Weather Changes Impact	Future Development Impact	Future Likelihood
Extreme Heat	76%	Increase in Frequency and Extent	Neither Increase nor Decrease in Frequency. Increase Exposure	**Very Likely**
Extreme Cold	100%	Decrease in Frequency and Extent	Neither Increase nor Decrease in Frequency. Increase Exposure	**Very Likely**

Changing Extreme Weather

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*[57] 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.

Extreme Heat Predictions for Days over 100F

County	Midcentury Prediction 2036-2065 (Days per year)	Late Century Prediction 2070-2099 (Days per year)
Butler	35	61
Dodge	34	59
Saunders	36	62

Source: Union of Concerned Scientists

Impacts from changing extreme weather will significantly affect the prevalence and extent of extreme temperature conditions. The Fifth National Climate Assessment noted numerous impacts from extreme heat including higher rates of illness and death, infrastructure damage, and increased severe wildfire events with hot dry conditions.[58] Jurisdictions across the planning area may also experience more than one climate related impact simultaneously such as drought and extreme heat. The assessment found that overall cold extremes are becoming less frequent and milder with the number of days below freezing going down. However, some studies found that arctic warming results in the polar vortex spilling down over the United States, as seen in February 2021.

Future Development

Any increases in population and development will elevate exposure levels to extreme heat or 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.

[57] 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.

[58] U.S. Global Change Research Program. 2023. "Fifth National Climate Assessment". https://nca2023.globalchange.gov/.

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. The following table outlines key risk factors from heat risk for each county.

Heat Risk

Heat Risk Factors	Butler County	Dodge County	Saunders County
Overall Heat Risk	Moderate Risk	Moderate Risk	Moderate Risk
Likelihood of 3+ Day Heat Wave (>100°F)	82% this year 25% in 30 years	26% this year 282% in 30 years	25% this year 53% in 30 years
Health Caution Days	8 days this year 0 days in 30 years	39 days this year 43 days in 30 years	39 days this year 42 days in 30 years
Dangerous Days	44 days this year 70 days in 30 years	14 days this year 26 days in 30 years	15 days this year 28 days in 30 years
Hot Days	7 days this year 16 days in 30 years	7 days this year 16 days in 30 years	7 days this year 16 days in 30 years
Number of Cooling Days (requiring AC)	158 days this year 167 days in 30 years	160 days this year 169 days in 30 years	161 days this year 170 days in 30 years

Source: Risk Factor[59]
Note: Health Caution Days = days where "feels like" temperature exceeds 90°F-100°F; Dangerous Days = days where "feels like" temperature exceeds 100°F; Hot Days = days where "feels like" temperature exceeds 104°F.

The planning area is a mixture of rural farmland and small to medium sized communities, which presents an added vulnerability to extreme temperature events. In rural areas those suffering from an extreme temperature event may be farther away from medical resources causing dangerous situations for the elderly and those with preexisting conditions. The following table provides information related to regional vulnerabilities. For jurisdictional-specific vulnerabilities, refer to *Section Eight*.

Regional Extreme Temperature Vulnerabilities

Sector	Vulnerability
People	-Heat exhaustion -Heat stroke Vulnerable populations include: -People working outdoors -People without air conditioning or heating -Young children outdoors or without air conditioning or heating -Elderly outdoors or without air conditioning or heating
Economic	-Short-term interruption of business -Loss of power -Agricultural and livestock losses
Built Environment	-Damage to air conditioning and heating systems if overworked -Frozen and broken pipes -Fuel congealed

[59] Risk Factor. January 2024. "Risk Factor". https://riskfactor.com/.

SECTOR	VULNERABILITY
COMMUNITY LIFELINES	-Damages to roadways (prolonged extreme events) -Stressing electrical systems (brownouts during peak usage) -Loss of power

Jurisdictions Ranking Extreme Temperature as a Prioritized Hazard of Concern

The following lists jurisdictions and stakeholders which identified extreme temperatures as a prioritized hazard of concern.

- Village of Mead
- Mead Public Schools

Flooding

Flooding can occur on a local level, sometimes affecting only a few streets, but can also extend throughout a large area, affecting whole drainage basins and impacting property in multiple states. Heavy accumulations of ice or snow can also cause flooding during the melting and freezing stages. 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 Nebraska: riverine flooding, flash flooding, stormwater flooding, and ice jam flooding.

Riverine Flooding

Riverine flooding, typically slower developing with a moderate to long warning time, 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 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 floodplain” refer to the area in the floodplain that is subject to a one percent or greater chance of flooding in any given year. In some areas there may also be a “500-year floodplain” which refers to the area in the floodplain that is subject to a 0.2 percent 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 particular river and its tributaries.

Flash Flooding

Flash floods, typically rapidly developing with little to no warning time, result from convective precipitation usually due to intense thunderstorms or sudden releases due to a failure of 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.

Stormwater 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 capacity. 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 stormwater flooding, is becoming increasingly prevalent as development exceeds the capacity of drainage infrastructure, therefore limiting its ability to convey stormwater. Flooding also occurs due to combined storm and sanitary sewers being overwhelmed by the high flows that often accompany storm events. Typical impacts range from dangerously flooded roads to water backing up into homes or 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. 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 or winter freezing, rivers frequently become clogged with this accumulation of ice. Because of relatively low stream banks and channels blocked with ice, rivers overtop existing banks and flow overland. This type of flooding tends to frequently occur on wide, shallow rivers such as the Platte River, although other rivers can be impacted.

Location

Major waterways in the district include the Big Blue River, Elkhorn River, Loup River, North Fork Elkhorn River, and the Platte River. There are 82 creeks and tributaries within the planning area, which include Pebble Creek, Shell Creek, and Wahoo Creek which have a history of flooding. These rivers and creeks are potential locations for flooding to occur. Major lakes in the area include Homestead Lake in Skull Creek Township, Czechland Lake near Prague, Lake Wanahoo near Wahoo, Pioneer Lake near North Bend, Fremont Lakes, and Woodcliff Lakes. The table below shows current statuses of Flood Insurance Rate Map (FIRM) panels. The Flood Risk Areas – Planning Area figure below shows the mapped floodplain for the planning area. For jurisdictional-specific maps, please refer to *Section Eight*.

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
Abie	31023CIND0A, 31023C0180C	08/16/2011
Bellwood	31023CIND0A, 31023C0130C	08/16/2011
Bruno	31023CIND0A, 31023C0190C	08/16/2011
David City	31023CIND0A, 31023C0145C, 31023C0165C, 31023C0235C, 31023C0255C	08/16/2011
Dwight	31023CIND0A, 31023C0360C	08/16/2011
Garrison	31023CIND0A, 31023C0245C	08/16/2011
Linwood	31023CIND0A, 31023C0090C, 31023C0095C	08/16/2011
Octavia	31023CIND0A, 31023C0155C, 31023C0160C	08/16/2011
Rising City	31023CIND0A, 31023C0210C	08/16/2011
Surprise	31023CIND0A, 31023C0305C, 31023C0310C	08/16/2011
Ulysses	31023CIND0A, 31023C0330C	08/16/2011
Dodge County	31053C0025E, 31053C0050E, 31053C0060E, 31053C0075E, 31053C0080E, 31053C0085E, 31053C0100E, 31053C0135E, 31053C0175E, 31053C0200E, 31053C0225E, 31053C0250E, 31053C0290E, 31053C0300E, 31053C0310E, 31053C0335E, 31053C0350E, 31053C0375E, 31053C0380E, 31053C0385E, 31053C0390E,	01/02/2008

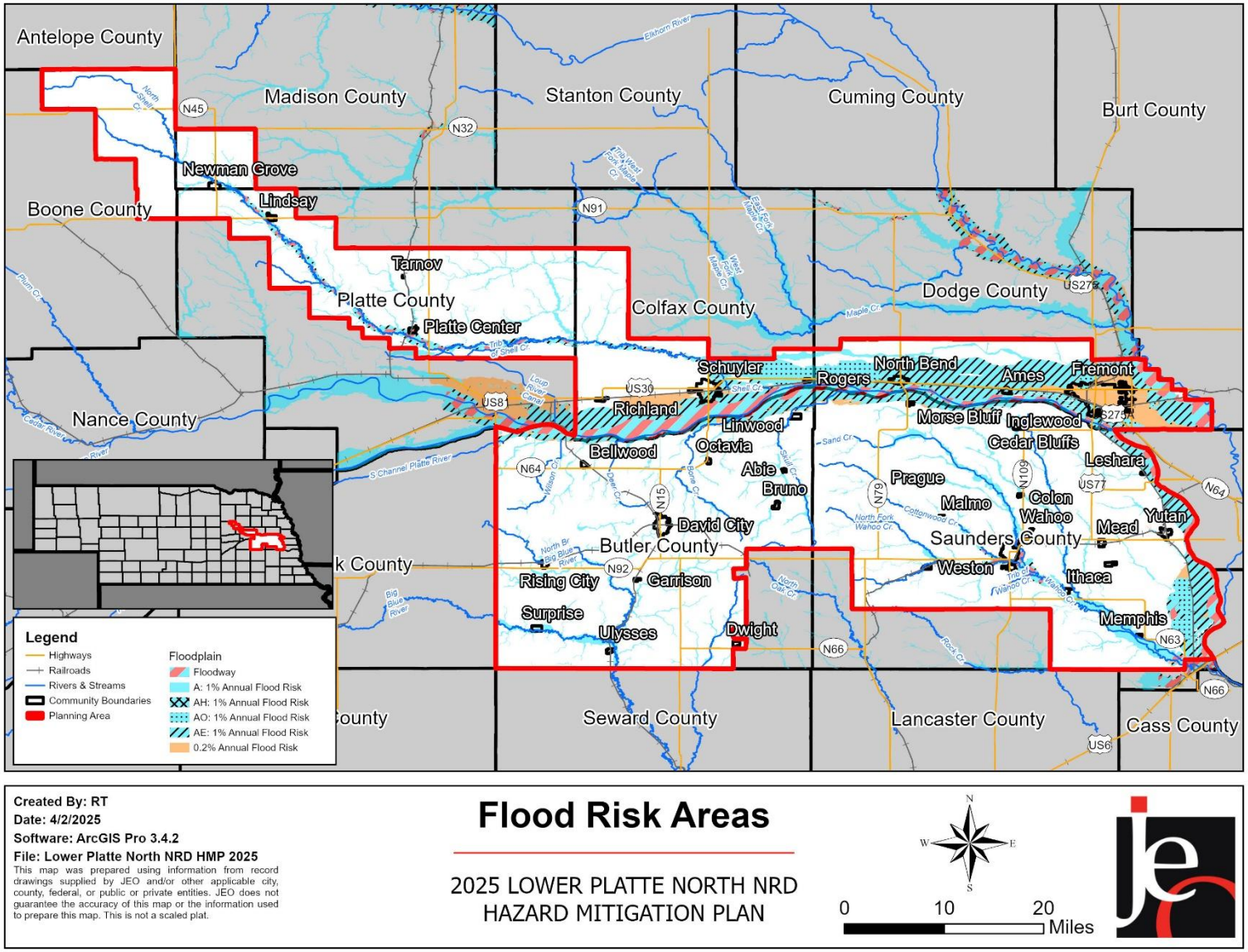
Jurisdiction	Panel Number	Effective Date
	31053C0395E, 31053C0405E, 31053C0415E, 31053C0425E, 31053C0450E	
	31053C0125F, 31053C0150F, 31053C0275F	05/04/2009
	31053C0120G	03/03/2011
	31053CIND0D, 31053C0260G	04/17/2020
Fremont	31053CIND0D	01/02/2008
	31053C0380E, 31053C0385E, 31053C0390E, 31053C0395E, 31053C0405E, 31053C0415E, 31053C0425E	04/17/2020
Inglewood	31053C0395E, 31053C0415E	01/02/2008
	31053CIND0D	04/17/2020
North Bend	31053C0335E, 31053C0350E, 31053C0375E	01/02/2008
	31053CIND0D	04/17/2020
Saunders County	1155C0025D, 31155C0045D, 31155C0050D, 31155C0075D 31155C0090D, 31155C0100D, 31155C0125D, 31155C0150D, 31155C0155D, 31155C0160D, 31155C0165D, 31155C0170D, 31155C0200D, 31155C0235D, 31155C0250D, 31155C0275D, 31155C0300D, 31155C0325D, 31155C0400D, 31155C0425D, 31155C0450D, 31155C0475D, 31155C0500D, 31155C0525D, 31155C0535D, 31155C0545D, 31155C0550D, 31155C0555D, 31155C0565D, 31155C0575D	04/05/2010
	31155CIND0B, 31155C0225E, 31155C0335E, 31155C0350E, 31155C0355E, 31155C0375E	08/03/2016
Cedar Bluffs	31155C0075D, 31155C0090D	04/05/2010
	31155CIND0B	08/03/2016
Colon	31155C0200D	04/05/2010
	31155CIND0B, 31155C0225E	08/03/2016
Ithaca	31155CIND0B, 31155C0375E	08/03/2016
Lashara	31155C0235D, 31155C0250D	04/05/2010
	31155CIND0B	08/03/2016
Malmo	31155C0200D	04/05/2010
	31155CIND0B	08/03/2016
Mead	31155C0400D	04/05/2010
	31155CIND0B, 31155C0375E	08/03/2016
Memphis	31155C0535D, 31155C0550D	04/05/2010
	31155CIND0B	08/03/2016
Morse Bluff	31155C0045D	04/05/2010

Jurisdiction	Panel Number	Effective Date
	31155CIND0B	08/03/2016
Prague	31155C0155D, 31155C0160D, 31155C0165D, 31155C0170D	04/05/2010
	31155CIND0B	08/03/2016
Wahoo	31155CIND0B, 31155C0225E, 31155C0335E, 31155C0350E, 31155C0355E, 31155C0375E	08/03/2016
Weston	31155C0325D	04/05/2010
	31155CIND0B, 31155C0350E	08/03/2016
Yutan	31155C0250D, 31155C0275D, 31155C0400D, 31155C0425D	04/05/2010
	31155CIND0B	08/03/2016

Source: FEMA, 2024[60]

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

Flood Risk Areas



Created By: RT
Date: 4/2/2025
Software: ArcGIS Pro 3.4.2
File: Lower Platte North NRD HMP 2025

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Flood Risk Areas

2025 LOWER PLATTE NORTH NRD
HAZARD MITIGATION PLAN

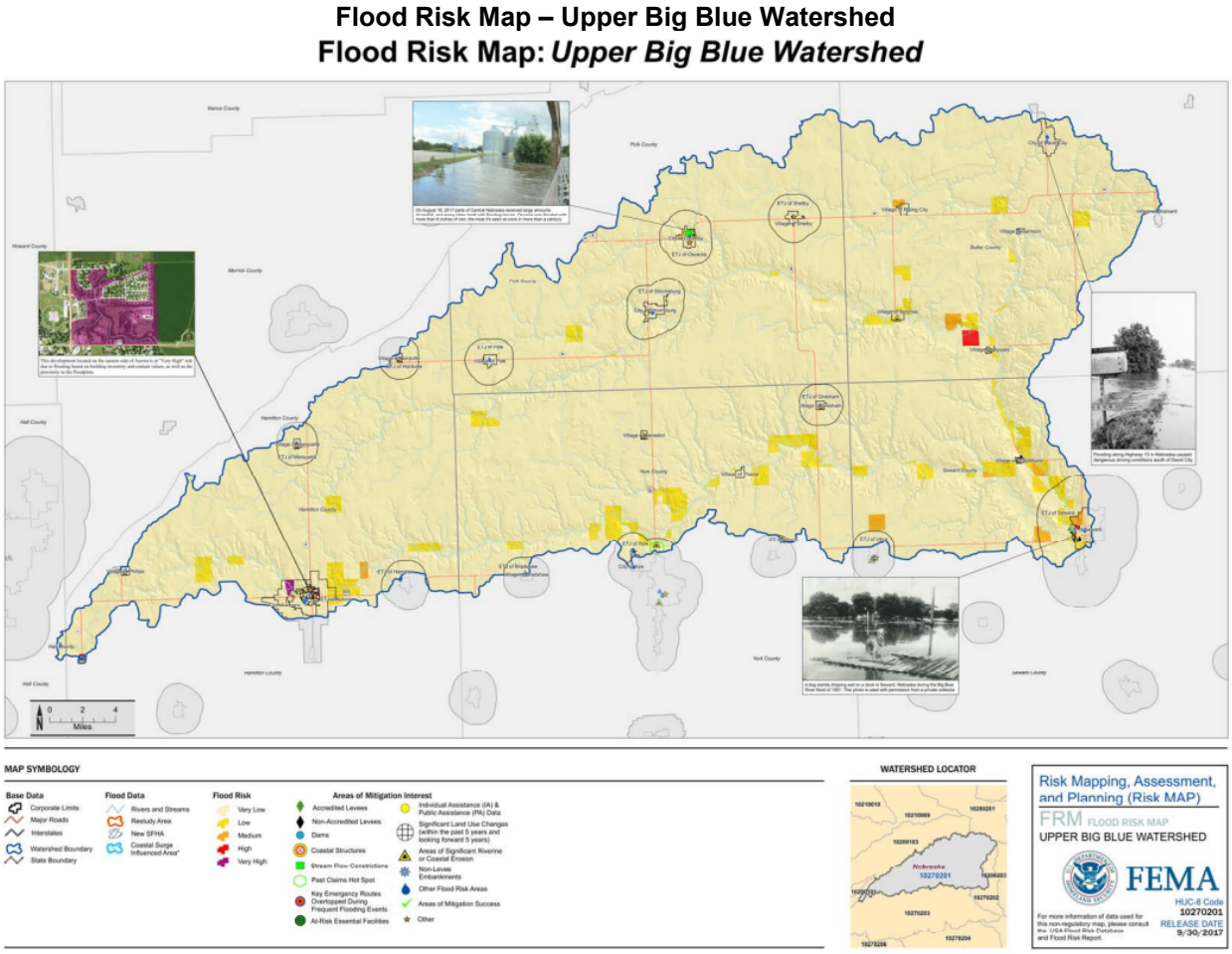
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Risk MAP Products

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. Portions of Butler County including David City, Village of Garrison, Village of Rising City, Village of Surprise, and Village of Ulysses have Risk MAP products available. 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 – Upper Big Blue Watershed



Source: FEMA[61]

[61] FEMA. September 2017. "Flood Risk Report: Upper Big Blue, 10270201". https://map1.msc.fema.gov/data/FRP/FRR_10270201_20170930.pdf?LOC=502abe4d7229f6c146635a23d3f18946.

Butler County – Estimated Potential Losses for Flood Event Scenarios

Type	Inventory Estimated Value	% of Total	10% (10-yr) Dollar Losses[1]	10% Loss Ratio[2]	2% (50-yr) Dollar Losses[1]	2% Loss Ratio[2]	1% (100-yr) Dollar Losses[1]	1% Loss Ratio[2]	0.2% (500-yr) Dollar Losses[1]	0.2% Loss Ratio[2]	Annualized Losses[1] ($/yr)	Ann. Loss Ratio[2]
Residential Building & Contents	$154,000,000	70%	$500,000	0%	$1,000,000	1%	$1,200,000	1%	$2,000,000	1%	$60,000	0%
Commercial Building & Contents	$23,800,000	11%	$200,000	1%	$300,000	1%	$400,000	1%	$500,000	2%	$30,000	0%
Other Building & Contents	$42,700,000	19%	$800,000	2%	$1,400,000	3%	$1,600,000	4%	$2,000,000	4%	$200,000	0%
Total Building & Contents[3]	$220,400,000	100%	$1,500,000	1%	$2,600,000	1%	$3,100,000	1%	$4,000,000	2%	$200,000	0%
Business Disruption[4]	N/A	N/A	$0	N/A	$0	N/A	$0	N/A	$0	N/A	$0	N/A
TOTAL[5]	**$220,400,000**		**$1,500,000**	**1%**	**$2,700,000**	**1%**	**$3,200,000**	**1%**	**$4,100,000**	**2%**	**$200,000**	**0%**

Source: Hazus analysis results stored as the Flood Risk Assessment Dataset in the Flood Risk Database.

[1]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.
[2]Loss ratio = Dollar Losses ÷ Estimated Value. Loss Ratios are rounded to the nearest integer percent.
[3]Total Building and Contents = Residential Building and Contents + Commercial Building and Contents + Other Building and Contents.
[4]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.
[5]Total = Total Building and Contents + Business Disruption

The figures in this table only represent information within the Upper Big Blue Watershed.

Source: FEMA[62]

David City – Estimated Potential Losses for Flood Event Scenarios

Type	Inventory Estimated Value	% of Total	10% (10-yr) Dollar Losses[1]	10% Loss Ratio[2]	2% (50-yr) Dollar Losses[1]	2% Loss Ratio[2]	1% (100-yr) Dollar Losses[1]	1% Loss Ratio[2]	0.2% (500-yr) Dollar Losses[1]	0.2% Loss Ratio[2]	Annualized Losses[1] ($/yr)	Ann. Loss Ratio[2]
Residential Building & Contents	$308,200,000	61%	$80,000	0%	$200,000	0%	$200,000	0%	$300,000	0%	$20,000	0%
Commercial Building & Contents	$87,500,000	17%	$10,000	0%	$20,000	0%	$20,000	0%	$30,000	0%	$10,000	0%
Other Building & Contents	$113,700,000	22%	$10,000	0%	$20,000	0%	$20,000	0%	$30,000	0%	$10,000	0%
Total Building & Contents[3]	$509,400,000	100%	$90,000	0%	$200,000	0%	$300,000	0%	$400,000	0%	$20,000	0%
Business Disruption[4]	N/A	N/A	$0	N/A	$0	N/A	$0	N/A	$0	N/A	$0	N/A
TOTAL[5]	**$509,400,000**		**$90,000**	**0%**	**$200,000**	**0%**	**$300,000**	**0%**	**$400,000**	**0%**	**$20,000**	**0%**

Source: Hazus analysis results stored as the Flood Risk Assessment Dataset in the Flood Risk Database.

[1]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.
[2]Loss ratio = Dollar Losses ÷ Estimated Value. Loss Ratios are rounded to the nearest integer percent.
[3]Total Building and Contents = Residential Building and Contents + Commercial Building and Contents + Other Building and Contents.
[4]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.
[5]Total = Total Building and Contents + Business Disruption

The figures in this table only represent information within the Upper Big Blue Watershed

Source: FEMA[63]

[62] FEMA. September 2017. "Flood Risk Report: Upper Big Blue, 10270201". https://map1.msc.fema.gov/data/FRP/FRR_10270201_20170930.pdf?LOC=502abe4d7229f6c146635a23d3f18946.

[63] FEMA. September 2017. "Flood Risk Report: Upper Big Blue, 10270201". https://map1.msc.fema.gov/data/FRP/FRR_10270201_20170930.pdf?LOC=502abe4d7229f6c146635a23d3f18946.

Village of Garrison – Estimated Potential Losses for Flood Event Scenarios

Type	Inventory Estimated Value	% of Total	10% (10-yr) Dollar Losses[1]	10% Loss Ratio[2]	2% (50-yr) Dollar Losses[1]	2% Loss Ratio[2]	1% (100-yr) Dollar Losses[1]	1% Loss Ratio[2]	0.2% (500-yr) Dollar Losses[1]	0.2% Loss Ratio[2]	Annualized Losses[1] ($/yr)	Ann. Loss Ratio[2]
Residential Building & Contents	$10,300,000	98%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Commercial Building & Contents	$200,000	2%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Other Building & Contents	$0	0%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Building & Contents[3]	$10,500,000	100%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Business Disruption[4]	$0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TOTAL[5]	**$10,500,000**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**

Source: Hazus analysis results stored as the Flood Risk Assessment Dataset in the Flood Risk Database.

[1]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.
[2]Loss ratio = Dollar Losses ÷ Estimated Value. Loss Ratios are rounded to the nearest integer percent.
[3]Total Building and Contents = Residential Building and Contents + Commercial Building and Contents + Other Building and Contents.
[4]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.
[5]Total = Total Building and Contents + Business Disruption

The figures in this table only represent information within the Upper Big Blue Watershed.

Source: FEMA[64]

Village of Rising City – Estimated Potential Losses for Flood Event Scenarios

Type	Inventory Estimated Value	% of Total	10% (10-yr) Dollar Losses[1]	10% Loss Ratio[2]	2% (50-yr) Dollar Losses[1]	2% Loss Ratio[2]	1% (100-yr) Dollar Losses[1]	1% Loss Ratio[2]	0.2% (500-yr) Dollar Losses[1]	0.2% Loss Ratio[2]	Annualized Losses[1] ($/yr)	Ann. Loss Ratio[2]
Residential Building & Contents	$57,000,000	70%	$60,000	0%	$100,000	0%	$200,000	0%	$300,000	0%	$20,000	0%
Commercial Building & Contents	$5,800,000	7%	$0	0%	$0	0%	$0	0%	$0	0%	$0	0%
Other Building & Contents	$18,600,000	23%	$0	0%	$0	0%	$0	0%	$0	0%	$0	0%
Total Building & Contents[3]	$81,400,000	100%	$60,000	0%	$100,000	0%	$200,000	0%	$300,000	0%	$20,000	0%
Business Disruption[4]	$0	N/A	$0	N/A	$0	N/A	$0	N/A	$0	N/A	$0	N/A
TOTAL[5]	**$81,400,000**		**$60,000**	**0%**	**$100,000**	**0%**	**$200,000**	**0%**	**$300,000**	**0%**	**$20,000**	**0%**

Source: Hazus analysis results stored as the Flood Risk Assessment Dataset in the Flood Risk Database.

[1]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.
[2]Loss ratio = Dollar Losses ÷ Estimated Value. Loss Ratios are rounded to the nearest integer percent.
[3]Total Building and Contents = Residential Building and Contents + Commercial Building and Contents + Other Building and Contents.
[4]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.
[5]Total = Total Building and Contents + Business Disruption

The figures in this table only represent information within the Upper Big Blue Watershed.

Source: FEMA[65]

64 FEMA. September 2017. "Flood Risk Report: Upper Big Blue, 10270201". https://map1.msc.fema.gov/data/FRP/FRR_10270201_20170930.pdf?LOC=502abe4d7229f6c146635a23d3f18946.

65 FEMA. September 2017. "Flood Risk Report: Upper Big Blue, 10270201". https://map1.msc.fema.gov/data/FRP/FRR_10270201_20170930.pdf?LOC=502abe4d7229f6c146635a23d3f18946.

Village of Surprise – Estimated Potential Losses for Flood Event Scenarios

Type	Inventory Estimated Value	% of Total	10% (10-yr) Dollar Losses[1]	10% Loss Ratio[2]	2% (50-yr) Dollar Losses[1]	2% Loss Ratio[2]	1% (100-yr) Dollar Losses[1]	1% Loss Ratio[2]	0.2% (500-yr) Dollar Losses[1]	0.2% Loss Ratio[2]	Annualized Losses[1] ($/yr)	Ann. Loss Ratio[2]
Residential Building & Contents	$7,800,000	69%	$60,000	0%	$200,000	3%	$300,000	3%	$500,000	6%	$20,000	0%
Commercial Building & Contents	$2,300,000	20%	$0	0%	$50,000	2%	$200,000	6%	$400,000	17%	$10,000	0%
Other Building & Contents	$1,200,000	11%	$0	0%	$20,000	1%	$60,000	5%	$200,000	14%	$10,000	0%
Total Building & Contents[3]	$11,300,000	100%	$60,000	0%	$300,000	3%	$500,000	4%	$1,000,000	9%	$20,000	0%
Business Disruption[4]	N/A	N/A	$0	N/A	$0	N/A	$0	N/A	$0	N/A	$0	N/A
TOTAL[5]	**$11,300,000**		**$60,000**	**0%**	**$300,000**	**3%**	**$500,000**	**4%**	**$1,000,000**	**9%**	**$20,000**	**0%**

Source: Hazus analysis results stored as the Flood Risk Assessment Dataset in the Flood Risk Database.

[1]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.
[2]Loss ratio = Dollar Losses ÷ Estimated Value. Loss Ratios are rounded to the nearest integer percent.
[3]Total Building and Contents = Residential Building and Contents + Commercial Building and Contents + Other Building and Contents.
[4]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.
[5]Total = Total Building and Contents + Business Disruption

The figures in this table only represent information within the Upper Big Blue Watershed.

Source: FEMA[66]

Village of Ulysses – Estimated Potential Losses for Flood Event Scenarios

Type	Inventory Estimated Value	% of Total	10% (10-yr) Dollar Losses[1]	10% Loss Ratio[2]	2% (50-yr) Dollar Losses[1]	2% Loss Ratio[2]	1% (100-yr) Dollar Losses[1]	1% Loss Ratio[2]	0.2% (500-yr) Dollar Losses[1]	0.2% Loss Ratio[2]	Annualized Losses[1] ($/yr)	Ann. Loss Ratio[2]
Residential Building & Contents	$36,700,000	72%	N/A	N/A	$0	0%	$10,000	0%	$20,000	0%	$0	0%
Commercial Building & Contents	$3,700,000	7%	N/A	N/A	$0	0%	$10,000	0%	$40,000	1%	$0	0%
Other Building & Contents	$10,900,000	21%	N/A	N/A	$0	0%	$0	0%	$20,000	0%	$0	0%
Total Building & Contents[3]	$51,300,000	100%	N/A	N/A	$0	0%	$10,000	0%	$60,000	0%	$0	0%
Business Disruption[4]	N/A	N/A	N/A	N/A	$0	N/A	$0	N/A	$0	N/A	$0	N/A
TOTAL[5]	**$51,300,000**		**N/A**	**N/A**	**$0**	**0%**	**$10,000**	**0%**	**$60,000**	**0%**	**$0**	**0%**

Source: Hazus analysis results stored as the Flood Risk Assessment Dataset in the Flood Risk Database.

[1]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.
[2]Loss ratio = Dollar Losses ÷ Estimated Value. Loss Ratios are rounded to the nearest integer percent.
[3]Total Building and Contents = Residential Building and Contents + Commercial Building and Contents + Other Building and Contents.
[4]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.
[5]Total = Total Building and Contents + Business Disruption

The figures in this table only represent information within the Upper Big Blue Watershed.

Source: FEMA[67]

Extent

The National Weather Service (NWS) has four flood severity categories as displayed in the table below. Actual impacts will vary by community depending on severity of flood event and local conditions such as total developed area in the floodplain or existing flood risk reduction structures.

[66] FEMA. September 2017. "Flood Risk Report: Upper Big Blue, 10270201". https://map1.msc.fema.gov/data/FRP/FRR_10270201_20170930.pdf?LOC=502abe4d7229f6c146635a23d3f18946.

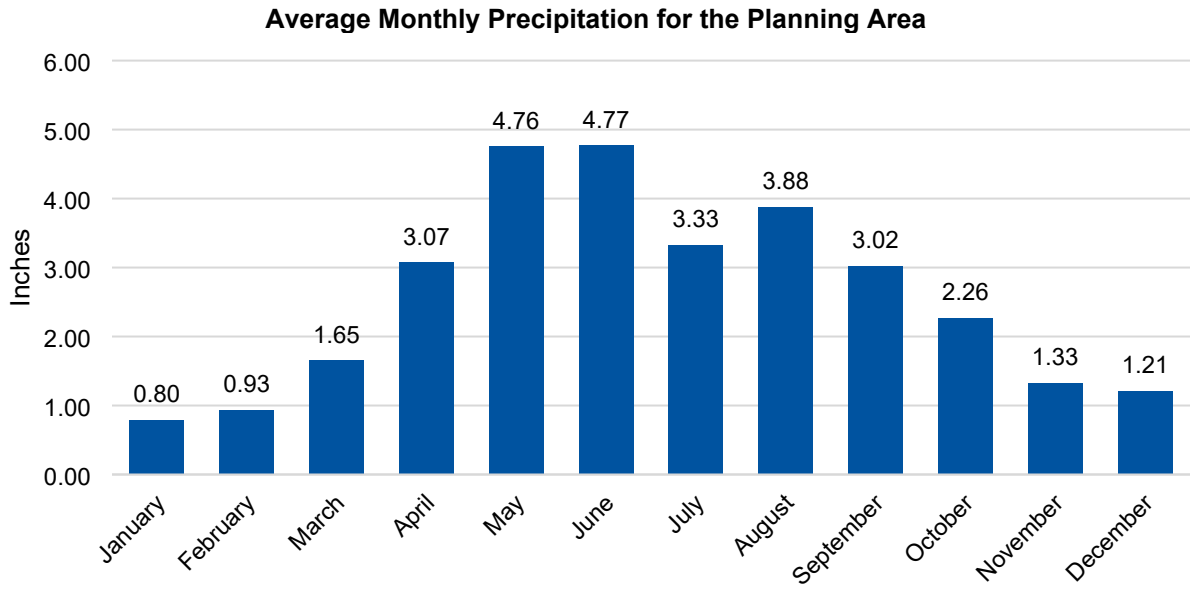
[67] FEMA. September 2017. "Flood Risk Report: Upper Big Blue, 10270201". https://map1.msc.fema.gov/data/FRP/FRR_10270201_20170930.pdf?LOC=502abe4d7229f6c146635a23d3f18946.

Flooding Stages

Flood Stage	Description of flood impacts
Action Stage	Water may cause minor impacts and be a nuisance to people near the stream. Local government or agencies may take actions to reduce property damage and danger to life.
Minor Flooding	Some property flooding and public threat may occur. Roadways, trails, park land, and private property near the stream may become flooded.
Moderate Flooding	Flooding of structures and main roadways may occur. Residences and numerous roadways near the stream may become flooded. Evacuations may be necessary. Disruptions to daily life.
Major Flooding	Extensive flooding of structures, main roadways, and other critical infrastructure may occur. Schools, hospitals, police stations, fire stations, residences, businesses, and roadways may become flooded. Evacuations may be necessary. Significant disruptions to daily life.

Source: NWS[68]

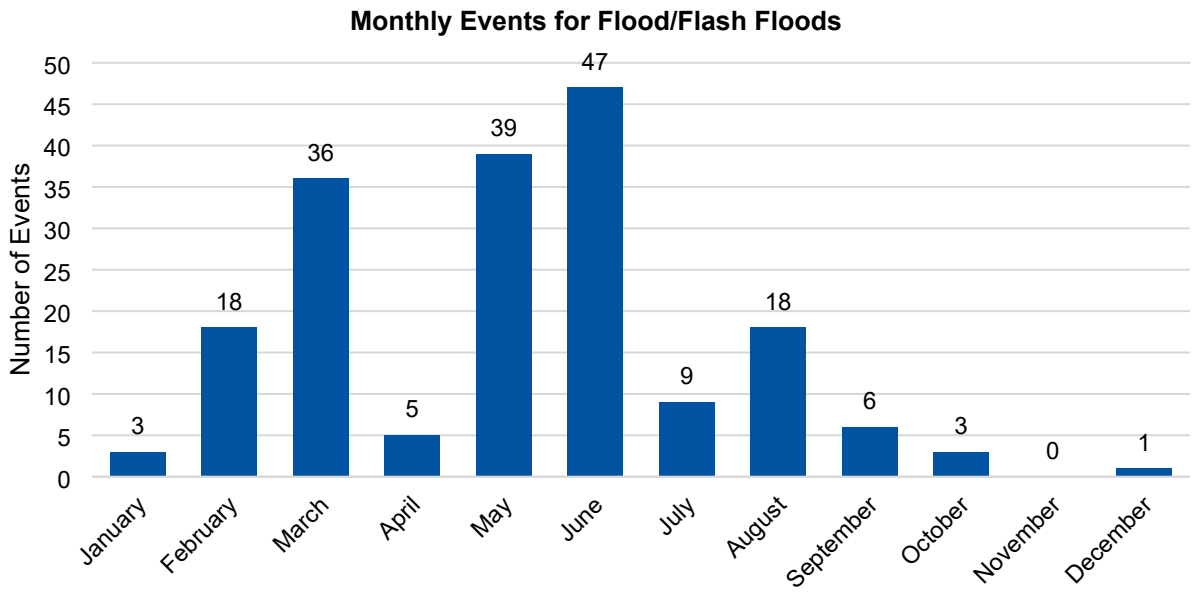
The figure below shows the normal average monthly precipitation for the planning area, which is helpful in determining whether any given month is above, below, or near normal in precipitation. The most common months for flooding in the planning area are in May, June, and August.



Source: NCEI, 1991-2020[69]

[68] NOAA National Weather Service. January 2024. "Hydrology Terms and Definitions". https://www.weather.gov/lot/hydrology_definitions.

[69] NOAA National Centers for Environmental Information. 2023. "U.S. Climate Normals Quick Access". https://www.ncei.noaa.gov/access/us-climate-normals/.



Source: NCEI, 1996-December 2023[70]

Historical Occurrences

The NCEI reports flood events as they occur in each community. A single flood 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, 58 flash flood events resulted in $492,500 in property damage, while 127 riverine flood events resulted in $58,763,000 in property damage in the planning area from 1996 to December 2023. USDA RMA data does not distinguish the difference between riverine flood damage and flash flood damage. The total crop loss according to the RMA is $17,252,866.[71] Descriptions of the most damaging flood events from the NCEI and planning team are listed below.

- **August 4, 1996 – Flood:** Heavy rains dropped four to nine inches of rain in east central Nebraska, causing record flooding to the Pebble and Maple Creeks. Dodge reported a little more than 6 inches of rain. Extensive damage was done to the homes and businesses in Nickerson and Winslow. Major flooding occurred in Winslow, where all 40 homes and businesses reported flooding. One hundred and fifty residents were evacuated. County-wide, it was estimated that 100 homes were affected. Numerous roads were closed with damage to roads and bridges around $500,000. The cities of Nickerson and Winslow reported damage of $170,000. Damage to 50,000 acres of crops was estimated at $2.25 million for corn and $3 million for soybeans.[72]

- **June 10-21, 2010 – Flood, Flash Flood:** A warm front lifted northeast into eastern Nebraska during the morning hours of June 10th. This brought scattered heavy rain producing thunderstorms to the region. A few of the storms were severe with large hail

[70] NOAA National Centers for Environmental Information. December 2023. “Storm Events Database”. https://www.ncdc.noaa.gov/stormevents/.

[71] U.S. Department of Agriculture Risk Management Agency. 2023. "Cause of Loss Historical Data Files: 2000-2023." https://www.rma.usda.gov/tools-reports/summary-business/cause-loss.

[72] NOAA National Centers for Environmental Information. December 2023. “Storm Events Database”. https://www.ncdc.noaa.gov/stormevents/.

and damaging winds, but they generally dropped very heavy rainfall which began a two week or so period of heavy rain and flooding over much of eastern Nebraska and parts of southwest Iowa. Overall, the flooding damage in Nebraska alone in June was estimated to be at least $20 million to public property which not including private property or crop damage. The White House declared a federal disaster in 53 Nebraska counties for flooding in June.[73]

- **August 14, 2017- Flood, Flash Flood:** Heavy rainfall fell on August 15th through the 16th. The heaviest rains were focused over western Butler and Polk counties. A cooperative weather observer in David City measured 6.01 inches of rain for this event. This rain caused the Big Blue River and nearby tributaries to reach flood stage, which lasted until August 23rd. Many roads were flooded and closed for several days in the affected area. Highway 30 was flooded near Richland and Highway 15 had water over it in both Butler and Colfax counties. In total, three flash flood warnings were issued for this event and an estimated $250,000 in property damages were reported.

- **March 13-14, 2019 – Flood:** A bomb cyclone moved out of the central Rockies on Wednesday, March 13, 2019, and helped to create widespread, moderate to major, and in many cases historic, flooding across eastern Nebraska and western Iowa. From four to 15 inches of snow cover remained across the mid Missouri River Valley, and the ground was frozen with existing frost depths of 15 to 23 inches. Warm temperatures allowed all of the snow to rapidly melt, and record moisture allowed one to 2.5 inches of rain to fall over 48 hours. Due to the frozen ground, and one to two feet of thick ice remained in area rivers, widespread, and in many cases, catastrophic flooding developed. Due to expansive levee breaches on many rivers and streams, the flood damage was particularly devastating to many communities. Four individuals lost their lives due to the extreme conditions, and several hundred people required rescue via air or boat. Tens of thousands of people were evacuated from their homes or businesses. Nearly 50 levees were breached on the Platte, Elkhorn and Missouri rivers due to the large volume of water. One such levee breach along the Platte River near Leshara, Nebraska forced the evacuation of National Weather Service Omaha, located in Valley, Nebraska for eight days. Former Nebraska Governor Pete Ricketts presented $1.3 billion in preliminary damage estimates for the entire state. About 2,000 miles of state roads including 15 Nebraska state highway bridges and numerous local bridges, roughly 20% of the entire state road system were impacted.[74]

  Major highways throughout eastern Nebraska were closed either from being washed away or floodwaters impeding traffic. Dozens of communities were inundated, with some requiring full or partial evacuations. A levee along Shell Creek overtopped, and the Village of Rogers evacuated residents before floodwaters entered the community. Shortly after the March floods, Shell Creek flooded again in May, causing the southbound lane of Highway 81 to close. Additionally, Fremont was isolated from access due to flooded highways preventing people from entering and leaving. Multiple levee breaches in the planning area contributed to widespread economic loss as many properties and agricultural lands were destroyed. Hundreds of people in the state had to be rescued by

[73] NOAA National Centers for Environmental Information. December 2023. “Storm Events Database”. https://www.ncdc.noaa.gov/stormevents/.

[74] NOAA National Centers for Environmental Information. December 2023. “Storm Events Database”. https://www.ncdc.noaa.gov/stormevents/.

air or boat, and tens of thousands had to evacuate their communities. Over 1,500 homes and buildings were impacted, and 247 structures were red-tagged.[75] A StoryMap of the March 2019 floods from the Nebraska Department of Natural Resources describes the leading causes and impacts from this event can be found here: https://arcg.is/mCDb.[76]

May 2024 flooding in Wahoo, NE



Source: KOLN

- **May 20-21, 2024 – Flash Flood:** Numerous rounds of thunderstorms caused flash flooding in multiple areas. Many roads were under water in Fremont, Bruno, and near Skull Creek. Water levels at Lake Wanahoo reached several feet higher than levels during the March 2019 flooding event. In Leshara, 14 people needed to be rescued and many homes were damaged. In Wahoo, many buildings were flooded, and nearby fields and roads were washed out. Lake Wanahoo water levels reached several feet higher than levels during the March 2019 floods, nearing three feet from the edge of Highway 77/92. Many areas surrounding Lake Wanahoo were under water, including the Breakwater Trail which was designed to slow the flow of incoming water and sediment from flood events. LPNNRD has an agreement with Houston Engineering to repair damages at the Wanahoo Dam Stilling Basin and the Breakwater Trail. Despite the damage that did occur, it is estimated that NRD flood structures prevented $1.3 million dollars in downstream property and infrastructure damage in the planning area. A disaster declaration was issued due to this event.[77]

Average Annual Damages

The average damage per event estimate was determined based on the 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. Floods caused a total of $59,255,500 in property damage and $5,736,483 in crop losses per year for the planning area.

Floods 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]
Flooding	185	6.6	$59,255,500	$2,116,268	**$5,736,483**	$239,020

Source: 1 Indicates data is from NCEI (1996 to Dec 2023)[78]; 2 Indicates data is from USDA RMA (2000 to 2023)[79]

Historical Probability & Future Likelihood

[75] Nebraska Department of Natural Resources. 2022. "2022 Nebraska State Flood Hazard Mitigation Plan". https://dnr.nebraska.gov/sites/dnr.nebraska.gov/files/doc/floodplain/resources/2022_SFHMP_FINAL_20220630_Ver2.pdf.

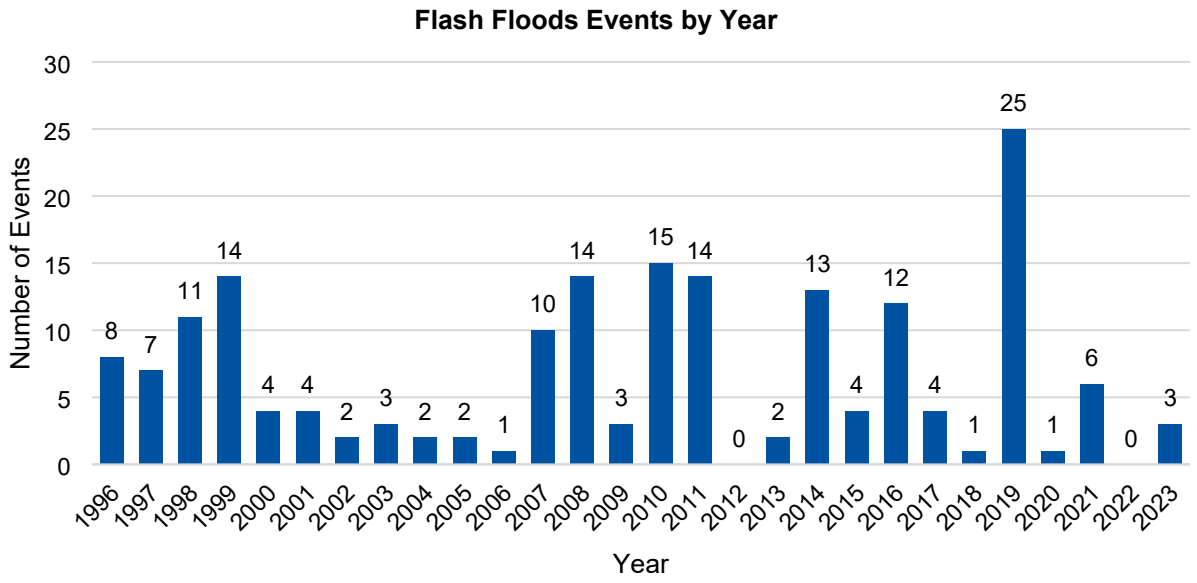
[76] Nebraska Department of Natural Resources. March 2024. "Nebraska Flooding: March 2019." https://storymaps.arcgis.com/stories/9ce70c78f5a44813a326d20035cab95a.

[77] Lower Platte North Natural Resources District. 2025. "Disaster Declaration for May's Significant Rainfall Event." *The Viaduct*. https://lpnnrd.org/wp-content/uploads/2025/01/2024-25-Viaduct-website.pdf.

[78] NOAA National Centers for Environmental Information. December 2023. "Storm Events Database". https://www.ncdc.noaa.gov/stormevents/.

[79] U.S. Department of Agriculture Risk Management Agency. 2023. "Cause of Loss Historical Data Files: 2000-2023." https://www.rma.usda.gov/tools-reports/summary-business/cause-loss.

The NCEI reports 58 flash floods and 127 riverine flood events for a total of 185 events from 1996 to December 2023. Some years had multiple flood events. The figure below shows the events broken down by year. Based on the historic record, there is a 93 percent historical probability (26 out of the 28 years) that floods will occur annually in the planning area. Due to the anticipated impacts from changes in extreme weather and future development, the future likelihood of flooding events is highly likely.



Source: NCEI, 1996-Dec 2023

Historical Probability & Future Likelihood – Flooding

Historical Probability	Extreme Weather Changes Impact	Future Development Impact	Future Likelihood
93%	Increase in Frequency and Intensity	Increase in Frequency. Increase Exposure	**Very Likely**

Changing Extreme Weather

In the warmer months, convective storms are common and include flash flood-producing rainstorms. If 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. 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.[80] The U.S. Global Change Research Program has created the Climate Mapping for Resilience and Adaptation tool that looks at how different emission scenarios affect climatological hazards. The table below shows that the annual total precipitation is expected to increase in both low emissions and high emission scenarios. The Annual Days that Exceed 99th Precipitation table shows the annual number of days that exceed

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

the 99th percentile precipitation increases as time goes on in both the lower emissions and higher emissions scenario.[81]

Average Annual Total Precipitation

County	Emission Scenario	Historical (1976-2005)	Early Century (2015-2044)	Mid Century (2035-2064)	Late Century (2070-2099)
Butler	Lower Emissions (RCP 4.5)	26.9 Inches	28.6 Inches	28.7 Inches	28.9 Inches
	Higher Emissions (RCP 8.5)	29.1 Inches	28.3 Inches	28.9 Inches	29.4 Inches
Dodge	Lower Emissions (RCP 4.5)	28.3 Inches	30.0 Inches	30.1 Inches	30.3 Inches
	Higher Emissions (RCP 8.5)	30.3 Inches	29.7 Inches	30.3 Inches	30.9 Inches
Saunders	Lower Emissions (RCP 4.5)	30.3 Inches	30.4 Inches	27.7 Inches	30.4 Inches
	Higher Emissions (RCP 8.5)	30.0 Inches	30.4 Inches	27.8 Inches	30.9 Inches

Source: NOAA[82]

Annual Days that Exceed 99th Precipitation

County	Emission Scenario	Historical (1976-2005)	Early Century (2015-2044)	Mid Century (2035-2064)	Late Century (2070-2099)
Butler	Lower Emissions (RCP 4.5)	4.6 Days	5.6 Days	5.9 Days	6.2 Days
	Higher Emissions (RCP 8.5)	6.3 Days	5.6 Days	6.2 Days	6.9 Days
Dodge	Lower Emissions (RCP 4.5)	4.7 Days	5.4 Days	5.7 Days	6.0 Days
	Higher Emissions (RCP 8.5)	5.5 Days	5.5 Days	6.1 Days	6.6 Days
Saunders	Lower Emissions (RCP 4.5)	4.7 Days	5.6 Days	5.9 Days	6.1 Days
	Higher Emissions (RCP 8.5)	5.7 Days	5.6 Days	6.2 Days	6.6 Days

Source: USGCRP

Future Development

Any future building or development inside of the floodplain should be discouraged to protect 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. Buyout programs can be used

[81] USGCRP. October 2024. "Climate Mapping for Resilience and Adaptation". https://livingatlas.arcgis.com/assessment-tool/explore/details.

[82] USGCRP. October 2024. "Climate Mapping for Resilience and Adaptation". https://livingatlas.arcgis.com/assessment-tool/explore/details.

to eliminate properties located in floodplains, especially properties that have experienced repetitive losses. Communities may also consider incorporating "green infrastructure" to address flooding concerns. Examples of green infrastructure 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 floods, communities can implement stormwater management plans, participate in the National Pollutant Discharge Elimination System program, or participate in the National Flood Insurance Program (NFIP) or Community Rating System (CRS).

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 also prohibit new structures for human habitation in the floodway.[83] 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.

Regional Vulnerabilities

An updated national study examining social vulnerability as it relates to flood events found that low-income and minority populations are disproportionately vulnerable to flood events.[84] 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 a higher rate of 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.

GIS parcel data was acquired from each County Assessor and Microsoft building footprint data to analyze the location, number, and value of buildings located in the 100-year and 500-year floodplains. A summary of the results of this analysis is provided in the following tables. Note: Some parcels may be in both the 100-year and 500-year floodplains and are included in both tables.

Exposure in the 100-Year Floodplain (1% Annual Flood Risk Area)

Jurisdiction	Number of Buildings	Total Value of Buildings	Percentage of Buildings
Butler County	791	$68,059,495	7.2%
Abie	1	$28,250	1.1%
Bellwood	1	$ 281,145	0.4%
Bruno	27	$2,951,615	21.3%

[83] 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.

[84] Tate, E., Rahman, M.A., Emrich, C.T. et al. Flood exposure and social vulnerability in the United States. Nat Hazards (2021). https://doi.org/10.1007/s11069-020-04470-2.

Jurisdiction	Number of Buildings	Total Value of Buildings	Percentage of Buildings
David City	6	$407,435	0.4%
Dwight	0	$0	0%
Garrison	0	$0	0%
Linwood	0	$0	0%
Octavia	0	$0	0%
Rising City	28	$2,963,975	10.3%
Surprise	35	$1,269,505	63.6%
Ulysses	0	$0	0%
Dodge County	5,149	$1,015,427,925	22.7%
Fremont	1,518	$425,377,724	14.6%
Inglewood	179	$23,075,287	100%
North Bend	703	$73,565,975	100%
Saunders County	1,642	$355,445,689	8.3%
Cedar Bluffs	10	$977,224	3.0%
Colon	22	$2,763,044	20.2%
Ithaca	32	$2,053,417	32%
Leshara	16	$1,050,983	20.3%
Malmo	0	$0	0%
Mead	0	$0	0%
Memphis	12	$574,470	18.2%
Morse Bluff	4	$233,205	3.7%
Prague	1	$126,235	0.4%
Wahoo	80	$9,400,932	3.8%
Weston	9	$440,869	4.2%
Yutan	12	$237,511	2.1%

County Assessor, 2024; Microsoft, 2024

Exposure in the 500-Year (0.2% Annual Flood Risk Area)

Jurisdiction	Number of Structures	Total Value of Structures	Percentage of Structures
Butler County	72	$6,174,565	0.7%
Abie	0	$0	0%
Bellwood	0	$0	0%
Bruno	0	$0	0%
David City	0	$0	0%
Dwight	0	$0	0%

Jurisdiction	Number of Structures	Total Value of Structures	Percentage of Structures
Garrison	0	$0	0%
Linwood	0	$0	0%
Octavia	0	$0	0%
Rising City	0	$0	0%
Surprise	0	$0	0%
Ulysses	0	$0	0%
Dodge County	10,635	$2,345,768,414	46.9%
Fremont	8,889	$1,980,096,376	85.6%
Inglewood	0	$0	0%
North Bend	0	$0	0%
Saunders County	171	$40,421,868	0.9%
Cedar Bluffs	0	$0	0%
Colon	0	$0	0%
Ithaca	0	$0	0%
Leshara	0	$0	0%
Malmo	0	$0	0%
Mead	0	$0	0%
Memphis	0	$0	0%
Morse Bluff	0	$0	0%
Prague	5	$662,276	2.2%
Wahoo	36	$2,959,857	1.7%
Weston	0	$0	0%
Yutan	21	$2,960,636	3.7%

County Assessor, 2024; Microsoft, 2024

For additional flooding risk information see the *2022 Nebraska State Flood Hazard Mitigation Plan*.[85] The following table is a summary of regional vulnerabilities. For additional jurisdictional-specific flood vulnerabilities, refer to *Section Eight*.

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

[85] Nebraska Department of Natural Resources. 2022. "2022 Nebraska State Flood Hazard Mitigation Plan". https://dnr.nebraska.gov/sites/dnr.nebraska.gov/files/doc/floodplain/resources/2022_SFHMP_FINAL_20220630_Ver2.pdf.

Sector	Vulnerability
	-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 -Butler County: LEOP estimates 40% of people reside within the one percent annual chance floodplain -Dodge County: LEOP estimates 40% of people reside within the one percent annual chance floodplain -Saunders County: LEOP estimates 8% of people reside within the one percent annual chance floodplain
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	-Buildings may be damaged
Community Lifelines	-Damages to roadways, bridges, and railways -Wastewater facilities are at risk, particularly those in the floodplain -Community Lifelines, especially those in the floodplain, are at risk of damage (specific community lifelines located in the floodplain are noted within individual community profiles)

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 owners of structures located in 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 as defined by FEMA's flood maps. One of the strengths of the program has been keeping people away from flooding rather than keeping the flooding away from people, through historically expensive flood control projects. The following tables summarize NFIP participation and active policies within the county. Additional information about NFIP participation, implementation, and enforcement can be found in *Section 8*.

NFIP Participation

Jurisdiction	Participate in NFIP	Eligible-Regular Program	Date Current Map	Sanction	Suspension	Rescinded
Butler County	Yes	08/16/2011	08/16/2011	-	-	-
Abie	No	-	08/16/2011	08/16/2012	-	-
Bellwood	Yes	08/16/2011	08/16/2011(M)	-	-	-
Bruno	Yes	01/01/1987	08/16/2011(M)	-	-	-
David City	Yes	08/24/2012	08/16/2011(M)	-	-	-
*Dwight	No	-	08/16/2011	-	-	-
*Garrison	No	-	08/16/2011	-	-	-

Jurisdiction	Participate in NFIP	Eligible-Regular Program	Date Current Map	Sanction	Suspension	Rescinded
Linwood	Yes	01/01/1987	08/16/2011(M)	-	-	-
*Octavia	No	-	08/16/2011	-	-	-
Rising City	Yes	02/28/2012	08/16/2011(M)	-	-	-
Surprise	Yes	08/16/2011	08/16/2011(M)	-	-	-
Ulysses	Yes	10/31/1983	08/16/2011(M)	-	-	-
Dodge County	Yes	08/17/1981	04/17/2020	-	-	-
Fremont CRS Entry Date: 10//01/1991 CRS Current Class: 8	Yes	02/01/1979	01/02/2008	-	-	-
Inglewood	Yes	05/04/2007	01/02/2008	-	-	-
North Bend	Yes	03/18/1980	01/02/2008	-	-	-
Saunders County	Yes	12/01/1978	08/03/2016	-	-	-
Cedar Bluffs	Yes	09/24/1984	04/05/2010	-	-	-
Colon	Yes	09/21/2010	08/03/2016	-	-	-
Ithaca	Yes	05/01/1987	08/03/2016	-	-	-
Leshara	Yes	04/05/2010	04/05/2010	-	-	-
Malmo	Yes	09/04/1986	04/05/2010(M)	-	-	-
Mead	Yes	09/24/1984	08/03/2016	-	-	-
Memphis	No	-	04/05/2010	04/05/2011	-	-
Morse Bluff	No	-	04/05/2011	04/05/2011	-	-
Prague	Yes	12/29/2000	04/05/2010	-	-	-
Wahoo	Yes	12/01/1977	08/03/2016	-	-	-
Weston	Yes	07/03/1985	08/03/2016	-	-	-
Yutan	Yes	04/04/1983	04/05/2010	-	-	-

Source: Federal Emergency Management Agency, National Flood Insurance Program[86]
Note: (M) is "No Elevation Determined - All Zone A, C and X"
**No Special Flood Hazard Areas identified*

NFIP Policies in Force and Total Payments

Jurisdiction	Policies In-force	Total Coverage	Total Losses	Total Payments
Butler County	19	$2,991,000	3	$83,688
Abie	N/A	N/A	N/A	N/A

[86] Federal Emergency Management Agency. February 2024. "Community Status Book Report". https://www.fema.gov/cis/NE.html.

Jurisdiction	Policies In-force	Total Coverage	Total Losses	Total Payments
Bellwood	N/A	N/A	N/A	N/A
Bruno	1	$85,000	0	$0
David City	N/A	N/A	N/A	N/A
Dwight	N/A	N/A	N/A	N/A
Garrison	N/A	N/A	N/A	N/A
Linwood	0	$0	4	$4,433
Octavia	N/A	N/A	N/A	N/A
Rising City	3	$382,000	0	$0
Surprise	N/A	N/A	N/A	N/A
Ulysses	N/A	N/A	N/A	N/A
Dodge County	87	$17,716,000	151	$1,724,487
Fremont	650	$137,420,000	529	$7,693,830
Inglewood	28	$4,010,000	19	$355,056
North Bend	166	$27,802,000	85	$1,058,845
Saunders County	342	$97,109,000	207	$3,882,316
Cedar Bluffs	1	$140,000	8	$6,326
Colon	3	$690,000	0	$0
Ithaca	5	$580,000	0	$0
Leshara	4	$742,000	0	$0
Malmo	N/A	N/A	N/A	N/A
Mead	N/A	N/A	N/A	N/A
Memphis	N/A	N/A	N/A	N/A
Morse Bluff	N/A	N/A	N/A	N/A
Prague	N/A	N/A	N/A	N/A
Wahoo	4	$1,515,000	3	$3,600
Weston	N/A	N/A	N/A	N/A
Yutan	2	$850,000	0	$0

Source: FEMA - 2024

It should be noted that while the number of policies in force may change monthly and annually as representatives enroll, maintain, or lapse policies, the total number of losses and payments are cumulative over time.

This plan strongly encourages the county and all communities to participate in the NFIP. All participating counties and communities have confirmed that they will remain in good standing and continue involvement with the NFIP. Compliance with the NFIP should remain a top priority for each participant. Jurisdictions are encouraged to initiate activities above the minimum participation requirements, which are described in the Community Rating System Coordinator's

Manual (FIA-15/2017) and its 2021 Addendum. The City of Fremont is the only community in the planning area participating in the CRS Program and is a Class 8.

NFIP Repetitive Loss Structures

NeDNR, and NEMA were contacted to determine if any existing properties are classified as NFIP Repetitive Loss Structures. Note there are two definitions for repetitive loss structures. Severe repetitive loss is a grant definition for HMA purposes that has specific criteria while repetitive loss is a general NFIP definition. There are 78 repetitive loss properties and seven severe repetitive loss properties located in the planning area as of 2025. Only jurisdictions with reported properties are included in the following table.

Repetitive Loss Structures

Jurisdiction	Repetitive Loss Structures	Repetitive Loss Structure Type	Severe Repetitive Loss Structures	Severe Repetitive Loss Structure Types	Total Losses	Total Payments
Dodge County	15	Single Family	1	Single Family	36	$519,143
Fremont	1	Residential Mobile	4	Single Family	92	$1,615,767
	29	Single Family				
Newman Grove	1	Single Family	0	-	2	$5,930
Platte Center	1	Single Family	0	-	2	$14,064
Saunders County	13	Single Family	1	Single Family	36	$899,072
	0	-	1	Other – Non Residential		
Schuyler	13	Single Family	0	-	36	$367,185
	4	Other – Non Residential				
	1	Business				

Source: NEMA, 2025

NFIP RL: Repetitive Loss Structure refers to a structure covered by a contract for flood insurance under the NFIP that has incurred flood-related damage on two occasions during a 10-year period, each resulting in at least a $1,000 claim payment.

NFIP SRL: Severe Repetitive Loss Properties are defined as single or multifamily residential properties that are covered under an NFIP flood insurance policy and:

(1) That have incurred flood-related damage for which four or more separate claims payments have been made, with the amount of each claim (including building and contents payments) exceeding $5,000, and with the cumulative amount of such claim payments exceeding $20,000; or

(2) For which at least two separate claims payments (building payments only) have been made under such coverage, with cumulative amount of such claims exceeding the market value of the building.

(3) In both instances, at least two of the claims must be within 10 years of each other, and claims made within 10 days of each other will be counted as one claim.

HMA RL: A repetitive loss property is a structure covered by a contract for flood insurance made available under the NFIP that:

(1) Has incurred flood-related damage on two occasions, in which the cost of the repair, on the average, equaled or exceeded 25 percent of the market value of the structure at the time of each such food event; and

(2) At the time of the second incidence of flood-related damage, the contract for flood insurance contains Increased Cost of Compliance Coverage.

HMA SRL: A severe repetitive loss property is a structure that:

(1) Is covered under a contract for flood insurance made available under the NFIP.

(2) Has incurred flood related damage –

(a) For which four or more separate claims payments (includes building and contents) have been made under flood insurance coverage with the amount of each such claim exceeding $5,000, and with the cumulative amount of such claim payments exceeding $20,000; or

(b) For which at least two separate claims payments (including only building) have been made under such coverage, with the cumulative amount of such claims exceeding the market value of the insured structure.

Jurisdictions Ranking Flooding as a Prioritized Hazard of Concern

The following lists jurisdictions and stakeholders which identified flooding as a prioritized hazard of concern.

- Ames Diking and Drainage District
- Butler County
- City of Fremont
- City of North Bend
- City of Wahoo
- City of Yutan
- Colon Volunteer Fire District
- Cotterel Diking and Drainage District
- David City
- David City Public Schools
- Dodge County
- Four Corners Health Department
- Lower Platte North NRD
- Mead Public Schools
- Methodist Health System - Fremont
- Morse Bluff Township
- North Bend Central Public Schools
- North Bend Drainage District
- North Bend Volunteer Fire Department
- Platte Township
- Platte Valley Drainage District

- Pohocco Township
- Reading Township
- Rising City Rural Fire Department
- Saunders County
- Schuyler Volunteer Fire Department
- Skull Creek Township
- Three Rivers Public Health Department
- Village of Bruno
- Village of Cedar Bluffs
- Village of Colon
- Village of Inglewood
- Village of Leshara
- Village of Lindsay
- Village of Linwood
- Village of Morse Bluff
- Village of Prague
- Village of Rogers
- Village of Surprise
- Village of Ulysses
- Ulysses Township
- Union Township
- Weston Volunteer Fire and Rescue
- Woodcliff Lakes SID #8

Grass/Wildfire

Wildfires, also known as grassfires, brushfires, forest fires, or wildland fires, are any uncontrolled fire that occurs in the countryside, agricultural fields, or wildland. Wildland areas may include but are not limited to grasslands, forests, woodlands, pastures, and other vegetated areas. Wildfires range in size from a few acres (the most common) to thousands of acres. Fire events can quickly spread from their original source, change direction, and jump gaps such as roads, rivers, and fire breaks. Wildfire behavior is particularly dependent on the local conditions including temperature, humidity, wind speed, wind direction, slope, topography, and available fuel load. While some wildfires burn in remote forested regions, others can cause extensive destruction of homes and other structures located in the wildland-urban interface (WUI), the zone of transition between developed areas and undeveloped land. Although 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.

Fire Protection

There are 24 local fire districts identified in the planning area. The following is a list of the fire districts and the figure on the next page shows their district boundaries.

- Abie Volunteer Fire Department
- Bellwood Volunteer Fire Department
- Bruno Volunteer Fire Department
- Cedar Bluffs Suburban Fire Protection District #7
- Colon Volunteer Fire District
- David City Volunteer Fire Department
- Dwight Volunteer Fire Department
- Fremont Rural Fire Department
- Ithaca Volunteer Fire Department
- Lindsay Fire & Rescue
- Linwood Volunteer Fire Department
- Malmo Volunteer Fire Department
- Mead Volunteer Fire & Rescue Department
- Morse Bluff Volunteer Fire Department
- Newman Grove Fire & Rescue
- North Bend Volunteer Fire Department
- Platte Center Rural Fire District
- Prague Fire & Rescue
- Rising City Rural Fire Department
- Schuyler Volunteer Fire Department
- Ulysses Volunteer Fire Department
- Wahoo Volunteer Fire Department
- Weston Volunteer Fire & Rescue
- Yutan Volunteer Fire Department

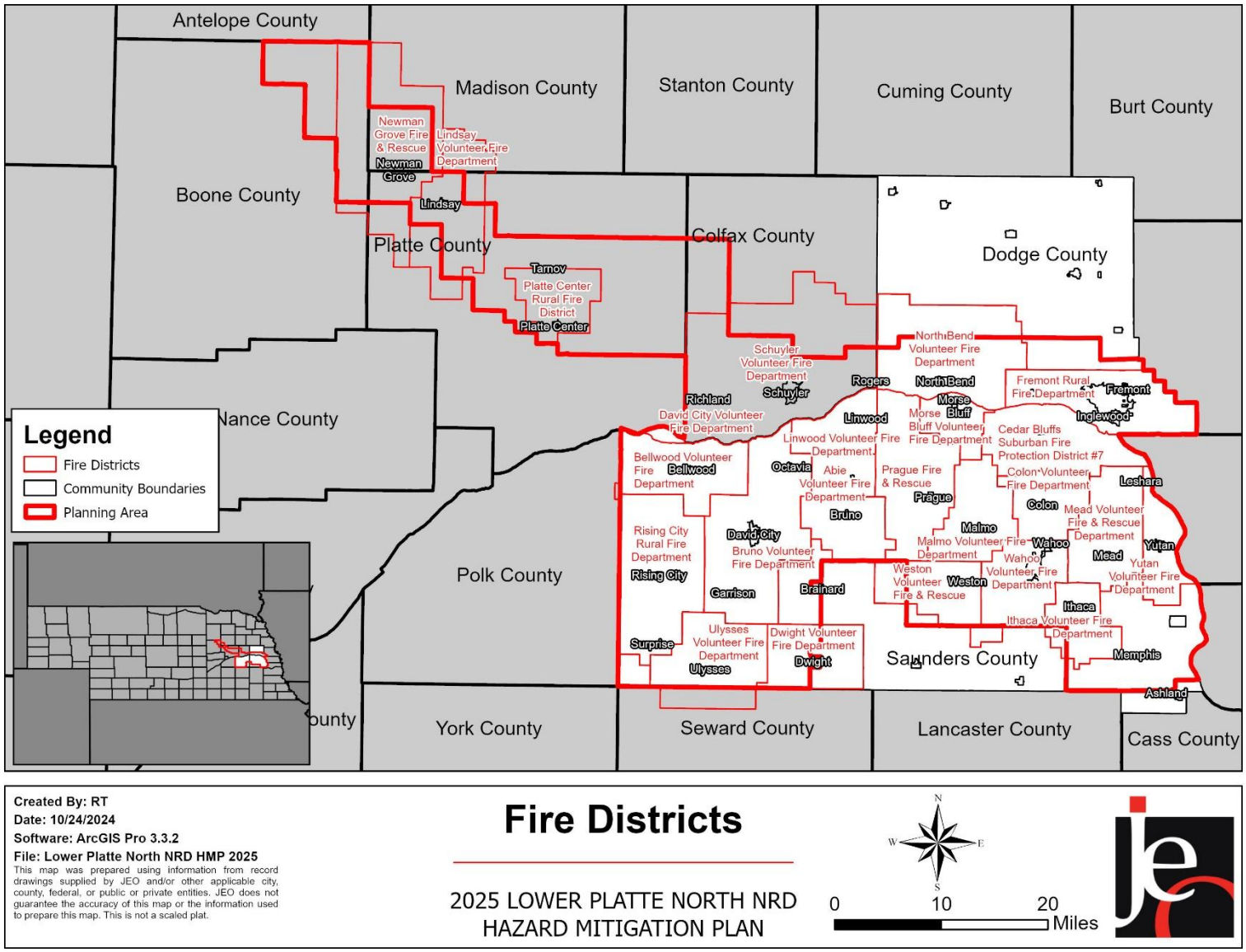
Community Wildfire Protection Plans

Even though grass/wildfire is a natural part of the ecosystem, it can present a substantial hazard to life and property, especially in the WUI. The planning area is covered by two Community Wildfire Protection Plans (CWPPs): the 2022 Missouri River East CWPP and the 2020 Southeast Nebraska CWPP.[87] The purpose of the CWPPs is to help effectively manage wildfires and increase collaboration and communication among organizations who manage fire. The CWPPs

[87] Nebraska Forest Service. 2024. "Community Wildfire Protection Plans." https://nfs.unl.edu/publications/community-wildfire-protection-plans.

discuss county-specific historical wildfire occurrences and impacts, identify areas most at risk from wildfires, discuss protection capabilities, and identify wildfire mitigation strategies.

Fire Districts in the Planning Area



Created By: RT
Date: 10/24/2024
Software: ArcGIS Pro 3.3.2
File: Lower Platte North NRD HMP 2025

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.

Fire Districts

2025 LOWER PLATTE NORTH NRD HAZARD MITIGATION PLAN

N W E S

0 10 20 Miles

Firewise USA

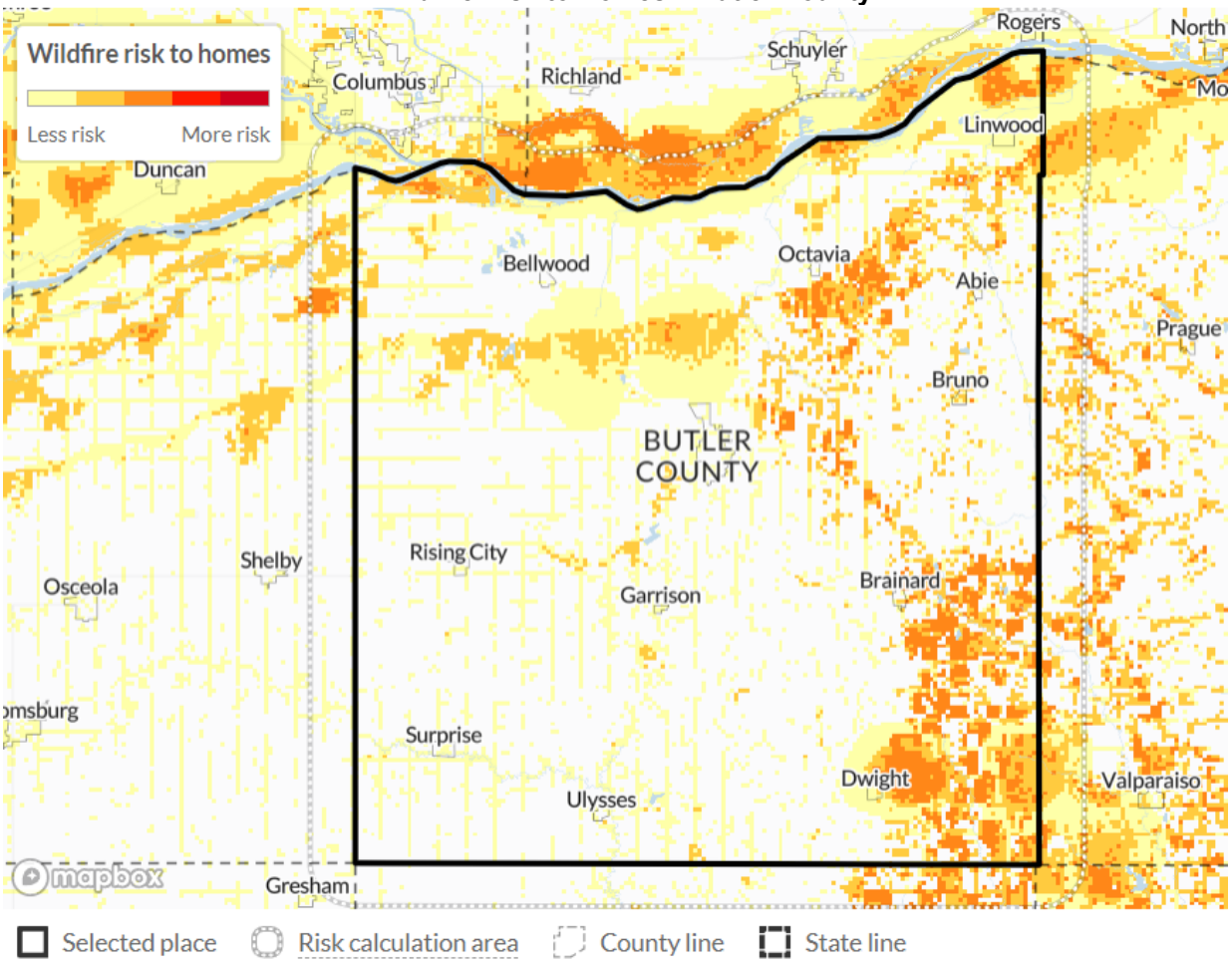
Firewise USA is a national recognition program that provides resources to inform communities how to adapt to living with wildfire and encourages neighbors to take action together to reduce their wildfire risk. There are no Firewise USA sites in the planning area.[88]

Location

Wildfires can occur throughout the planning area. The United States Department of Agriculture and United States Forest Service created the interactive web resource *Wildfire Risk to Communities* to help communities and jurisdictions understand, explore, and reduce wildfire risk. The following figures show wildfire risk to homes by county in the planning area.

The figure below shows the greatest wildfire risk to homes is located primarily along the Platte River and in densely vegetated areas in the southeast of Butler County. According to *Wildfire Risk to Communities*, Butler County has medium risk of wildfire – higher than 50% of counties in the United States.

Wildfire Risk to Homes – Butler County



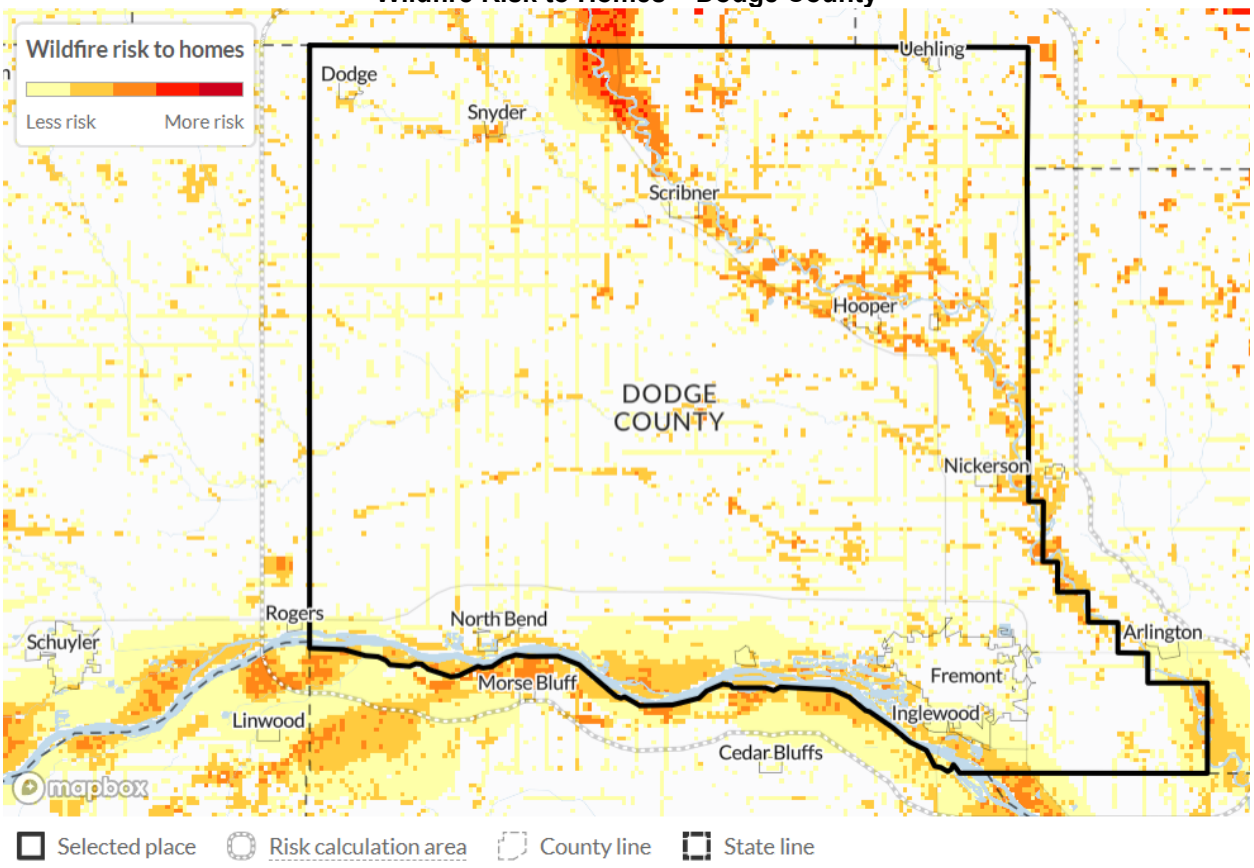
Source: Wildfire Risk to Communities[89]

[88] National Fire Protection Association. July 2024. "Firewise USA Sites". https://www.nfpa.org/education-and-research/wildfire/firewise-usa/firewise-usa-sites.

[89] USDA & US Forest Service. July 2024. "Wildfire Risk to Communities. https://wildfirerisk.org/.

The figure below shows the greatest wildfire risk to homes is located primarily from the north to southeast of Dodge County along the Elkhorn River and to the south along the Platte River. According to *Wildfire Risk to Communities*, Dodge County has a medium risk of wildfire – higher than 44% of counties in the United States.

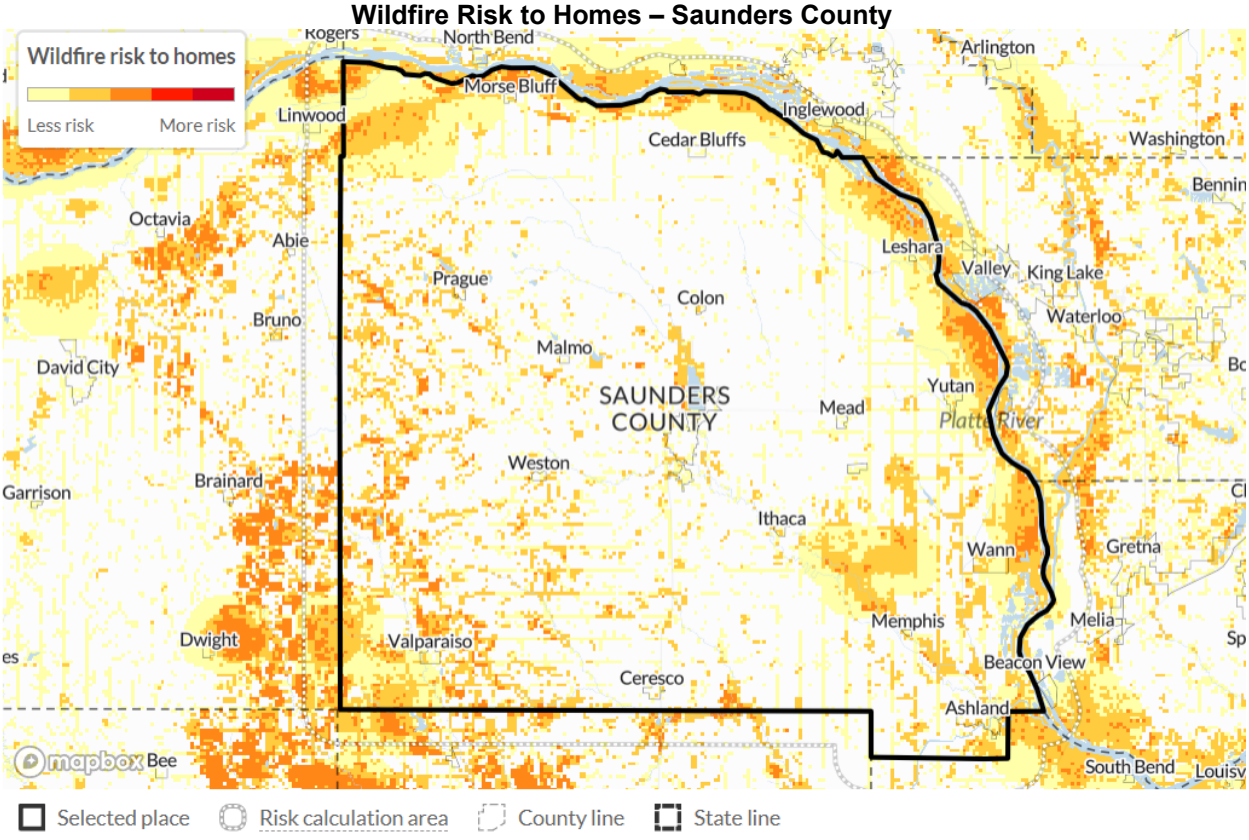
Wildfire Risk to Homes – Dodge County



Source: Wildfire Risk to Communities

The figure below shows the greatest wildfire risk to homes is primarily along the Platte River along the east of Saunders County and in the southwest. According to *Wildfire Risk to Communities*, Saunders County has medium risk of wildfire – higher than 48% of counties in the United States.

Wildfire Risk to Homes – Saunders County



Source: Wildfire Risk to Communities

Wildland-Urban Interface

In recent decades, as the population of the United States has become more decentralized and residents have moved farther away from the center of villages and cities, the areas known as the WUI has developed significantly. The WUI is defined as the zone of transition between developed areas and undeveloped land, where structures and other human development meet wildland. The expansion of the WUI increases the likelihood that wildfires will threaten people and homes, making it the focus of most wildfire mitigation efforts.

According to the 2022 Missouri River East CWPP and the 2020 Southeast Nebraska CWPP, the entire three-county planning area has been designated as WUI. This is because intense fire behavior can start in rural areas, move quickly over large areas, and threaten population centers.

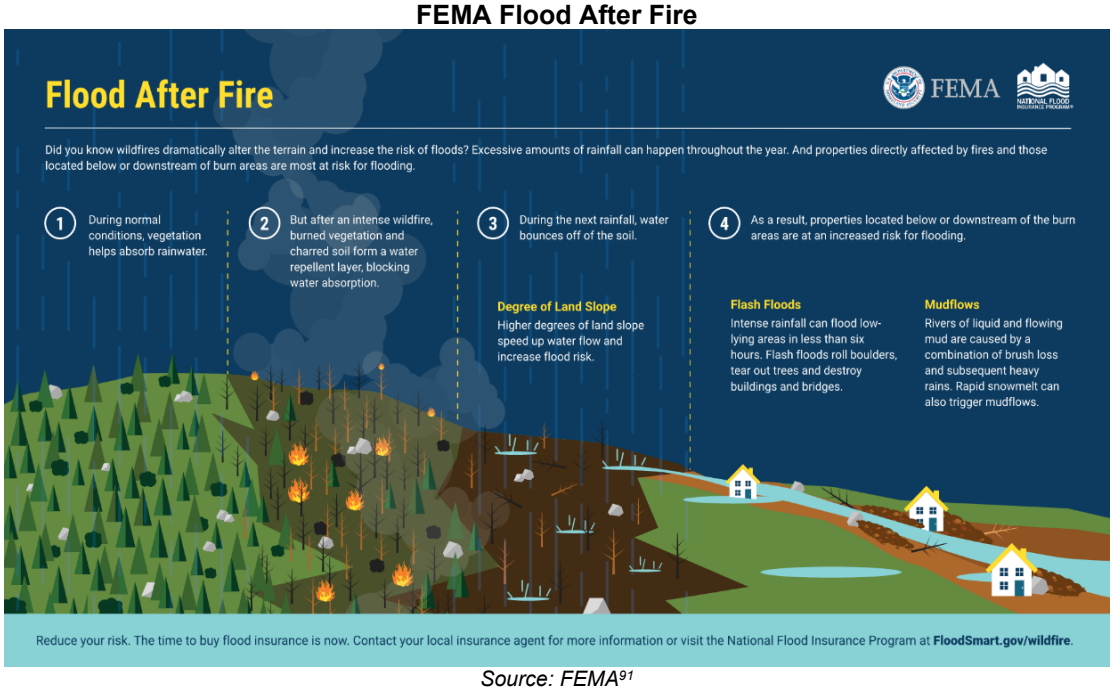
Extent

From 2000-2023, 1,086 wildfires were reported in the planning area and burned 6,366 acres in total.[90] Of these, nine fires burned 100 acres or more, with the largest wildfires burning 630 acres in Saunders County in March of 2021. The average area burned per wildfire was approximately six acres.

[90] Nebraska Forest Service. 2024. “Fire Incident Type Summary.” Data Files 2000-2023 provided by NFS.

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. 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.

FEMA Flood After Fire



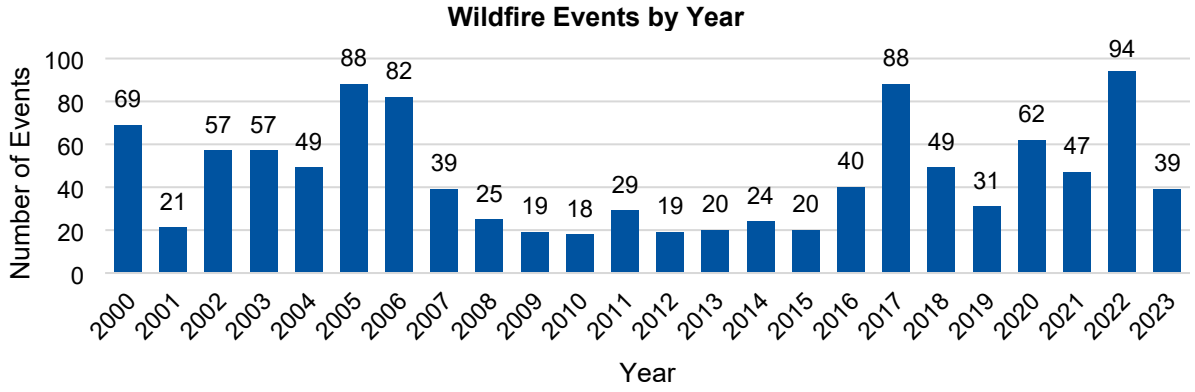
Source: FEMA[91]

Historical Occurrences

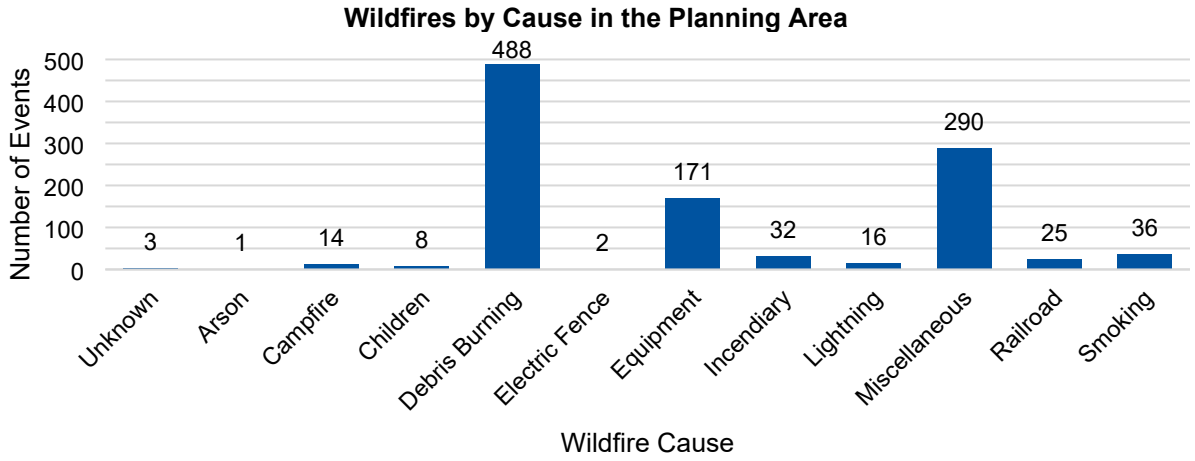
For the planning area, 24 different fire departments reported a total of 1,086 wildfires between 2000 and 2023, according to the Nebraska Forest Service. The reported events burned 6,366 acres in total. Two injuries and two fatalities were reported from these events. Most fires occurred in 2005, 2006, 2017, and 2022. Most reported wildfires were caused by debris burning or from miscellaneous causes. Wildfires have ranged from less than one acre to 630 acres, with an average burned area of three acres. 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 to the Nebraska Forest Service and local reporting standards can vary between departments. Actual fire events and their impacts are likely underreported in the available data.

The fire event that burned 630 acres was located south of Prague. Prague Fire and Rescue reported the fire on March 10, 2021. Cropland was the most affected area, with 530 acres burned, followed by 80 acres of grassland and 20 acres of forestland. There were no injuries, deaths, or destroyed structures reported from the incident. Another significant fire occurred in Butler County south of David City and east of Garrison in October 2024. Butler County Emergency Management issued a warning as the fire was traveling north. A portion of Highway 92 was closed and multiple fire departments were called to help fight the fire. The fire was eventually contained with no reported injuries or deaths.

[91] FEMA. 2023. “Flood After Fire”. https://agents.floodsmart.gov/marketing/participate-in-campaigns/flood-after-fire.



Source: NFS, 2000-2023



Source: NFS, 2000-2023

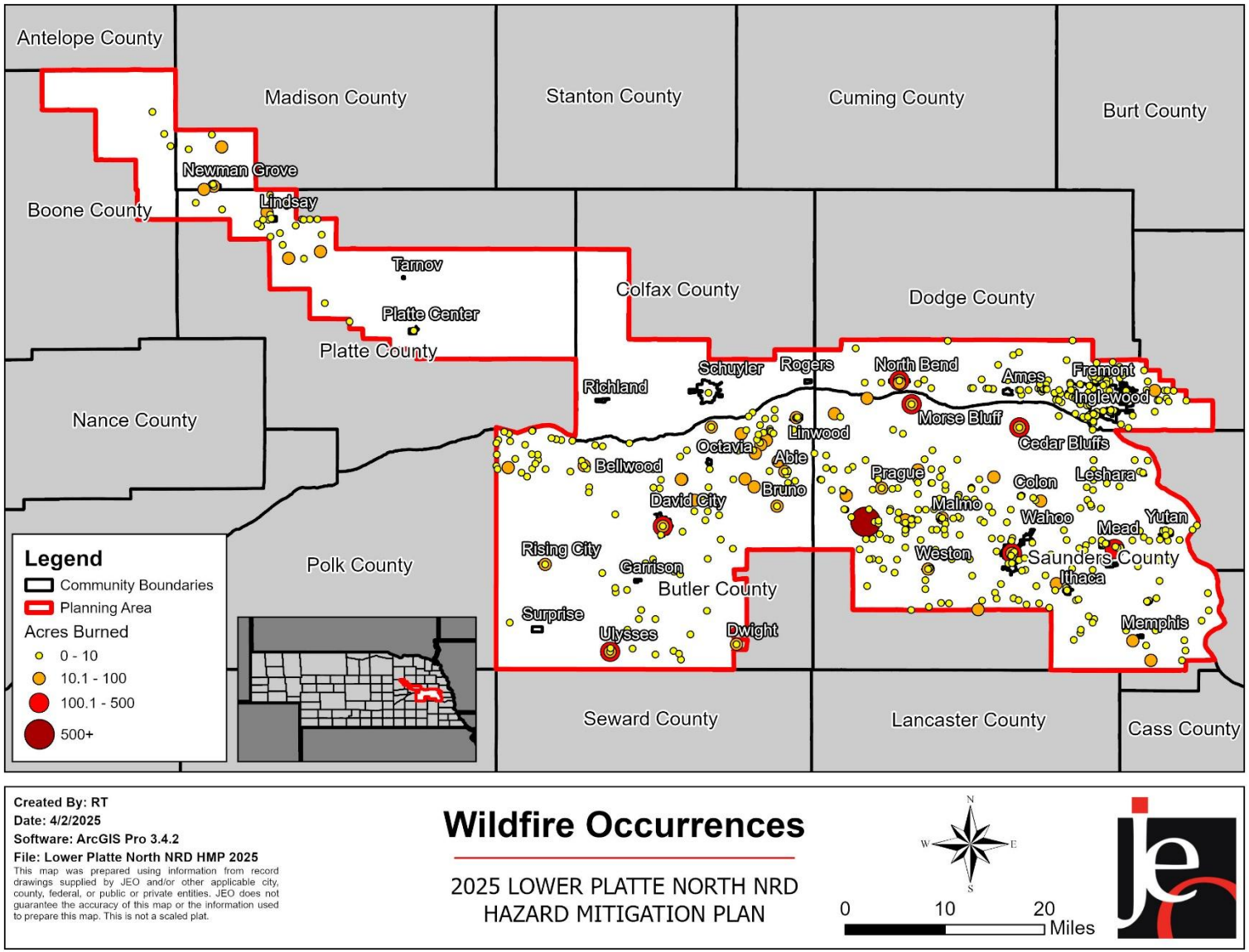
The map on the next page shows the location and general size of wildfires provided to the Nebraska Forest Service from 2000 to 2023. As the number of reported wildfires in the planning area indicates, wildfire events can occur in any county within the planning area. Saunders County has reported the greatest number of fires and largest number of acres burned.

Reported Wildfires by County

County	Reported Wildfires	Acres Burned	Other Impacts
Boone*	3	20	-
Butler	277	2,171	8 Homes Threatened, 13 Other Structures Threatened, 1 Home Destroyed, 4 Other Structures Destroyed, 1 Injury
Colfax*	2	<1	-
Dodge*	289	459	7 Homes Threatened, 10 Other Structures Threatened, 1 Other Structure Destroyed
Madison*	28	215	3 Homes Threatened
Platte*	55	130	-
Saunders	432	3,372	28 Homes Threatened, 33 Other Structures Threatened, 3 Homes Destroyed, 9 Other Structures Destroyed, 1 Injury, 2 Fatalities

*Source: NFS, 2000-2023. *Only includes incidents that occurred within the Lower Platte North NRD boundary.*

Historical Wildfire Occurrences



Average Annual Losses

The average damage per event estimate was not able to be determined as property and crop damage estimates are not tracked or accurately tracked by the Nebraska Forest Service, RMA, or NCEI. However, the number of homes and other structures destroyed is tracked from reports submitted to the Nebraska Forest Service. In the planning area, 1,086 reported wildfires destroyed four homes, destroyed 14 other structures, and burned a total of 6,366 acres from 2000 to 2023. Two injuries and two fatalities were reported from these events.

Damages caused by wildfires extend beyond the loss of building stock, recreation areas, timber, forage, wildlife habitat, and scenic views. Secondary effects of wildfires, including erosion, landslides, introduction of invasive species, and changes in water quality, all increase due to the exposure of bare ground and loss of vegetative cover following a wildfire, and can often be more disastrous than the fire itself in long-term recovery efforts.

Wildfire Loss Estimation

Hazard Type	Number of Events	Events Per Year	Number of Acres Burned	Average Acres Per Fire
Wildfire	1,086	45.3	6,366	5.9

Source: NFS, 2000-2023

Wildfire Event Impacts and Threats

Hazard Type	Injuries	Fatalities	Homes Destroyed	Homes Threatened	Other Structures Destroyed	Other Structures Threatened
Wildfire	2	2	4	46	14	56

Source: NFS, 2000-2023

Historical Probability & Future Likelihood

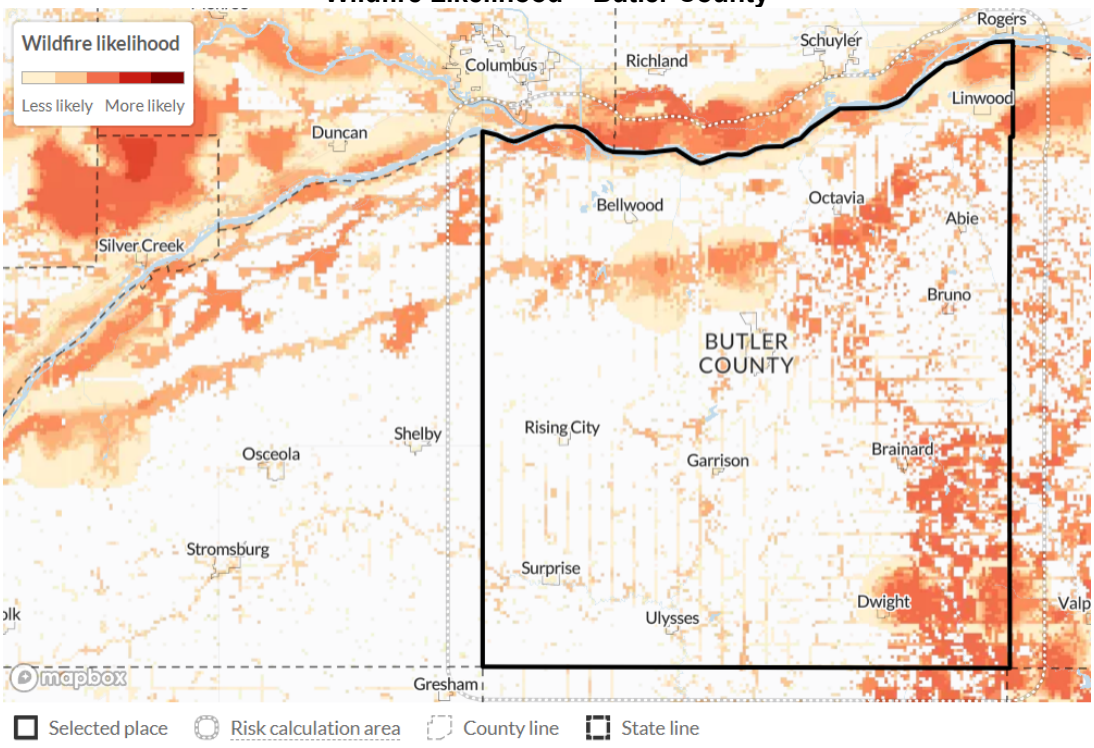
The historical probability of wildfire occurrence is based on the historic record provided by the Nebraska Forest Service and reported potential by participating jurisdictions. With a grass/wildfire occurring each reported year there is a 100 percent annual historical probability of wildfires occurring in the planning area each year. Due to the anticipated impacts from changes in extreme weather and future development, the future likelihood of grass/wildfire events is very likely.

Historical Probability & Future Likelihood – Grass/Wildfire

Historical Probability	Extreme Weather Changes Impact	Future Development Impact	Future Likelihood
100%	Increase in Frequency and Intensity	Neither Increase nor Decrease in Frequency. Increase Exposure	**Very Likely**

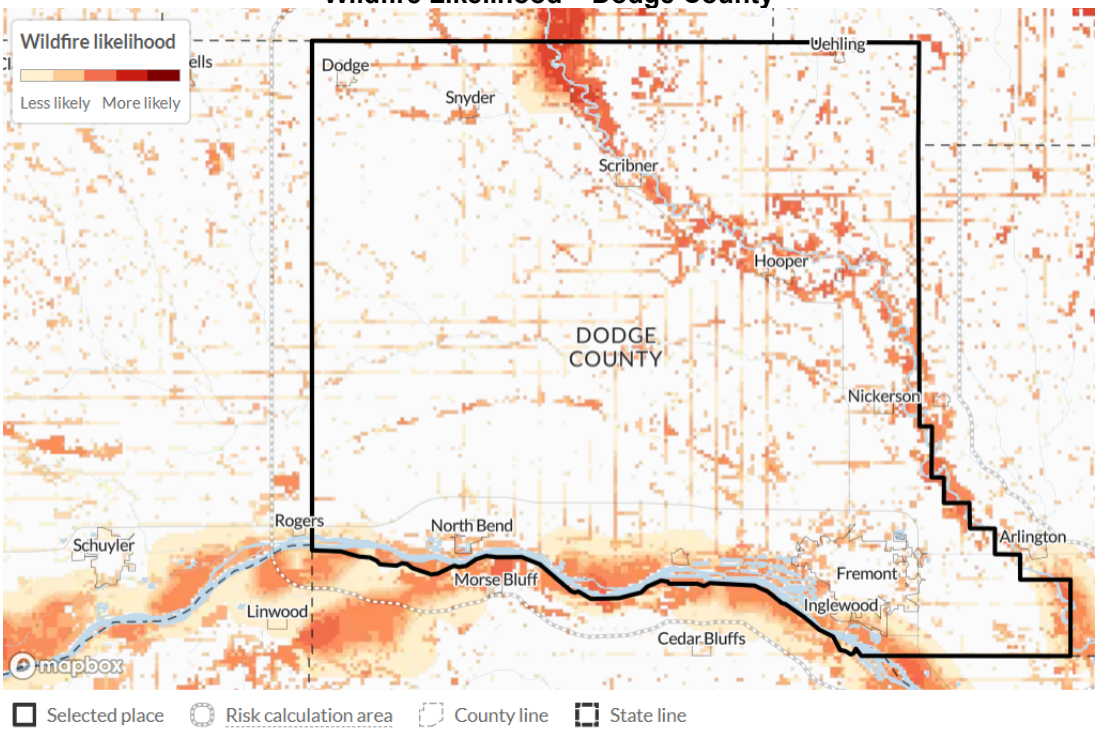
The USDA's and the U.S. Forest Service's *Wildfire Risk to Communities* also includes wildfire likelihood. The maps on the next couple of pages show the probability by location of wildfire burning in any given year for each of the three counties. Both Butler and Saunders counties were given medium wildfire likelihood and Dodge County was given low wildfire likelihood.

Wildfire Likelihood – Butler County



Source: Wildfire Risk to Communities[92]

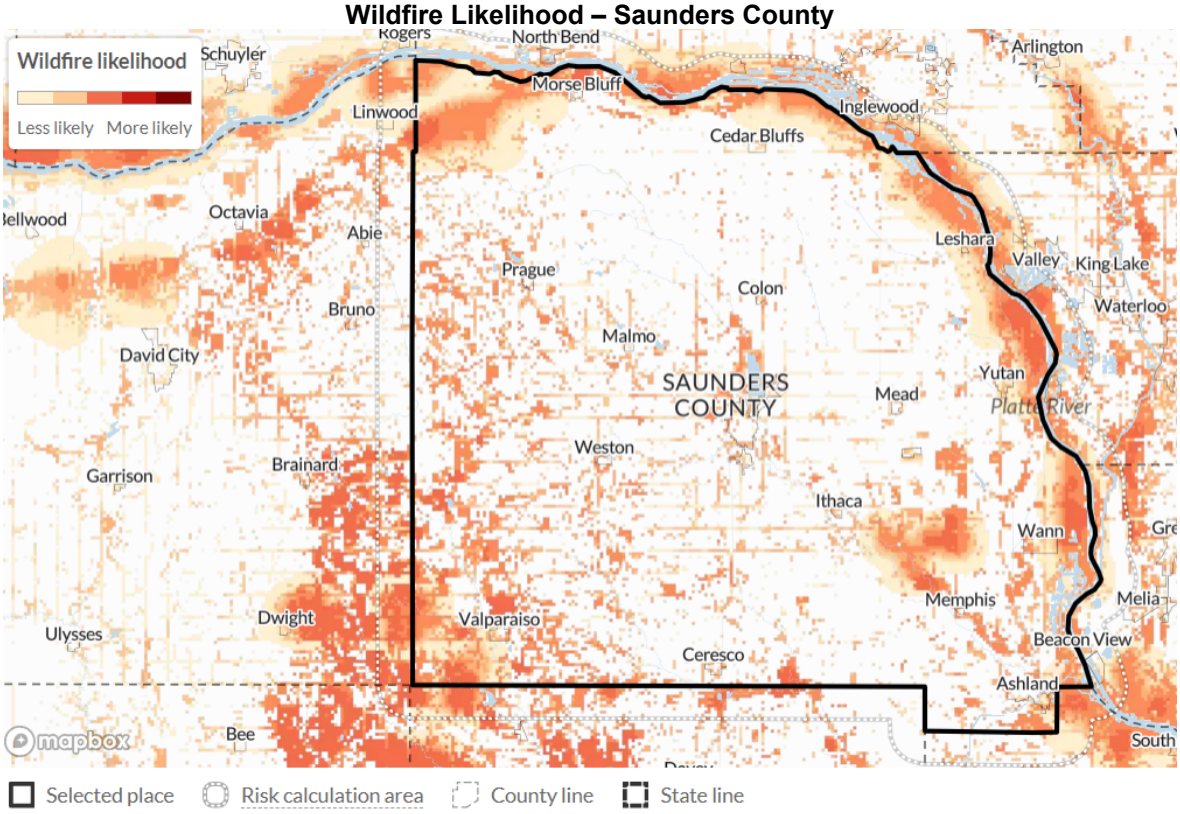
Wildfire Likelihood – Dodge County



Source: Wildfire Risk to Communities

[92] USDA & US Forest Service. July 2024. "Wildfire Risk to Communities. https://wildfirerisk.org/.

Wildfire Likelihood – Saunders County



Source: Wildfire Risk to Communities

Changing Extreme Weather

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.[93] As mentioned in the drought section, changes in extreme weather will likely contribute to the rise in the frequency and intensity of drought, especially during the summer months.[94] With increased drought conditions, grass/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. The table below shows the change in wildfire danger days in three-county region with different warming scenarios.

Change in Wildfire Danger Days

		Warming Scenarios			
	1° C	1.5° C	2° C	2.5° C	3° C
Change in Wildfire Danger Days	-6 to 6 Days per Year	-6 to 13 Days per Year	7 to 13 Days per Year	7 to 13 Days per Year	14 to 29 Days per Year

Source: Probable Futures[95]

[93] 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/.

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

[95] Probable Futures. "Maps of Temperature". Accessed January 2024. https://probablefutures.org/.

Future Development

Any new 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. These may include more stringent building code standards, setback requirements, or zoning regulations. Problems can arise if new development increases without coordinated fuels reduction and the creation of defensible space around homes.

In the event of a grass/wildfire, vegetation, structures, and other flammables can combine to create unwieldy and unpredictable events. Factors relevant to the fighting of such fires include access, firebreaks, proximity of water sources, distance from fire stations, and available firefighting personnel and equipment. The vulnerability of structures and homes is increased by combustible roofing and construction material; no/insufficient defensible space; poor access to structures; heavy natural fuel types; limited water supply; and winds over 30 miles per hour.

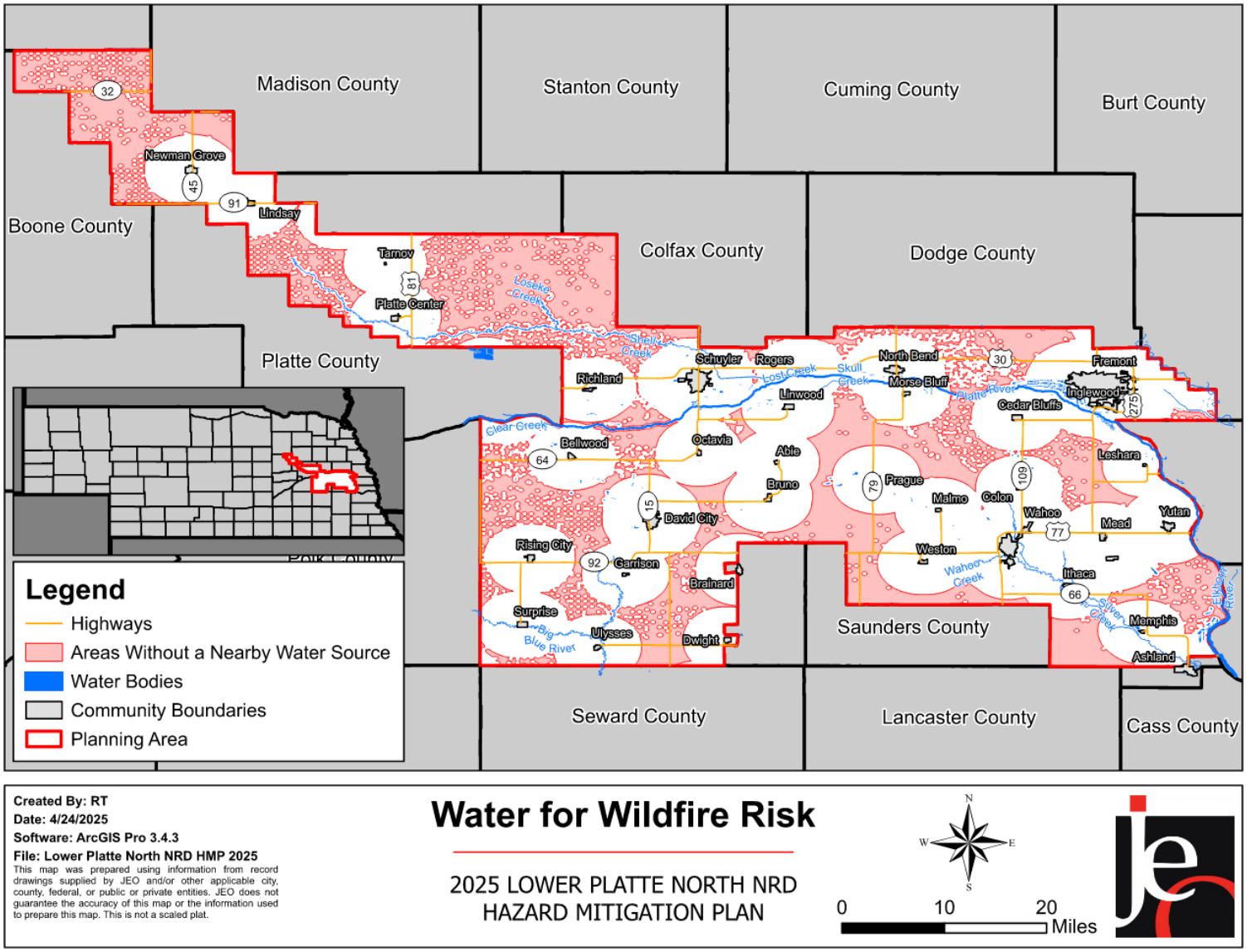
Regional Vulnerabilities

Grass/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 both urban and rural building stock and properties including community lifelines, as well as agricultural producers which support the local industry and economy. Damaged homes can reduce available housing stock for residents, causing residents to leave the area. Additionally, fire events threaten the health and safety of residents and emergency response personnel.

Other notable vulnerabilities exist for fire departments which service both urban and rural areas as many fire districts lack adequate resources and staff to respond to multi-fire complexes or events in separate areas. The utilization and development of mutual aid agreements or memorandum of understandings are an important tool for districts to share resources and coverage. Smoke and air pollution from wildfires can be a severe health hazard, especially for sensitive populations, including children, the elderly, and those with respiratory and cardiovascular diseases. Smoke generated by wildfire consists of visible and invisible emissions that contain particulate matter, gases, and toxics. Public health impacts associated with wildfire include difficulty in breathing, odor, and reduction in visibility.

One of the wildfire concerns for the LPNNRD is the availability of water in rural areas. Areas without a nearby water source have a higher risk of a grass/wildfire event spreading quickly and not being able to contain it. The map below shows locations in the planning area where there may not be a nearby water source. Potential sources of water include hydrants, wells, ponds, streams, lakes, and rivers. When creating the map areas, anywhere within three miles of a community was deemed near a water source, as fire districts could quickly drive to the community to fill tankers. Areas within 1,000 feet of a well that pumped more than 200gpm, a pond or lake, or a stream or river with an average flow of 200gpm were deemed near a water source as hoses and pumps could be used to fill portable tanks or fight the fire directly. These distances and flow requirements were determined based on research into rural wildfire response. While reviewing the map, it should be noted that all wells that pumped more than 200gpm were used in the analysis; however, only wells with electrical center pivots can be used. Electrical versus gas powered well data was not available, so the area without a nearby water source will likely be larger than shown. Local fire districts should work with farmers in their districts to identify specific wells that can be utilized in the event of a wildfire.

Water for Wildfire Risk

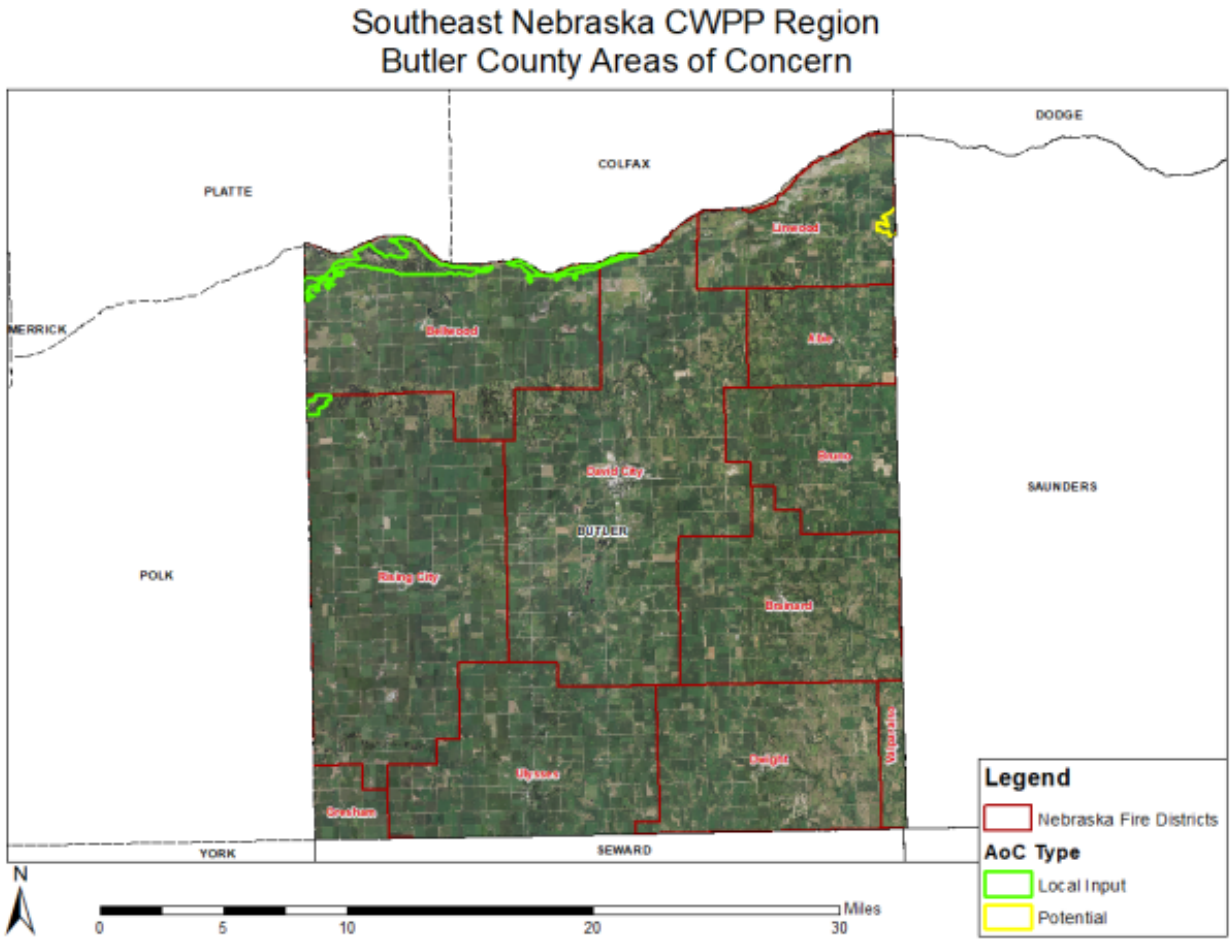


Identified in the local CWPPs are locations of concern as identified by local fire districts. These locations of concern are listed below by county along with maps of their location.

Butler County

According to the 2020 Southeast Nebraska CWPP, locations of special concern include “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.”[96]

Butler County Areas of Concern



Source: Nebraska Forest Service

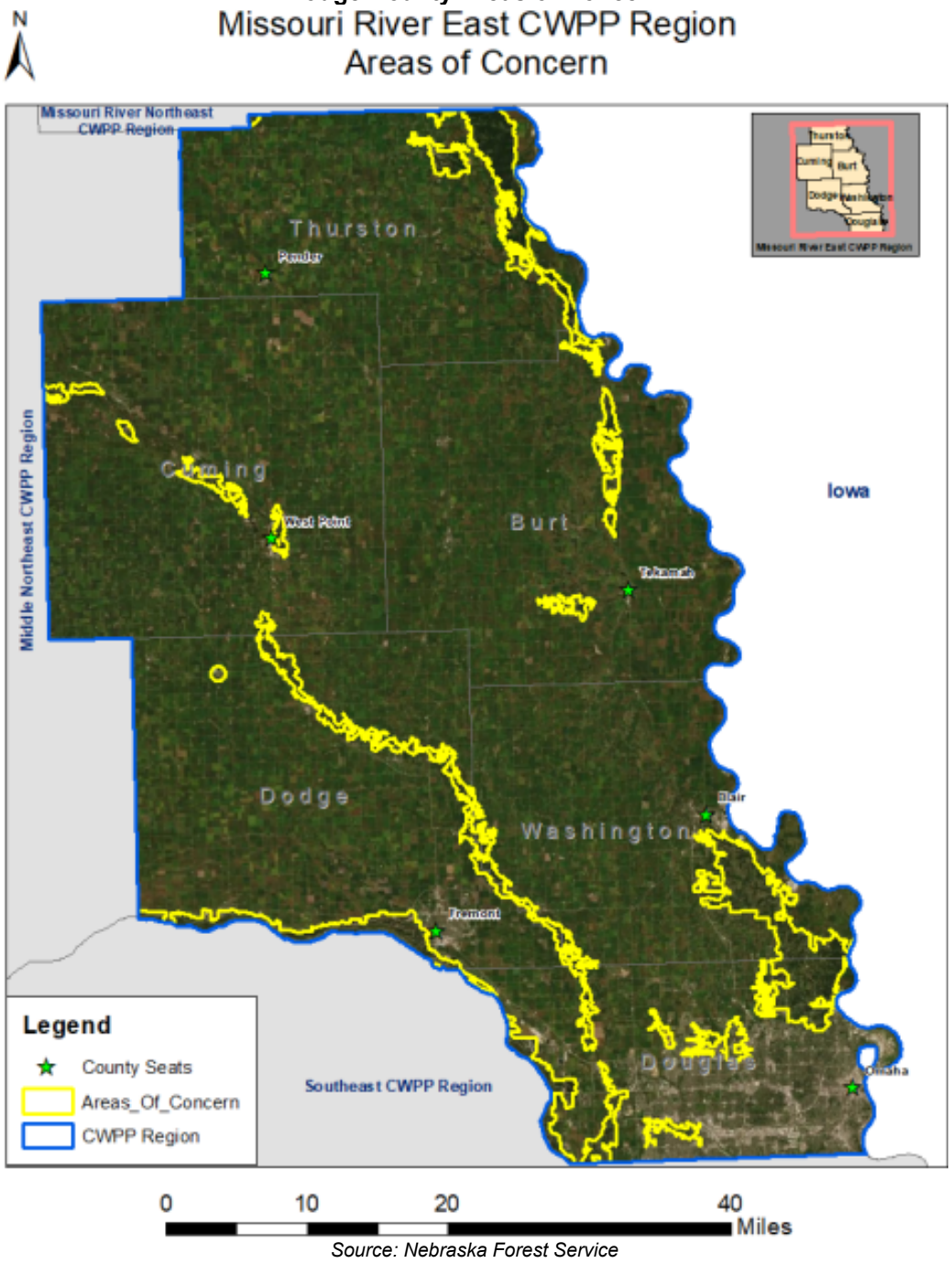
Dodge County

According to the 2022 Missouri River East CWPP, locations of special concern include “population centers adjacent to wildlands where topography is rough and woody fuels are dense.” Areas most at-risk from wildfire are along rivers and major creeks. The Fremont Rural Fire Department listed sites in Platte Township as of concern due to multiple structures, difficulty to access, rough terrain, one way in and out, heavy fuels, and lack of water within effective distances. The Meadowbrook

[96] Nebraska Forest Service. 2024. “Community Wildfire Protection Plans.” https://nfs.unl.edu/publications/community-wildfire-protection-plans.

Mobile Home Park on West Highway 30 is near three railroad lines and two chemical and fuel distribution centers. The North Bend fire chief mentioned areas along the Platte River as a concern due to difficulty to access, rough terrain, one way in and out, heavy fuels, and lack of water within effective distances."[97]

Dodge County Areas of Concern



Source: Nebraska Forest Service

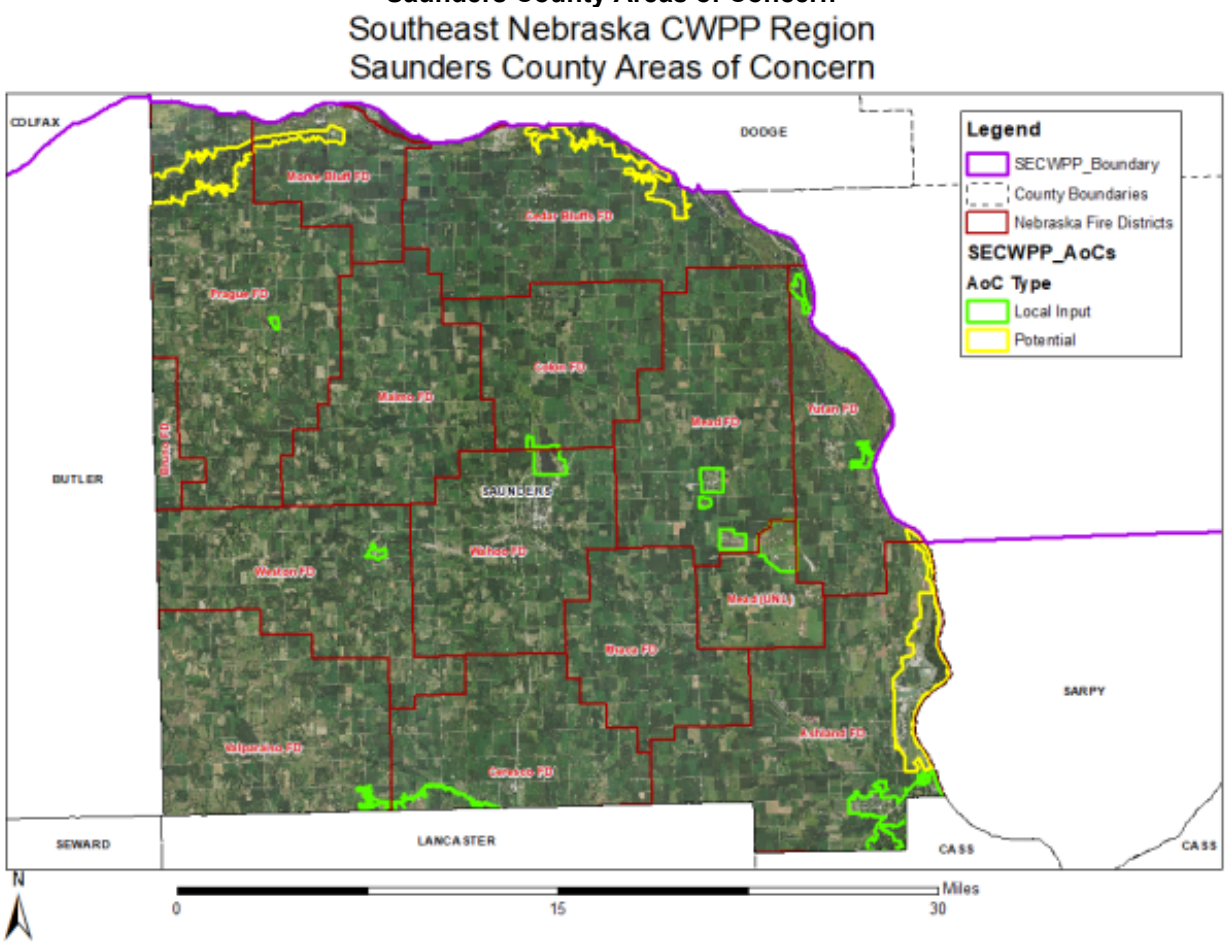
[97] Nebraska Forest Service. 2024. "Community Wildfire Protection Plans." https://nfs.unl.edu/publications/community-wildfire-protection-plans.

Saunders County

According to the 2020 Southeast Nebraska CWPP, locations of concern "include population centers adjacent to wildlands, croplands, and wooded areas along the rivers and streams." The Lower Platte North NRD has concerns about the Czechland Lake and Wanahoo Lake campgrounds, along with 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, many residents, and being difficult to access. The Weston fire chief identified the Village of Weston as at-risk due to multiple structures, high home density, and infrastructure. Yutan Volunteer Fire Department listed several developments in their district that have multiple structures, rough terrain, heavy fuels, are difficult to access and/or lack of water within an effective distance. The Ashland VFD included area lake communities with high home density, infrastructure or other resources are at high risk, some with one way in and out as locations of special concern.[98]

Saunders County Areas of Concern



Source: Nebraska Forest Service

The following table provides information related to regional vulnerabilities; for jurisdictional-specific vulnerabilities, refer to *Section Eight.*

[98] Nebraska Forest Service. 2024. "Community Wildfire Protection Plans." https://nfs.unl.edu/publications/community-wildfire-protection-plans.

Regional Grass/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
COMMUNITY LIFELINES	-Damage to power lines and utility structures -Potential loss of firefighting equipment and resources -Risk of damages to buildings
OTHER	-May lead to poor water quality -Post fire, flash flooding events may be exacerbated

Jurisdictions Ranking Grass/Wildfire as a Prioritized Hazard of Concern

The following lists jurisdictions and stakeholders which identified grass/wildfire as a prioritized hazard of concern.

- City of Yutan
- North Bend Volunteer Fire Department
- Rising City Rural Fire Department
- Schuyler Volunteer Fire Department
- Village of Linwood
- Weston Volunteer Fire & Rescue

Hazardous Materials Release

The following description for hazardous materials is provided by the Federal Emergency Management Agency (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.[99]

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 in 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 materials 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.[100]

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. 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

[99] Federal Emergency Management Agency. 2017. "Technological Hazards". https://www.fema.gov/pdf/areyouready/technohazards.pdf.

[100] Emergency Planning and Community Right-to-Know Act of 1986, Pub. L. No. 116 § 10904. (1986).

understanding the dynamics of a spill during a transportation incident, it is important for response personnel to understand the hazard classes and their divisions.

The table below shows the nine classes of hazardous material according to the 2024 Emergency Response Guidebook.

Hazardous Materials Classes

Class	Type of Material	Divisions
1	Explosives	1.1 Explosives which have a mass explosion hazard 1.2 Explosives which have a projection hazard but not a mass explosion hazard 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 1.4 Explosives which present no significant hazard 1.5 Very insensitive explosives with a mass explosion hazard 1.6 Extremely insensitive articles which do not have a mass explosion hazard
2	Gases	2.1 Flammable gases 2.2 Non-flammable, non-toxic gases 2.3 Toxic gases
3	Flammable liquids (and Combustible liquids)	-
4	Flammable solids; Substances liable to spontaneous combustion; Substances which, on contact with water, emit flammable gases	4.1 Flammable solids, self-reactive substances and solid desensitized explosives 4.2 Substances liable to spontaneous combustion 4.3 Substances which in contact with water emit flammable gases
5	Oxidizing substances and Organic peroxides	5.1 Oxidizing substances 5.2 Organic peroxides
6	Toxic Substances and infectious substances	6.1 Toxic substances 6.2 Infectious substances
7	Radioactive materials	-
8	Corrosive substances	-
9	Miscellaneous hazardous materials/dangerous goods and articles	-

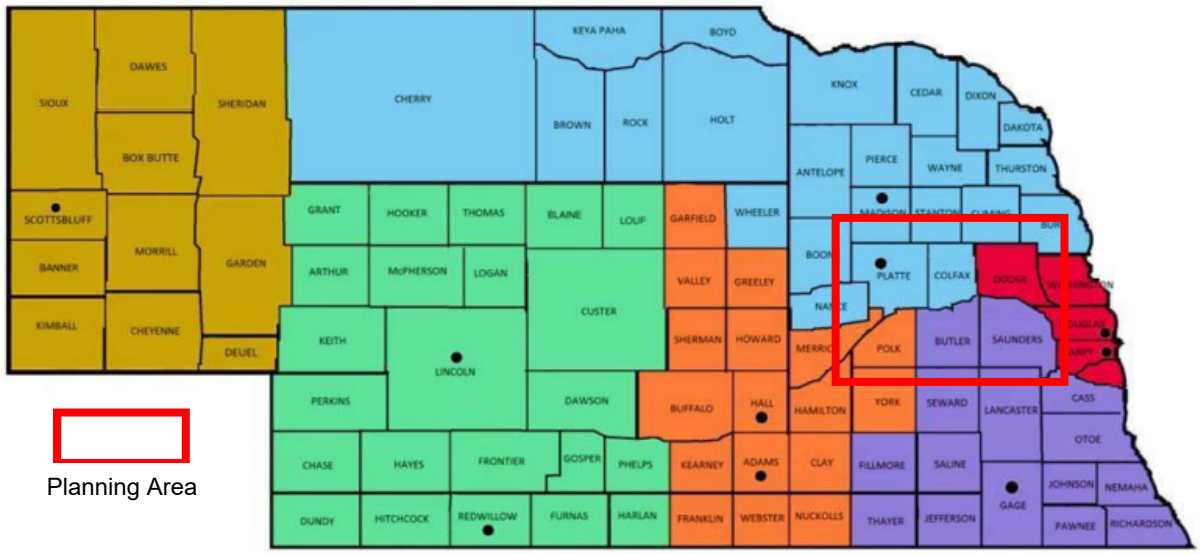
Source: Emergency Response Guidebook, 2024[101]

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.

[101] U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration. 2024. "2024 Emergency Response Guidebook". https://www.phmsa.dot.gov/hazmat/erg/emergency-response-guidebook-erg.

There are three SERT districts which cover the planning area. There is a team located in Platte County.

Nebraska SERTs Map



Source: NEMA[102]

Location

Fixed Site

There are 129 facility locations across the planning area that submitted Tier II reports to the Nebraska Department of Environment and Energy (NDEE) in 2022 and 2023.[103] These locations are shown in the figure on the next page. The locations include a half mile buffer to show the potential evacuation area during a hazardous materials release. A half mile was chosen because, in the 2024 Emergency Response Guidebook, the initial evacuation area for a "Mixed Load/Unidentified Cargo" involved in a fire is a half mile in all directions.[104]

Transportation

A large number of spills typically occur during the loading and unloading of chemicals for highway and pipeline chemical transport. Hazardous materials releases during transportation primarily occur on major transportation routes as identified in the figure Major Transportation Routes.

Pipelines

According to the National Pipeline Mapping System, there are multiple gas transmission and hazardous liquid pipelines located in the NRD.[105] Maps of the pipelines can be seen over the next several pages.

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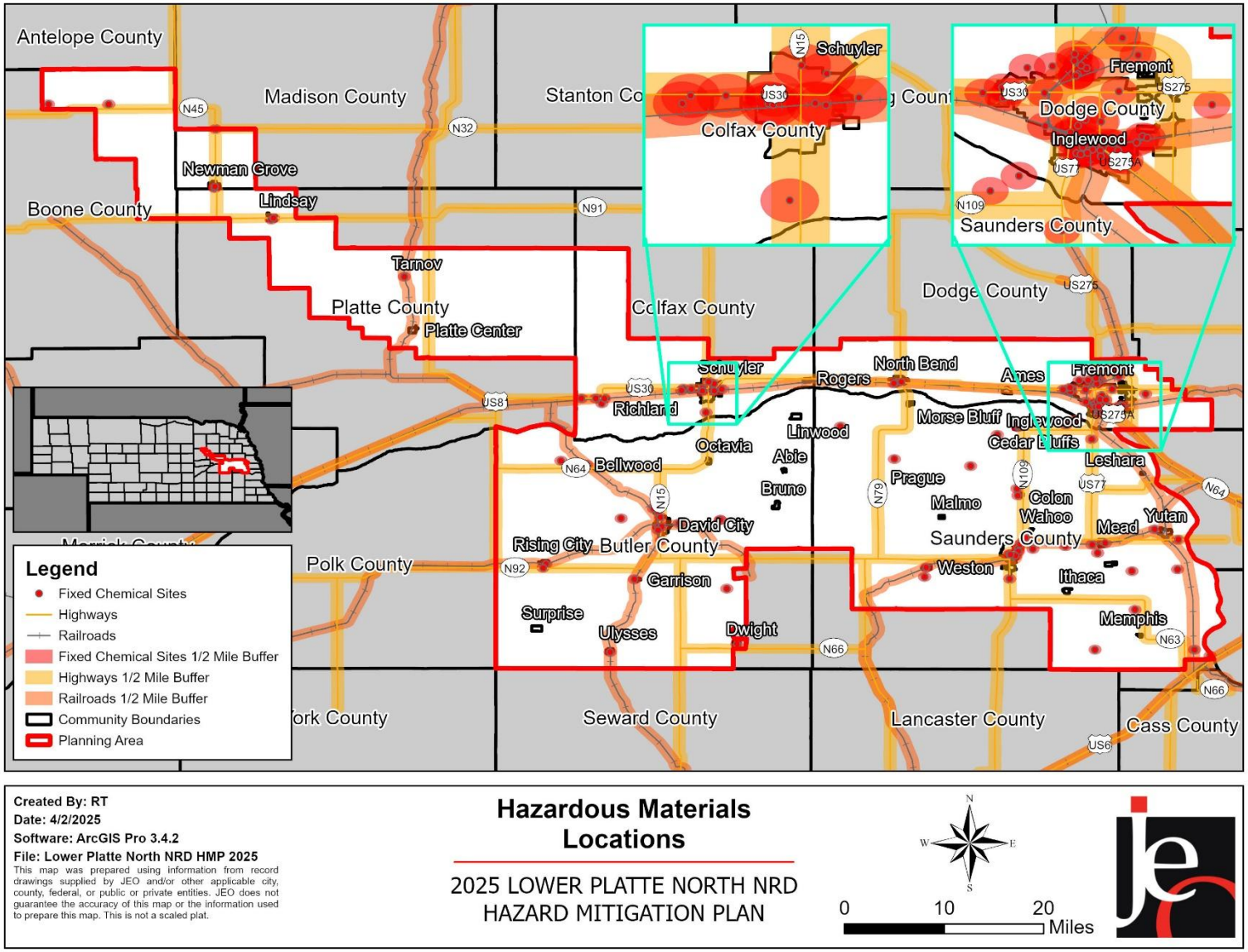
[102] Nebraska Emergency Management Agency. June 2020. "Emergency Assistance to a Hazardous Materials Incident". https://nema.nebraska.gov/assets/files/publications/hazmat-blue-book.pdf.

[103] Nebraska Department of Environment and Energy. 2024. "Nebraska DEE Tier 2 Data Download". https://deq-iis.ne.gov/tier2/tier2Download.html.

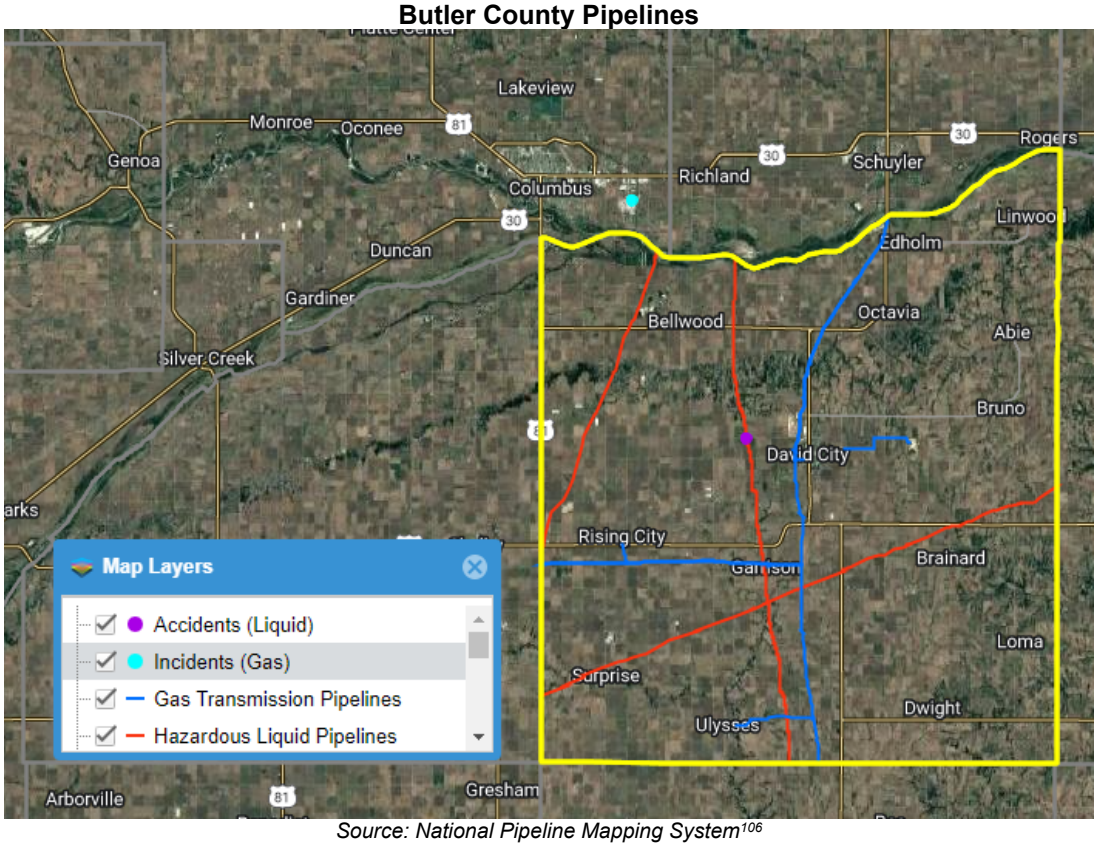
[104] U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration. 2024. "2024 Emergency Response Guidebook". https://www.phmsa.dot.gov/hazmat/erg/emergency-response-guidebook-erg.

[105] National Pipeline Mapping System. October 2024. "National Pipeline Mapping System Public Viewer". https://pvnpms.phmsa.dot.gov/PublicViewer/.

Hazardous Material Locations

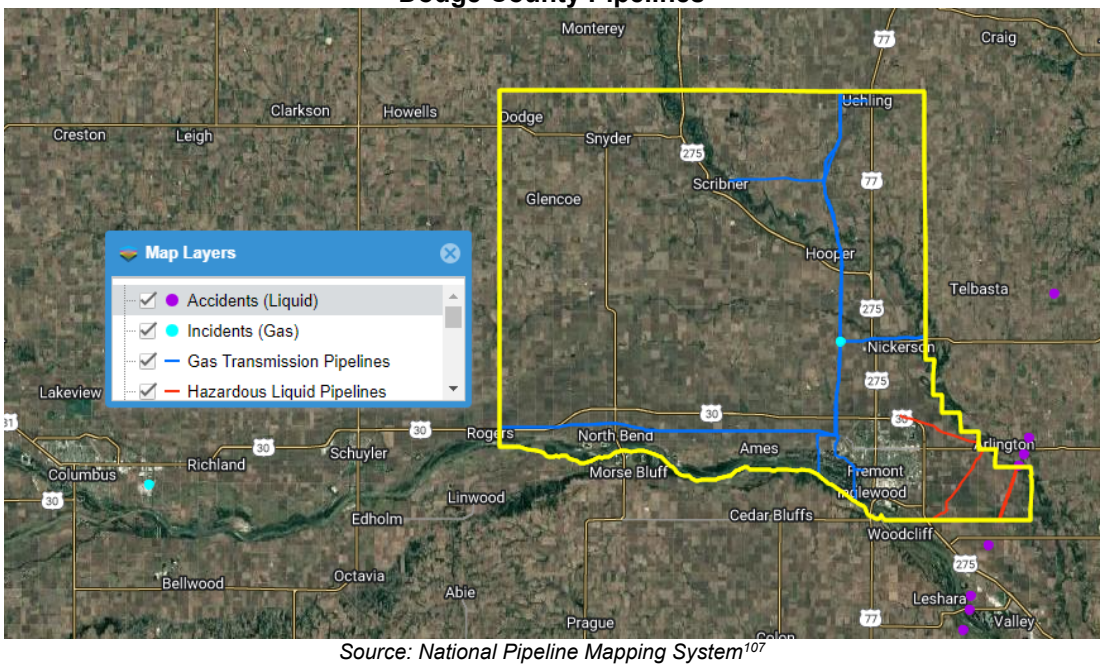


Butler County Pipelines



Source: National Pipeline Mapping System[106]

Dodge County Pipelines

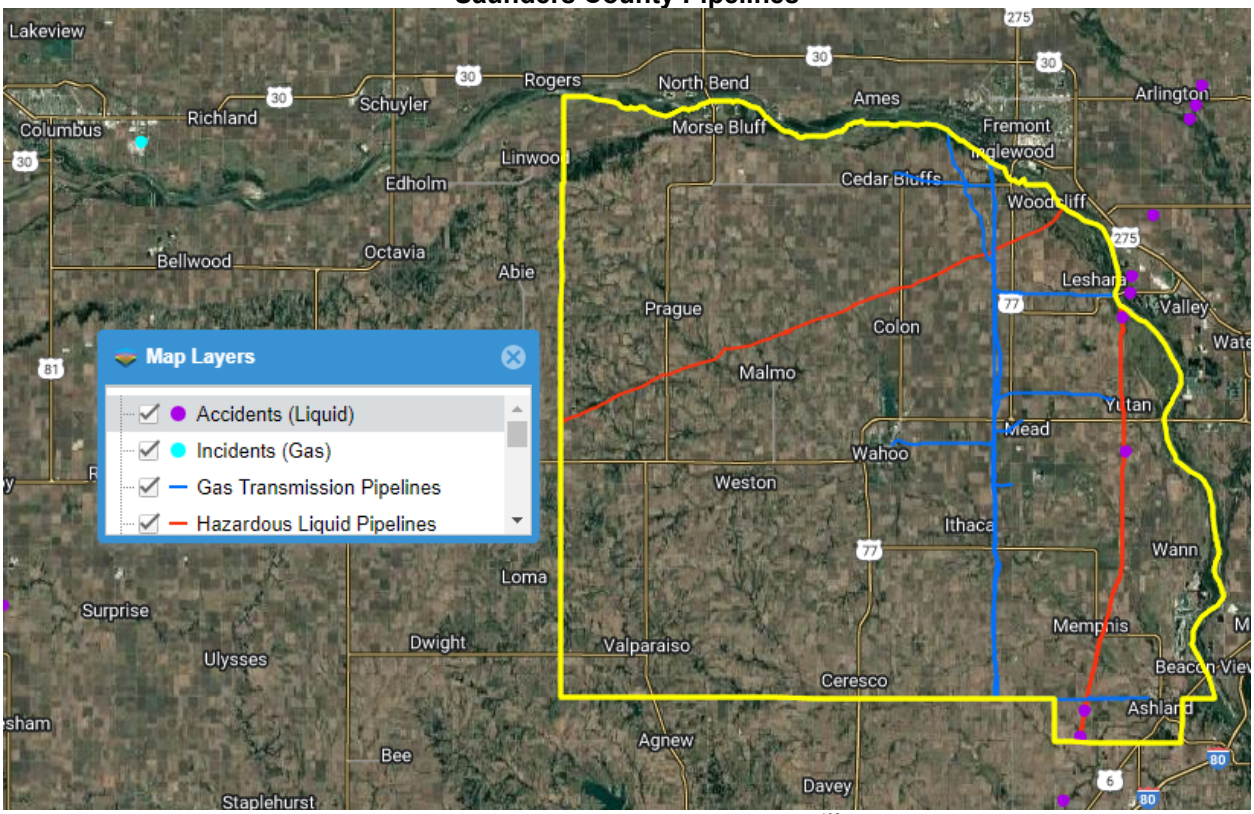


Source: National Pipeline Mapping System[107]

[106] National Pipeline Mapping System. October 2024. "National Pipeline Mapping System Public Viewer". https://pvnpms.phmsa.dot.gov/PublicViewer/.

[107] National Pipeline Mapping System. October 2024. "National Pipeline Mapping System Public Viewer". https://pvnpms.phmsa.dot.gov/PublicViewer/.

Saunders County Pipelines



Source: National Pipeline Mapping System[108]

Extent

The extent of hazardous materials releases varies and depends on the type of chemical that is released with most events localized to the facility or container. In total 119 fixed site and transportation releases have occurred in the planning area, and the total amount spilled ranged from less than one gallon to 2,000 gallons, and less than an ounce to 20,000 pounds. Of the 119 chemical spills, three spills resulted in evacuations, four spills reported injuries, and one fatality was reported from an incident.

Historical Occurrences

Fixed Site

According to the U.S. Coast Guard's National Response Center database (NRC), there have been 84 hazardous materials releases at fixed sites from 1990 to December 2023 in the planning area. There was no property damage but one fatality, six reported injuries, and 93 people evacuated. The incident that led to one fatality was due to a train striking a passenger truck at a crossing.[109] The following table displays the more serious spills that have occurred throughout the planning area (>500 gallons/pounds, or if an injury, fatality, or evacuation occurred).

[108] National Pipeline Mapping System. October 2024. "National Pipeline Mapping System Public Viewer". https://pvnpms.phmsa.dot.gov/PublicViewer/.

[109] U.S. Coast Guard National Response Center. December 2023. "Chemical Pollution and Railroad Incidents, 2000-2023." [datafile]. https://nrc.uscg.mil/.

Fixed Site Hazardous Material Releases

Year of Event	Location of Release	Quantity Spilled	Material Involved	Injury	Fatality	Evacuations
1991	Schuyler	Unknown	Chlorine	1	0	0
1992	Fremont	2,000 gallons	Diesel Oil	0	0	0
1997	Fremont	650 gallons	Fuel Oil	0	0	0
1999	David City	20,000 pounds	Anhydrous Ammonia	0	0	0
2009	Fremont	100 pounds	Anhydrous Ammonia	0	0	30
2012	Fremont	Unknown	Sewage	2	0	0
2022	Fremont	Unknown	Anhydrous Ammonia	3	0	50
2023	North Bend	Unknown	Unknown	0	1	0
2023	Schuyler	Unknown	Anhydrous Ammonia	0	0	13

Source: National Response Center, 1990-December 2023

Transportation

According to the Pipeline and Hazardous Materials Safety Administration (PHMSA), 35 hazardous materials releases occurred during transportation in the planning area between 1971 and June 2024. During these events, there was one reported injury, no fatalities, no evacuations, and $100,104 in damages. The incident with the reported injury was due to a leak from a tank car carrying anhydrous ammonia.[110] The following table provides information about the more serious spills that have occurred throughout the planning area (>500 gallons spilled, or if an injury or evacuation occurred).

Transportation Hazardous Materials Release

Year of Event	Location of Release	Material Involved	Method of Transportation	Amount	Total Damage	Injury	Evacuation
1978	Weston	Fuel Oil	Highway	800 pounds	$0	No	No
1978	Schuyler	Ammonium Nitrate	Rail	500 pounds	$0	No	No
1992	North Bend	Fuel Oil	Highway	1,000 gallons	$5,000	No	No
1995	Fremont	Anhydrous Ammonia	Rail	0	$0	Yes	No

Source: PHMSA, 1971–June 2024[111]

Average Annual Damages

Using data from the tables above, average annual damage from hazardous materials releases can be estimated. There have been 84 fixed site spills in the planning area reported from the NRC

[110] U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration. June 2024. "Incident Statistics: Nebraska". https://www.phmsa.dot.gov/hazmat-program-management-data-and-statistics/data-operations/incident-statistics.

[111] U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration. June 2024. "Incident Statistics: Nebraska". https://www.phmsa.dot.gov/hazmat-program-management-data-and-statistics/data-operations/incident-statistics.

and 35 transportation spills as reported by PHMSA. Neither the NRC nor PHMSA track crop losses from chemical spills. These events reported $100,104 in property damage. This does not include losses from displacement, functional downtime, economic loss, injury, or loss of life.

Hazardous Materials Release Loss Estimate

Hazard Type	Number of Events	Events Per Year	Injuries	Fatalities	Total Damages	Average Annual Chemical Spill Loss
Hazardous Materials Release (Fixed Site)	84	2.5	6	1	$0	$0
Hazardous Materials Release (Transportation)	35	0.6	1	0	$100,104	$1,854

Source: National Response Center, 1990-Dec 2023[112]; PHMSA, 1971-June 2024

Historical Probability & Future Likelihood

Given the historic record of occurrence 30 years with a fixed chemical spill out of 34 years (many years had several chemical spills occur), the annual historical probability of occurrence for hazardous materials releases at fixed sites is 88 percent. Due to the anticipated impacts from future development, the future likelihood of fixed site chemical spills is very likely.

Given the historic record of occurrence 20 years with a transportation chemical spill out of 54 years (many years had several chemical spills occur), the annual historical probability of occurrence for hazardous materials releases during transportation is 37 percent. Due to changes in future development, the future likelihood of a transportation release event is likely.

Historical Probability & Future Likelihood – Hazardous Materials Release

Hazard	Historical Probability	Extreme Weather Changes Impact	Future Development Impact	Future Likelihood
Fixed Site	88%	Neither Increase nor Decrease in Frequency	Increase in Frequency and Exposure	**Very Likely**
Transportation	37%	Neither Increase nor Decrease in Frequency	Increase in Frequency and Exposure	**Likely**

Changing Extreme Weather

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,[113] which could damage roadways and pipelines causing more spills to occur.

Future Development

Future development is likely to increase the frequency of hazardous materials release because there will be more traffic and likely more chemical storage sites. 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 hospitals, schools, daycares, nursing

[112] U.S. Coast Guard National Response Center. December 2023. "Chemical Pollution and Railroad Incidents, 2000-2023." [datafile]. https://nrc.uscg.mil/.

[113] NOAA. January 2024. “Climate Mapping for Resilience and Adaptation”. https://livingatlas.arcgis.com/assessment-tool/explore/details.

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.

Regional Vulnerabilities

Using the half mile buffers for both the major transportation routes and fixed chemical sites, an analysis was performed to identify community lifelines that are located within those buffer areas. The half mile buffer was chosen because, in the 2024 Emergency Response Guidebook, the initial evacuation area for a "Mixed Load/Unidentified Cargo" involved in a fire is a half mile in all directions.[114] While some of the fixed chemical sites may not house chemical types or quantities that would require a half mile evacuation area, this does give an idea of what may need to be evacuated until the impacted or spilled material is identified. This does not mean that all of the identified community lifelines will be impacted by every hazardous materials release, it merely shows the lifelines that are more vulnerable to hazardous materials release due to their proximity to these locations. In total, 333 out of 452 community lifelines are located within a half mile of a major transportation route and 207 out 452 community lifelines are located within a half mile of a fixed chemical site.

The following table provides information related to regional vulnerabilities; for jurisdictional-specific vulnerabilities, refer to *Section Eight*.

Regional Hazardous Materials Release Vulnerabilities

Sector	Vulnerability
People	-Those in proximity to chemical fixed sites or transportation corridors could have minor to moderate health impacts -Possible evacuation -Hospitals, nursing homes, and the elderly at greater risk due to low mobility
Economic	-A chemical plant shutdown in smaller communities would have significant impacts to the local economy -Evacuations and closed transportation routes could impact businesses near spill
Built Environment	-Risk of fire or explosion
Community Lifelines	-Transportation routes can be closed during evacuations -Community lifelines are at risk of evacuation

Jurisdictions Ranking Hazardous Materials Release as a Prioritized Hazard of Concern

The following lists jurisdictions and stakeholders which identified hazardous materials release as a prioritized hazard of concern.

- Butler County
- City of Fremont
- Colon Volunteer Fire District
- Dodge County
- Mead Public Schools

[114] U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration. 2024. "2024 Emergency Response Guidebook". https://www.phmsa.dot.gov/hazmat/erg/emergency-response-guidebook-erg.

- Methodist Health System – Fremont
- North Bend Volunteer Fire Department
- Rising City Volunteer Fire Department
- Schuyler Volunteer Fire Department
- Three Rivers Public Health Department
- Union Township
- Village of Abie
- Village of Prague
- Village of Richland
- Village of Rogers
- Village of Rogers
- Weston Volunteer Fire and Rescue
- Woodcliff Lakes SID #8

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 in a breach and thus a levee failure.

Location

There are 15 non-federally accredited levees and three federally accredited levees located in the planning area. The three accredited levees include Clear Creek – Platte River RB in southeast Saunders County; Schuyler – Lost Creek & Platte River LB in Colfax County; and Schuyler – Shell Creek Levee in Schuyler. In total, these levee segments are 15.8 miles long and protect 3,251 people; 2,176 buildings; and approximately $703 million in property value according to the 2023 USACE National Inventory. The following two tables provide a list of the accredited and non-accredited levees in the planning area.

Accredited Levee Systems in Planning Area

Name	Sponsor	Location	River	Length (Miles)
Clear Creek - Platte River RB	Lower Platte North NRD	Wann, Saunders County	Platte River	11.76
Schuyler – Shell Creek RB	Schuyler	Schuyler, Colfax County	Shell Creek	2.16
Schuyler – Lost Creek & Platte River LB	Platte Valley Drainage District	Schuyler, Colfax County	Platte River	1.88

Source: USACE Levee Database[115]

Non-Accredited Levee Systems in Planning Area

Name	Sponsor	Location	River	Length (Miles)
AMES (Ames/Lake Timberwood Levee)	N/A	Dodge County	Platte River	1.03
Ames Diking - Platte River LB (Ames Drainage and Diking District)	Ames Diking District	Dodge County	Platte River	2.29
Clear Creek	N/A	Venice, Saunders County	Platte River	0.36
Fremont, Farmland, and Railroad Levee*	N/A	Fremont, Dodge County	Platte River	2.9
Leshara Drainage District	N/A	Leshara	Platte River	4.09
Morse Bluff Drainage District	N/A	Morse Bluff	Platte River	2.03
Platte River Levee 1 (Cotterell Diking and Drainage District Levee)	N/A	North Bend, Dodge County	Platte River	3.14
Platte River Levee 3 (North Bend Levee)	N/A	Dodge County	Platte River	4.75
Platte Valley Drainage District	N/A	Valley	Platte River	6.36
Platte Valley Drainage District 2	N/A	Leshara	Platte River	0.75
Skull Creek Levee 1	N/A	Buter County, Saunders County	Skull Creek	1.79
Skull Creek Levee 2	N/A	Buter County, Saunders County	Skull Creek	2.04
Upper Clear Creek	N/A	Yutan	Clear Creek	0.06
Valley - Union Dike - Platte River LB (NF) (Union Levee)	Papio-Missouri River NRD	Dodge County	Platte River	11.8
Woodcliff	N/A	Fremont	Platte River	1.87

Source: USACE Levee Database
**Levee is not in the National Levee Database; location is from the Fremont local planning team.*

[115] U.S. Army Corps of Engineers. January 2024. "Levees of Nebraska". https://levees.sec.usace.army.mil/#/.

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 currently to document the location of all levees, the areas they provide for flood risk reduction, nor the potential impact of these levees. The map below shows all the known levee systems in the planning area.

Extent

USACE, who is responsible for federal accredited levee oversite and inspection of levees, has three safety 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. Non-accredited levees are not inspected and thus do not have ratings.

USACE Levee Safety 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[116]

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. In 1972, the Ames Diking – Platte River LB levee was breached due to an ice jam. Then in 1978, it overtopped again because of an ice jam. 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. For a complete event narrative, refer to the Flooding hazard profile. As reported by USACE and the Planning Team, several levees in Dodge County and Saunders County were breached due to ice jams. The breaches are listed below:[117]

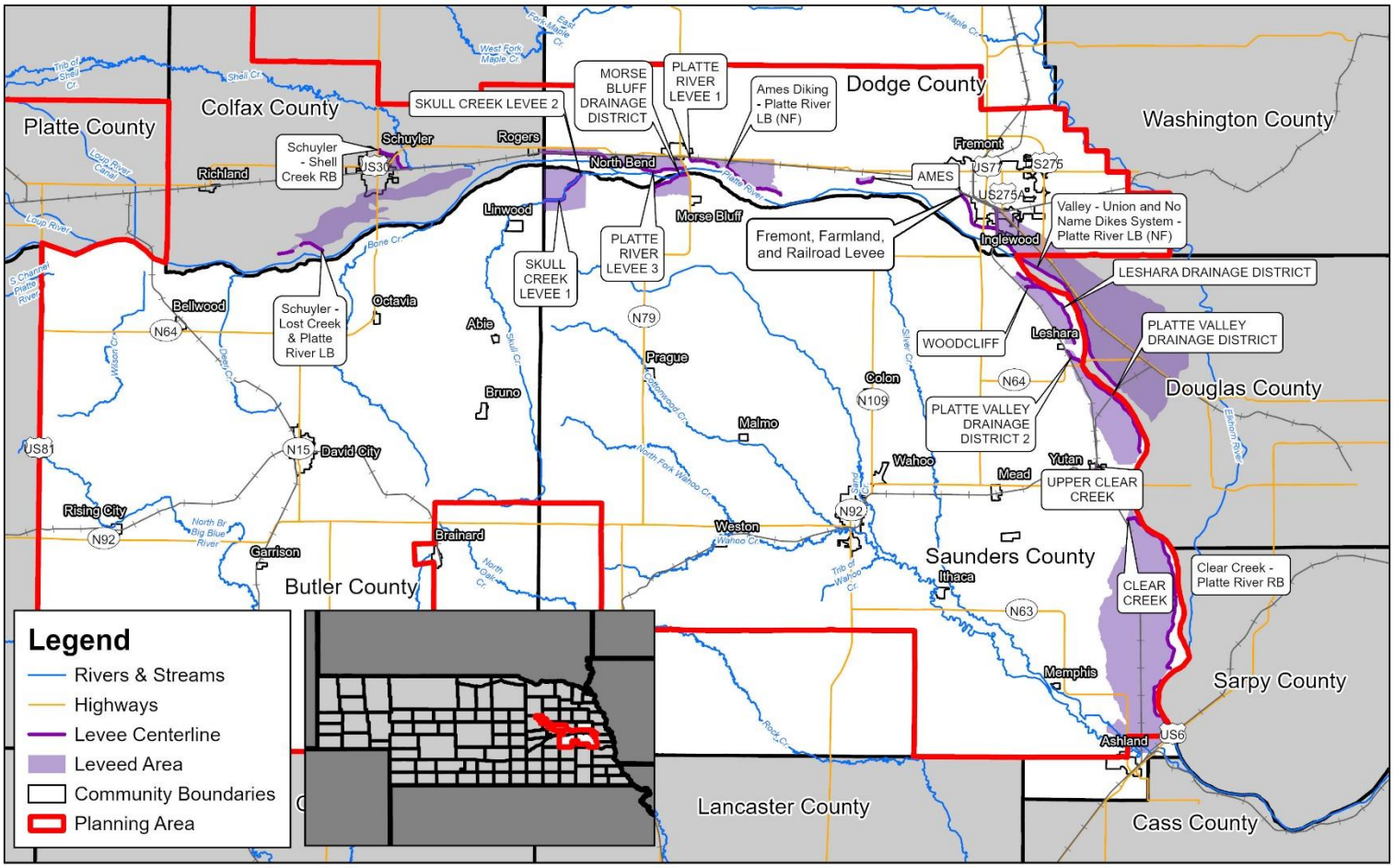
- In Dodge County, Morse Bluff's Ames Diking – Platte River LB (NF): The Ames Diking – Platte River Left Bank Levee System was damaged during the 2019 Flood Event, leading to the Levee Sponsor submitting a Public Law (PL) 84-99 Rehabilitation Assistance request to the US Army Corps of Engineers – Omaha District. The levee repair project was completed on August 14, 2020, with a final contract amount of $1.26 million.[118]

[116] U.S. Army Corps of Engineers. Accessed June 2024. "Levee Safety Program". https://www.mvd.usace.army.mil/Portals/52/docs/Levee%20Safety%20Program.pdf.

[117] 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/.

[118] U.S. Army Corps of Engineers. 2021. "Ames Diking Levee Restoration Information." https://www.nwo.usace.army.mil/Omaha-District-System-Restoration-Team/Ames-Diking/.

Planning Area Levees



Created By: RT
Date: 12/31/2024
Software: ArcGIS Pro 3.4.0
File: Lower Platte North NRD HMP 2025

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.

Levee Locations

2025 LOWER PLATTE NORTH NRD HAZARD MITIGATION PLAN

N W E S

0 5 10 Miles

- In Dodge County, Leshara's Valley - Union and No Name Dike System – Platte River LB (NF) experienced significant damage during the 2019 flood event. This led to one breach and substantial other damage occurring throughout the Levee System. A priority breach impacting the property and infrastructure behind the Union and No Name Levee System was identified for initial repairs. Construction on initial repairs was completed on March 28, 2019, and was 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. Final repairs to further repair the levee system and provide additional flood risk management were completed on September 13, 2020, with the final contract amount of $1.67 million.[119]

- In Saunders County, Wann's Clear Creek Platte River RB breached four times during the major flooding of 2019. Initial breach repairs began in March 2019 and were completed in April 2019, totaling $1.37 million. The final levee repair project was completed on October 17, 2020, with the full repair contract totaling $9.2 million.[120]

Average Annual Losses

Total contract amounts for repairing the historical levee failures was $12,130,000. NCEI and RMA data do not delineate damages from flood with flood damages from levee failure. Average annual loss information from flooding due to levee failure is included in the Flooding hazard section. It is possible to determine potential losses from a levee failure event. The USACE Levee Database was used to determine the number of buildings, property value, and population located in the leveed area. The table below shows potential loss information for the planning area.

Potential Losses in Levee Breach Area

Levee	Number of Buildings in Leveed Area	Property Value in Leveed Area	Population in Leveed Area
Ames	25	$9,758,106	44
Ames Diking - Platte River LB	54	$16,544,560	92
Clear Creek	6	$17,157,848	2
Clear Creek - Platte River RB	1,801	$638,089,966	2,496
Fremont, Farmland, and Railroad Levee	-	-	-
Leshara Drainage District	32	$18,206,666	33
Morse Bluff Drainage District	29	$14,788,918	21
Platte River Levee 1	0	$0	0
Platte River Levee 3	131	$79,878,188	46

[119] U.S. Army Corps of Engineers. 2021. "Union Dike and No Name Levee Restoration Information." https://www.nwo.usace.army.mil/Omaha-District-System-Restoration-Team/Union-Dike/.

[120] U.S. Army Corps of Engineers. 2020. "Clear Creek Levee Restoration Information." https://www.nwo.usace.army.mil/Omaha-District-System-Restoration-Team/Clear-Creek/.

Levee	Number of Buildings in Leveed Area	Property Value in Leveed Area	Population in Leveed Area
Platte Valley Drainage District	36	$29,546,407	34
Platte Valley Drainage District 2	1	$469,683	4
Schuyler - Lost Creek & Platte River LB	118	$12,694,259	135
Schuyler - Shell Creek RB	257	$52,081,043	620
Skull Creek Levee 1	8	$4,313,910	10
Skull Creek Levee 2	14	$5,477,782	15
Upper Clear Creek	1	$496,895	7
Valley - Union and No Name Dikes System - Platte River LB	1,747	$581,259,037	3,040
Woodcliff	1	$387,363	2
Total	**5,086**	**$1,654,611,791**	**7,942**

Source: USACE Levee Database[121]

Historical Probability & Future Likelihood

With three historical levee failures over the past 53 years, there is a six percent historical probability that a levee failure will occur annually in the planning area. Due to the potential impacts from changes in extreme weather and future development, the future likelihood of future levee failure events is unlikely.

Historical Probability & Future Likelihood – Levee Failure

Hazard	Historical Probability	Extreme Weather Changes Impact	Future Development Impact	Future Likelihood
Levee Failure	6%	Increase in Frequency	Neither Increase nor Decrease in Frequency. Increase in Exposure	**Unlikely**

Changing Extreme Weather

While the changes in extreme weather do not directly affect levee failure events, changes in precipitation and temperature swings can affect them. Projected increased rainfall events, either in frequency or in magnitude[122], will lead to exacerbated stress on infrastructure systems including levees. Additionally, historical streamflow records are typically used to design or determine levee construction requirements and maintenance requirements. Changes in extreme weather may impact these systems in the following ways.

[121] U.S. Army Corps of Engineers. October 2024. "Levees of Nebraska". https://levees.sec.usace.army.mil/#/.

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

- Drought: land subsidence, erosion, embankment settling, or foundation cracking.

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

Future Development
Any future growth in levee-protected areas increases the impacts of these events. Communities could implement requirements for any new development or substantial improvements in levee-protected areas like floodplain ordinances to minimize the number of people and property impacted during a failure event.

Regional Vulnerabilities

Regional vulnerabilities to levee failure vary based on surrounding development and other flood control measures. The following table provides information related to regional vulnerabilities; for jurisdictional-specific vulnerabilities, refer to *Section Eight*.

Levee Failure Vulnerabilities

SECTOR	VULNERABILITY
PEOPLE	-Those living in levee protected areas -Those at recreational sites situated near levees -Evacuation needs likely with failure events -Hospitals, nursing homes, and the elderly are at greater risk due to low mobility -Those without adequate notification may be at greater risk
ECONOMIC	-Loss of levee protected agricultural land -Businesses or recreation sites located in levee protected areas would be impacted and closed for an extended period -Employees of closed businesses may be out of work for an extended period of time
BUILT ENVIRONMENT	-Damage to buildings, recreation areas, and roads
COMMUNITY LIFELINES	-Transportation routes could be closed for extended period -Any community lifelines in levee protected areas are vulnerable to damages

Jurisdictions Ranking Levee Failure as a Prioritized Hazard of Concern

The following lists jurisdictions which identified levee failure as a prioritized hazard of concern.

- Ames Diking and Drainage District
- City of Fremont
- City of North Bend
- City of Schuyler
- Cotterell Diking and Drainage District
- Dodge County
- Lower Platte North NRD
- North Bend Drainage District

- Platte Valley Drainage District
- Saunders County
- Three Rivers Public Health Department
- Village of Inglewood
- Village of Leshara

Severe Thunderstorms

Severe thunderstorms are common and unpredictable seasonal events throughout Nebraska. The NWS defines a severe thunderstorm as a storm that produces one inch hail or larger in diameter and/or winds equal or exceeding 58 mph.[123]

Thunderstorms can develop in fewer than 30 minutes and can grow to an elevation of eight miles into the atmosphere. Lightning can be present in 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 contacts the ground. Lightning generally occurs when warm air mixes with colder air masses resulting in atmospheric disturbances necessary for polarizing the atmosphere. Additionally, hail is a common component of thunderstorms and often occurs in series, with one area having the potential to be hit multiple times in one day. Hail can destroy property and crops with sheer force, as some hail stones can fall at speeds up to 100 mph.

Damage from severe thunderstorms can include crop losses from wind and hail; property losses due to building and automobile damages from hail; high wind; flash flooding; death or injury to humans and animals from lightning or getting struck by falling or flying debris; and personal injury from people without shelter during these events or standing near windows. The potential for damage increases as the size of the hail increases. The figure on the next page displays the average number of days with thunderstorms across the country each year. The planning area experiences an average of 36 to 54 thunderstorms over the course of one year.

Location

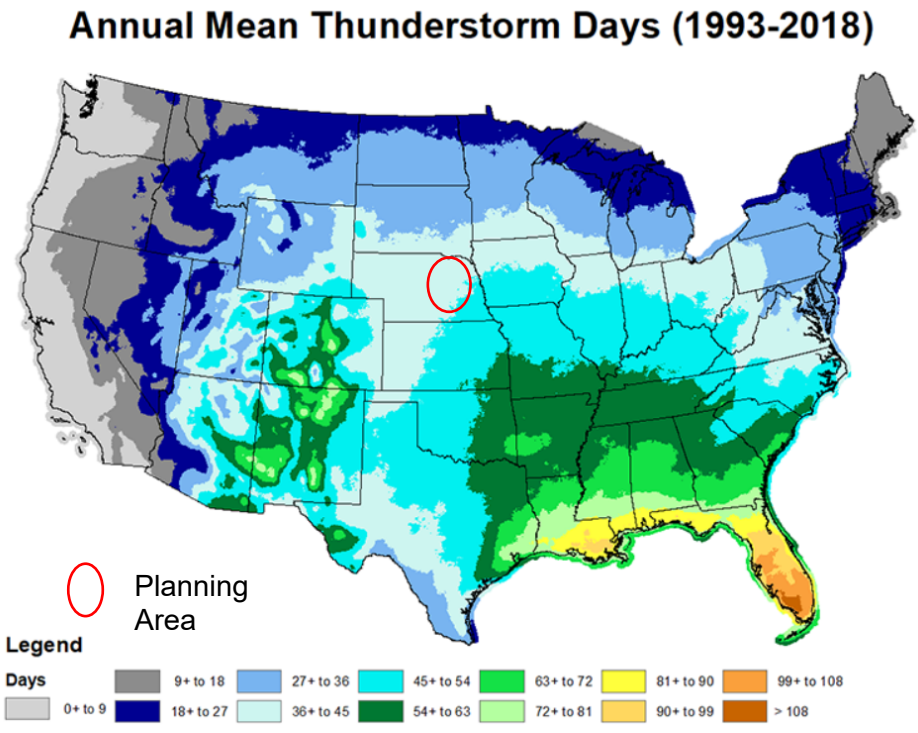
The entire planning area is at risk to thunderstorms due to the regional nature of this type of event.

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. The table on the next page outlines the TORRO Hail Storm Intensity Scale.

[123] National Weather Service. 2024. “Severe Weather Definitions”. https://www.weather.gov/bgm/severedefinitions#:~:text=Severe%20Thunderstorm%20Watch-,This%20is%20issued%20by%20the%20National%20Weather%20Service%20when%20conditions,exceed%2058%20miles%20an%20hour.

Average Number of Thunderstorms



Source: NWS[124]

TORRO Hail Scale

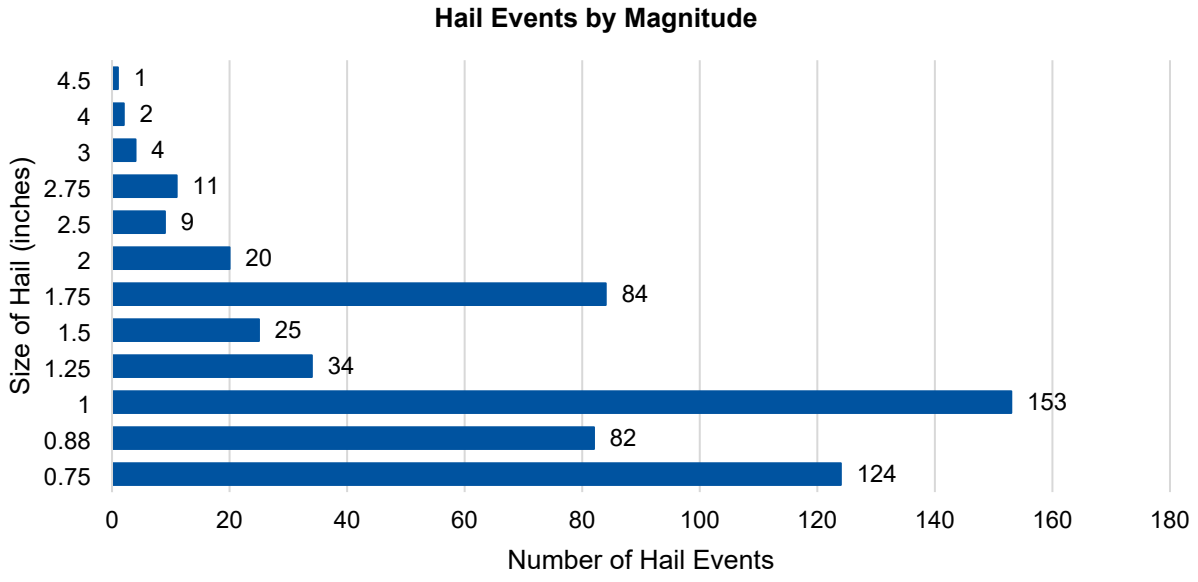
Class	Type of Material	Divisions
H0: Hard Hail	5 mm; (Pea size); 0.2 in	No damage
H1: Potentially Damaging	5 -15 mm (Marble) 0.2 – 0.6 in	Slight general damage to plants and crops
H2: Significant	10 -20 mm (Grape) 0.4 – 0.8 in.	Significant damage to fruit, crops, and vegetation
H3: Severe	20 -30 mm (Walnut) 0.8 – 1.2 in	Severe damage to fruit and crops, damage to glass and plastic structures
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

[124] NOAA National Weather Service. 2019. "Thunderstorms". https://www.noaa.gov/jetstream/thunderstorms.

Class	Type of Material	Divisions
H10: Super Hail	>100 mm (Melon) > 4.0 in	Extensive structural damage; risk or severe or even fatal injuries to persons outdoors

Source: TORRO[125]

The NCEI reported 549 individual hail events across the planning area since 1996.[126] As the NCEI reports events per county, this value overestimates the total amount of thunderstorm events. The average hailstone size was 1.2 inches. Events of this magnitude correlate to an H4 Severe 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 three H10 hail events (>4.0 inches) during the period of record. The figure below shows hail events based on the size of the hail.



Source: NCEI, 1996-Dec 2023

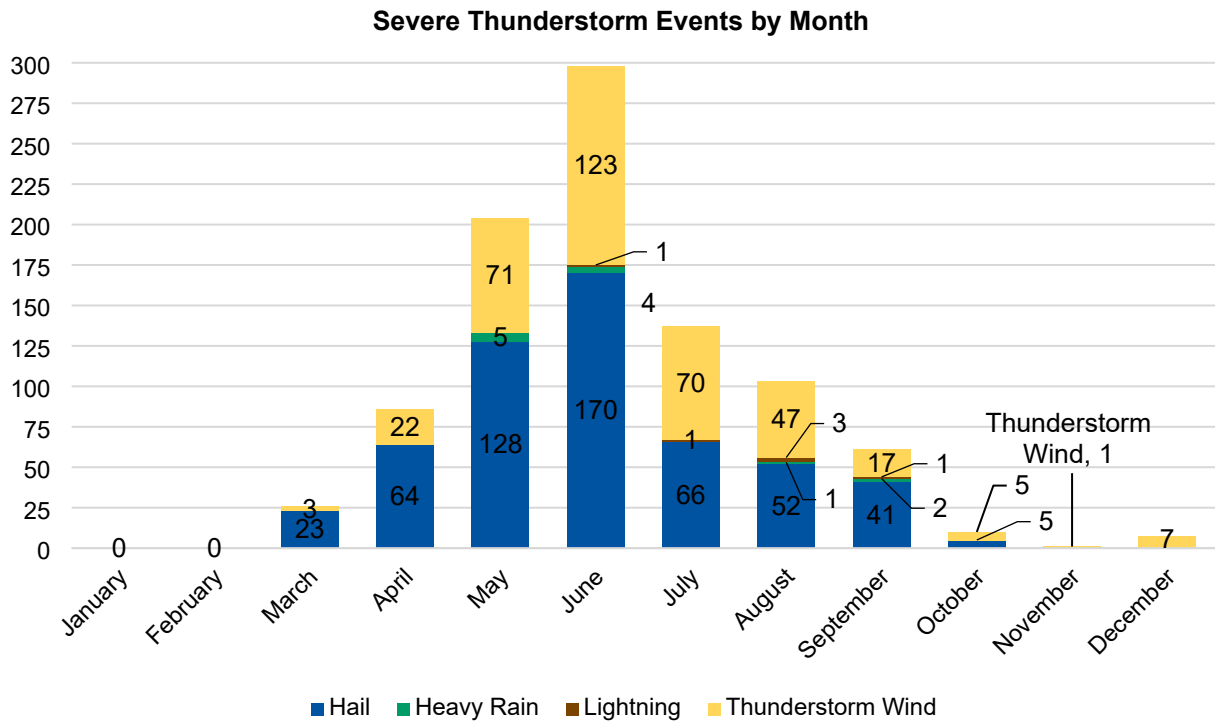
Communities and jurisdictions across the planning area are likely to experience similar impacts from severe thunderstorms. However, communities or areas with poor stormwater management systems may be at higher risk during heavy rain events.

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 late spring and summer months.

[125] Tornado and Storm Research Organization. 2024. "Hail Scale". https://www.torro.org.uk/research/hail/hscale.

[126] NOAA National Centers for Environmental Information. May 2024. "Storm Events Database". https://www.ncdc.noaa.gov/stormevents/.



Source: NCEI, 1996-Dec 2023[127]

The NCEI reports a total of 366 thunderstorm wind, 12 heavy rain, six lightning, and 549 hail events in the planning area from 1996 to December 2023. In total these events were responsible for $15,404,000in property damage. The USDA RMA data shows that severe thunderstorms caused $75,332,602 in crop damage.[128] There were 17 injuries reported in association with these storms. Event descriptions from NCEI for the most damaging events are provided below.

- **June 20, 1996 – Hail & Thunderstorm Wind:** $10,005,000 of property damage was reported in Dodge County. Hail up to 2.75 inches in diameter did considerable damage to thousands of acres of crops from Hooper to Fremont. Estimates of 4,000 homes and countless vehicles had damage from the winds and hail. Strong winds peeled off part of a business building's roof in Snyder.[129]

- **June 20, 1997 – Hail & Thunderstorm Wind:** $225,000 of property damage was reported in Butler ($103,000), Dodge ($2,000), and Saunders ($120,000) counties. Hail broke some windows in a home and thunderstorm winds blew a door off a machine shed on a farm in northern Dodge County. In Butler County, strong winds collapsed a large airport hangar in David City and toppled at least five center pivots irrigation systems. Trees fell on two homes in the Surprise area causing damage. Severe tree damage occurred throughout the planning area and many power lines were downed.

[127] NOAA National Centers for Environmental Information. May 2024. “Storm Events Database”. https://www.ncdc.noaa.gov/stormevents/.

[128] U.S. Department of Agriculture Risk Management Agency. 2023. "Cause of Loss Historical Data Files: 2000-2023." https://www.rma.usda.gov/tools-reports/summary-business/cause-loss.

[129] NOAA National Centers for Environmental Information. December 2023. “Storm Events Database”. https://www.ncdc.noaa.gov/stormevents/.

- **September 24, 2007 – Hail:** $4,000,000 of property damage was reported in Butler County. Hail up to two inches in diameter damaged at least several hundred vehicles in town and also caused roof damage to a few hundred homes. The main damage path was from the southwest into the northeast part of David City.

- **September 13, 2010 – Hail & Thunderstorm Wind:** $750,000 in property damage was reported in Saunders County. Thunderstorm winds and hail up to two inches in diameter caused substantial damage to the University of Nebraska agricultural research center. Winds were estimated to have gusted between 70 and 80 mph. Damage estimates to the center included $800,000 in crop damage, $500,000 in building damage and $250,000 in vehicle damage. Thirty-seven buildings had broken windows, siding and/or roof damage. Several horses were injured and had to be euthanized when the open-front portable building they were in was toppled.

- **July 28, 2023 – Hail:** Supercell storms developed near Dodge County and produced a large amount of hail near Fremont Lincoln. Over 50 reports were submitted to the office, with the largest being 4.5 inches near Fremont in Dodge County.

Average Annual Damages

The average damage per event estimate was determined based upon recorded damages from NCEI Storm Events Database since 1996. This does not include losses from displacement, functional downtime, economic loss, injury, or loss of life. Severe thunderstorms cause an average of $550,142 per year in property damage[130] and $5,260,555 in crop damage.[131]

Severe Thunderstorms Loss Estimate

Hazard Type	Number of Events[1]	Average Events Per Year	Total Property Loss[1]	Average Annual Property Loss	Total Crop Loss[2]	Average Annual Crop Loss
Hail	549	19.6	$14,251,000	$508,964	$25,485,345	$1,061,889
Heavy Rain	12	0.4	$0	$0	$37,666,301	$1,569,429
Lightning	6	0.2	$303,000	$10,821		
Thunderstorm Wind	366	13.1	$850,000	$30,357		
Total	**933**	**33.3**	**$15,404,000**	**$550,142**	**$63,151,646**	**$2,631,318**

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

Historical Probability & Future Likelihood

Based on historical records and reported events, severe thunderstorms events are likely to occur on an annual basis. The NCEI reported a total of 993 severe thunderstorm events between 1996 and December 2023 with multiple occurring each year, resulting in 100% historical probability for thunderstorms. Even with the uncertainty about how changes in extreme weather and future

[130] NOAA National Centers for Environmental Information. December 2023. "Storm Events Database". https://www.ncdc.noaa.gov/stormevents/.

[131] U.S. Department of Agriculture Risk Management Agency. 2023. "Cause of Loss Historical Data Files: 2000-2023." https://www.rma.usda.gov/tools-reports/summary-business/cause-loss.

development will impact severe thunderstorms, the future likelihood of severe thunderstorms is very likely.

Historical Probability & Future Likelihood – Severe Thunderstorms

Historical Probability	Extreme Weather Changes Impact	Future Development Impact	Future Likelihood
100%	Uncertain	Neither Increase nor Decrease in Frequency. Increase Exposure	**Very Likely**

Changing Extreme Weather

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."[132] According to the Fifth National Climate Assessment, "severe thunderstorms in the United States during spring and fall will increase under stronger warming scenarios. These changes are likely to lengthen the severe thunderstorm season in the Midwest during cool-season months."[133]

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 of 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.

Regional Vulnerabilities

The following table provides information related to regional vulnerabilities; for jurisdictional-specific vulnerabilities, refer to *Section Eight*.

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 of hail damage -Downed trees and tree limbs -Roofs, siding, windows, gutters, HVAC systems, etc. can incur damage
Community Lifelines	-High winds and lightning can cause power outages and down power lines

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

[133] U.S. Global Change Research Program. 2023. "Fifth National Climate Assessment". https://nca2023.globalchange.gov/.

SECTOR	VULNERABILITY
	-Roads may wash out from heavy rains and become blocked from downed tree limbs -Community lifelines may sustain damage from hail, lightning, and wind

Jurisdictions Ranking Severe Thunderstorms as a Prioritized Hazard of Concern

The following lists jurisdictions and stakeholders which identified severe thunderstorms as a prioritized hazard of concern.

- Ames Diking and Drainage District
- Cedar Bluffs Public Schools
- City of Fremont
- City of North Bend
- City of Schuyler
- City of Wahoo
- City of Yutan
- Colon Volunteer Fire District
- David City
- David City Public Schools
- Educational Service Unit #2
- Four Corners Public Health Department
- Mead Public Schools
- North Bend Central Public Schools
- Platte Township
- Pohocco Township
- Rising City Rural Fire Department
- Saunders County
- Three Rivers Public Health Department
- Village of Abie
- Village of Bruno
- Village of Cedar Bluffs
- Village of Dwight
- Village of Inglewood
- Village of Leshara
- Village of Lindsay
- Village of Linwood
- Village of Malmo
- Village of Mead
- Village of Morse Bluff
- Village of Octavia
- Village of Prague
- Village of Richland
- Village of Surprise
- Village of Ulysses
- Weston Volunteer Fire and Rescue
- Woodcliff Lakes SID #8

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. 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. Defined by the NWS as a combination of sustained winds or frequent gusts of 35 mph or greater, and visibilities of less than a quarter mile from falling or blowing snow for three hours or more.[134] Blizzards 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.

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. The figure below shows the SPIA index.

[134] NOAA National Weather Service. 2024. “Winter Storms and Blizzards”. https://www.weather.gov/fgz/WinterStorms#:~:text=Officially%2C%20the%20National%20Weather%20Service,(at%20least%203%20hours).

SPIA Index

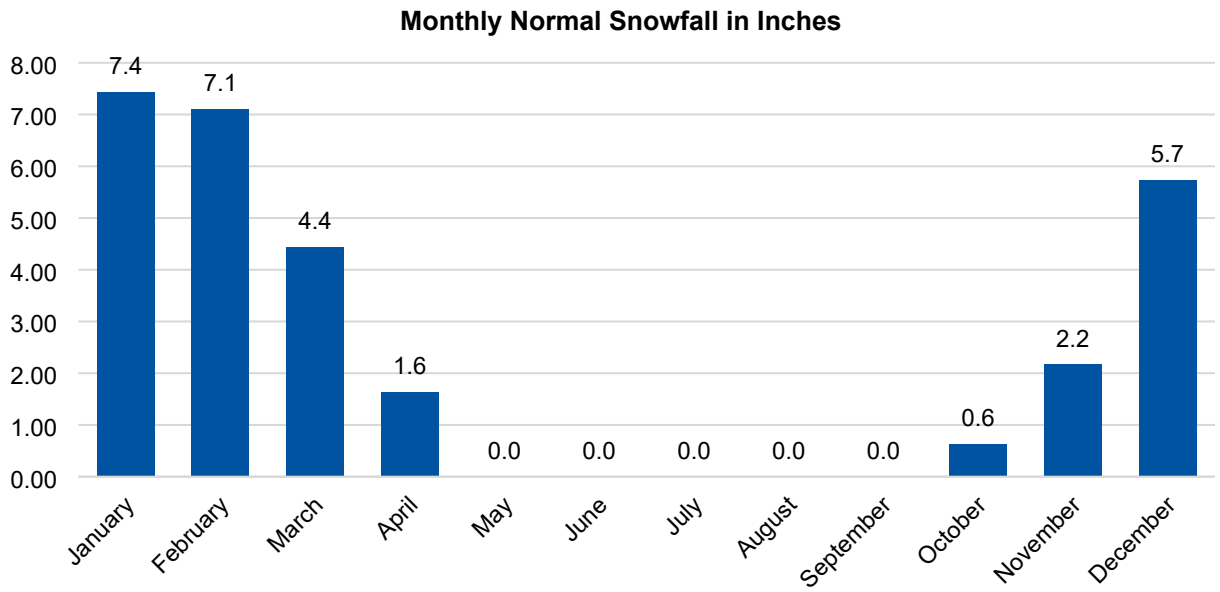
ICE DAMAGE INDEX	*AVERAGE ICE AMOUNT (in inches) *Revised: Oct. 2011*	WIND (mph)	DAMAGE AND IMPACT DESCRIPTIONS
0	<0.25	<15	Minimal risk of damage to exposed utility systems; no alerts or advisories needed for crews, few outages.
1	0.10 – 0.25	15 – 25	Some isolated or localized utility interruptions 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[135]

Average monthly snowfall for the planning area is shown in the figure below. It shows the snowiest months are between December and February. Communities and jurisdictions across the planning area are likely to experience similar extent impacts from severe winter storms.

[135] SPIA-Index. 2009. "Sperry-Piltz Ice Accumulation Index". Accessed June 2017. http://www.spia-index.com/index.php.



Source: NOAA, 1991-2020[136]

Historical Occurrences

According to the NCEI, there were a combined 262 severe winter storm events for the planning area from 1996 to December 2023. These recorded events caused a total of $3,000,000 in reported property damage[137] and $4,243,283 in crop damage.[138] According to the NCEI, there was one fatality associated severe winter storms in the planning area. Event descriptions from the NCEI for major damaging events, injuries, and fatalities are listed below.

- **October 25, 1997 – Heavy Snow:** $2,000,000 of property damage in Saunders County and $1,000,000 in Butler County. 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.[139]

- **December 30, 2006 – Extreme Cold/Wind Chill:** With temperatures below freezing for most of the planning area. The freezing rain mixed with sleet and snow fell briefly before ending over northeast Nebraska Sunday morning on December 31st. The freezing rain caused widespread major damage to trees and power poles and lines across a large part of central into northeast Nebraska. NPPD, the power company that absorbed much of the damage from this storm, called it the worst in the company's history, a fact echoed by many people that lived across the area. In total over Nebraska, the ice storm knocked 37 main high-voltage transmission lines across 600 miles out of service, snapped or toppled more than 6,000 utility poles, including large steel structures, caused power outages for

[136] NOAA National Centers for Environmental Information. 2023. "U.S. Climate Normals Quick Access". https://www.ncei.noaa.gov/access/us-climate-normals/.

[137] NOAA National Centers for Environmental Information. December 2023. “Storm Events Database”. https://www.ncdc.noaa.gov/stormevents/.

[138] U.S. Department of Agriculture Risk Management Agency. 2023. "Cause of Loss Historical Data Files: 2000-2023." https://www.rma.usda.gov/tools-reports/summary-business/cause-loss.

[139] NOAA National Centers for Environmental Information. December 2023. “Storm Events Database”. https://www.ncdc.noaa.gov/stormevents/.

over 15,000 homes and businesses in over 30 communities and did an estimated $240 million in utility damage alone. Some communities remained without power for days afterward, and some more remote customers remained without power for weeks.

- **December 1, 2007 – Ice Storm:** Freezing rain accumulated around a quarter of an inch over much of the planning area. The freezing precipitation began over much of the area between two and four a.m. and was preceded or initially mixed with a little sleet. Surface temperatures and dew points climbed to freezing or a bit above about five to 12 hours after the precipitation began, first over southeast Nebraska. Although there were reports of the ice downing tree limbs and causing scattered power outages and traffic accidents, the rise in temperatures to freezing and above helped mitigate a lot of the damage.[140]

- **February 23, 2019 – Blizzard:** A strong storm moved through the region, bringing mixed wintry precipitation, heavy snow, and very strong winds. The storm created widespread blizzard conditions and six to 12 inches of snow. Twenty-four hours of freezing fog, freezing rain, and a wintry mix led up to the blizzard, which compounded travel problems. One quarter mile visibility and wind gusts 35 mph and higher created whiteout conditions across the planning area.[141]

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 five 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 $107,143 per year in property damage and $75,039 per year in crop damage for the planning area.

Severe Winter Storms 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	27	0.96	$0	$0	$1,837,180	$76,549
Heavy Snow	16	0.6	$3,000,000	$107,143		
Ice Storm	11	0.4	$0	$0		
Winter Storm	148	5.3	$0	$0		
Winter Weather	40	1.4	$0	$0		
Total	**242**	**8.7**	**$3,000,000**	**$107,143**	**$1,837,180**	**$76,549**

[140] NOAA National Centers for Environmental Information. December 2023. “Storm Events Database”. https://www.ncdc.noaa.gov/stormevents/.

[141] NOAA National Centers for Environmental Information. December 2023. “Storm Events Database”. https://www.ncdc.noaa.gov/stormevents/.

Source: 1 Indicates data is from NCEI (1996 to Dec 2023)[142]; 2 Indicates data is from RMA (2000-2023)[143]

Historical Probability & Future Likelihood

Based on historical records, severe winter storm events are likely to occur on an annual basis. The NCEI reported a severe winter storm event every year, resulting in a 100% historical probability for severe winter storms. Even with the uncertainty about how changes in extreme weather and future development will impact severe winter storms, the future likelihood of events is very likely.

Historical Probability & Future Likelihood – Severe Winter Storms

Historical Probability	Extreme Weather Changes Impact	Future Development Impact	Future Likelihood
100%	Uncertain	Neither Increase nor Decrease in Frequency. Increase Exposure	**Very Likely**

Changing Extreme Weather

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."[144] Although severe winter weather projections are uncertain, winter precipitation is expected to increase across Nebraska. Heavier winter precipitation can be beneficial in improving soil moisture for winter crops but potentially delay planting for the summer crops.[145]

Future Development

All future developments will be affected by winter storms. More buildings and 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.

Regional Vulnerabilities

Severe winter storms that bring snow, ice, and high winds can cause significant impacts on life and property. Many severe winter storm deaths occur because of traffic accidents on icy roads, heart attacks when shoveling snow, and hypothermia from prolonged exposure to the cold. The temporary loss of home heating can be particularly hard on the elderly, young children, and other vulnerable individuals.

Severe winter storm also can cause the temporary closure of key roads, highways, the interstate, train operations, businesses, schools, government offices, and other important community services. These effects, if lasting more than several days, can create significant economic impacts for the communities affected as well as for the surrounding region.

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[142] NOAA National Centers for Environmental Information. December 2023. "Storm Events Database". https://www.ncdc.noaa.gov/stormevents/.

[143] U.S. Department of Agriculture Risk Management Agency. 2023. "Cause of Loss Historical Data Files: 2000-2023." https://www.rma.usda.gov/tools-reports/summary-business/cause-loss.

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

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

The following table provides information related to regional vulnerabilities. For jurisdictional-specific vulnerabilities, refer to *Section Eight*.

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 -Exposure or injury to first responders during working conditions -Exposure to motorists or other people outdoors
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
Community Lifelines	-Heavy snow and ice accumulation can lead to downed power lines and prolonged power outages -Transportation, especially on major transportation routes, may be difficult or impossible during blizzards, heavy snow, and ice events -Emergency response and recovery operations, communications, water treatment plants, and others are at risk to power outages, impassable roads, and other damages

Jurisdictions Ranking Severe Winter Storms as a Prioritized Hazard of Concern

The following lists jurisdictions and stakeholders which identified severe winter storms as a prioritized hazard of concern.

- Ames Diking and Drainage District
- City of Fremont
- City of North Bend
- City of Wahoo
- City of Yutan
- Colon Volunteer Fire District
- David City Public Schools
- Mead Public Schools
- Methodist Health System - Fremont
- Morse Bluff Township
- North Bend Central Public Schools
- Platte Township
- Pohocco Township
- Reading Township
- Schuyler Volunteer Fire Department
- Skull Creek Township
- Ulysses Township
- Union Township
- Village of Abie
- Village of Bruno
- Village of Cedar Bluffs
- Village of Dwight
- Village of Garrison
- Village of Inglewood
- Village of Leshara
- Village of Lindsay
- Village of Linwood
- Village of Malmo
- Village of Mead
- Village of Morse Bluff
- Village of Prague
- Village of Richland
- Village of Rogers
- Village of Surprise
- Weston Volunteer Fire and Rescue
- Woodcliff Lakes SID #8

Terrorism and Cyber-Attack

For the purposes of this plan, this hazard is going to include terrorism, cyber-attack, active shooter incidents, and other intentional human-caused threats that pose a significant hazard to life safety, property, infrastructure, or the environment.

Active Shooter
One or more individuals actively engaged in killing or attempting to kill people in a populated area.

Domestic Terrorism
Violent, criminal acts committed by individuals and/or groups to further ideological goals stemming from domestic influences within the United States, such as those of a political, religious, social, racial, or environmental nature.

International Terrorism
Violent, criminal acts committed by individuals and/or groups who are inspired by, or associated with, designated foreign terrorist organizations or nations.

Intentional attacks and terrorist activity may be based on ideology (i.e. religious fundamentalism, national separatist movements, and social revolutionary movements), but attacks can also be random with no ties to ideological reasoning.

Threat assessment, mitigation, and response to terrorism are federal and state directives that work in conjunction with local law enforcement and county emergency management.

Cyber-Attack
Cyber-attack is an incident involving the theft or modification of information on computer systems that can compromise the system or potentially disrupt essential services. A cyber-attack incident can impact governmental agencies, private utilities, or critical infrastructure/key resources like a power grid, public transportation system, and wireless networks. Cyber infrastructure includes electronic information and communications systems, and the information contained in those systems. Computer systems, control systems, and networks such as the internet are all part of cyber infrastructure.

> "Many of the Nation's essential and emergency services, as well as our critical infrastructure, rely on the uninterrupted use of the Internet and the communications systems, data, monitoring, and control systems that comprise our cyber infrastructure. A cyber-attack could be debilitating to our highly interdependent critical infrastructure and key resources and ultimately to our economy and national security."
>
> - National Strategy for Homeland Security

Nation-states, criminal organizations, terrorists, and other malicious actors conduct attacks against critical cyber infrastructure on an ongoing basis. The impact of a serious cyber incident or successful cyber-attack would be devastating to regional and local governments' assets, systems, and/or networks; the information contained in those networks; and the confidence of those who trust governments to secure those systems.

A cyber-attack can affect a system's:

- Confidentiality: protecting a user's private information
- Integrity: ensuring that data is protected and cannot be altered by unauthorized parties
- Availability: keeping services running and giving administration access to key networks and controls.

Location

Terrorism and cyber-attacks can occur throughout the entire planning. Most attacks in the United States have taken place in business/commercial sites, public open spaces, and schools. However, government buildings, healthcare facilities, and houses of worship can also be targets for ideologically motivated attacks. Critical infrastructure and commercial, private, and government computer systems may also be targeted for physical or cyber-attacks.[146]

According to the 2023 data from the Southern Poverty Law Center, there are seven hate and antigovernmental groups in Nebraska. Data is collected from pubic displays of hate groups and organizations. Information is collected through social media platforms, news articles, and tips submitted to the SPLC.[147]

Antigovernmental Groups in the Planning Area

Title	Ideology
Eagle Forum	Antigovernment General
Institute on the Constitution	Antigovernment General
Nebraska Parents Involved in Education	Antigovernment General
MSR Productions	Hate Music
Asatru Folk Assembly	Neo-VÃlkisch
National Justice Party - Nebraska	White Nationalist
Patriot Front	White Nationalist

Source: Southern Poverty Law, 2023

Extent

Terrorist and cyber-attacks can vary greatly in scale and magnitude, depending on the location, method, and target of the attack. They can range from an entire water system to a single building or structure.

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. According to this database, there has been one terrorist incident in the planning area since 1970.[148] A cyber-attack event was also provided that occurred in Butler County and is included below.

[146] Federal Bureau of Investigation. 2022. "Active Shooter Incidents in the United States in 2022". https://www.fbi.gov/file-repository/active-shooter-incidents-in-the-us-2022-042623.pdf/view.

[147] Southern Poverty Law Center. 2023. "Map of Hate Group Flyering in the U.S." https://www.splcenter.org/.

[148] University of Maryland and National Consortium for the Study of Terrorism and Response to Terrorism. 1970-2020. "Global Terrorism Database". https://www.start.umd.edu/gtd/.

- **May 4, 2002:** Between the dates of May 3-7, 2002, eighteen pipe bombs were found in rural mailboxes in five Midwestern states in the U.S.A., collectively causing seven injuries and leading to widespread panic in the region. Most of the explosives came with typewritten notes that bemoaned the power of the government and threatened more attacks. In the incidents that occurred on May 4-5, 2002, seven bombs were found in mailboxes in the southern and central counties of Nebraska. None of these bombs detonated and no injuries were suffered. On May 7, 2002, the FBI and Nevada state authorities arrested a 21-year-old college student, who confessed to being responsible for all of the bombs.[149]

- **July 2022:** The FBI announced that they assisted in stopping a cyber-attack on the Butler County Health Care Center in early July. The infected server was taken offline so no malware could spread to the rest of the hospital's network.[150]

Cyber-attacks are a common occurrence, and government and private sector organizations are targeted by various types of cyber-attacks regularly. Most of these attacks have been stopped prior to any impacts, however the threat is continual and constantly evolving.

Average Annual Damages

According to the Global Terrorism Database, the 2002 pipe bombs were the only known terrorism event in planning area. This event did not result in any property damage as the bombs detonated. However, a terrorist or cyber-attack event could range from less than $1 million in rural areas to more than $10 million in urban areas.

Historical Probability & Future Likelihood

Based on historical occurrences, the historical probability is four percent. However, historical occurrences may not be a useful measure of future likelihood. At the national level, the annual occurrence of active shooter attacks and ideologically motivated violence in the United States has increased substantially over the past 20 years.[151,152]

Cyber-attacks are occurring continuously across the state and region. While defense systems become more adept at catching cyber-attacks before they cause significant infrastructure or service disruption, the frequency and sophistication of cyber-attacks is expected to continue to increase.[153] Due to the anticipated impacts from changes in extreme weather, future development and increasing events nationally, the future likelihood of terrorism and cyber-attack is Unlikely.

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[149] University of Maryland and National Consortium for the Study of Terrorism and Response to Terrorism. 1970-2020. "Global Terrorism Database". https://www.start.umd.edu/gtd/.

[150] WOWT. "Cyberattacks targeting ag co-ops, Nebraska hospital thwarted by FBI." August 10, 2022. https://www.wowt.com/2022/08/10/fbi-helps-stop-cyberattack-targeting-nebraska-hospital/.

[151] Federal Bureau of Investigation. 2022. "Active Shooter Incidents in the United States in 2022". https://www.fbi.gov/file-repository/active-shooter-incidents-in-the-us-2022-042623.pdf/view.

[152] Federal Bureau of Investigation. May 2021. "Active Shooter Incidents 20-Year Review, 2000-2019". https://www.fbi.gov/file-repository/active-shooter-incidents-20-year-review-2000-2019-060121.pdf/view.

[153] Internet Crime Complaint Center. "2023 ICS Annual Report." 2023. https://www.ic3.gov/AnnualReport/Reports/2023_IC3Report.pdf.

Historical Probability & Future Likelihood – Terrorism and Cyber-Attack

Historical Probability	Extreme Weather Changes Impact	Future Development Impact	Future Likelihood
4%	Neither Increase nor Decrease in Frequency	Neither Increase nor Decrease in Frequency. Increase Exposure	**Unlikely**

Changing Extreme Weather

Changes in extreme weather will likely have very limited direct impact on terrorism and cyber-attacks. However, the impacts of these changes in extreme weather will likely put additional stress on social structures and may contribute to an increase in social disenfranchisement and politically motivated violence.

Future Development

Increased security measures at vulnerable locations such as schools or government buildings will reduce the likelihood and impacts of terrorism and cyber-attacks. Measures can include bollards to protect from vehicles, fencing, security cameras, advanced locks, etc. Having strong cyber security can keep bad actors from taking control of virtual systems with the intent to cause harm to humans and damage to buildings.

Regional Vulnerabilities

The following table provides information related to regional vulnerabilities. For jurisdictional-specific vulnerabilities, refer to *Section Eight.*

Regional Terrorism and Cyber-Attack Vulnerabilities

Sector	Vulnerability
People	-Civilians at risk of injury or death -Students and staff at school facilities at risk of injury or death from school shootings -Police officers and first responders at risk of injury or death
Economic	-Damaged businesses can cause loss of revenue and loss of income for workers -Risk of violence in an area can reduce income flowing into and out of that area -Agricultural attacks could cause significant economic losses for the region
Built Environment	-Targeted buildings may sustain heavy damage
Community Lifelines	-Water supply, power plants, utilities may be damaged -Police stations, schools, and government offices are at a higher risk

Jurisdictions Ranking Terrorism and Cyber-Attack as a Prioritized Hazard of Concern

The following lists jurisdictions and stakeholders which identified terrorism and cyber-attack as a prioritized hazard of concern.

- Cedar Bluffs Public Schools
- David City
- David City Public Schools
- Educational Service Unit #2
- Four Corners Health Department
- Mead Public Schools
- Methodist Health System - Fremont
- Village of Mead

- Village of Prague

Tornadoes and High Winds

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 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 one hour or longer, or winds of 58 mph or greater for any duration.[154] The figure on the next page 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 in Zone III which has maximum winds of 200 mph equivalent to an EF4/5 tornado.

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

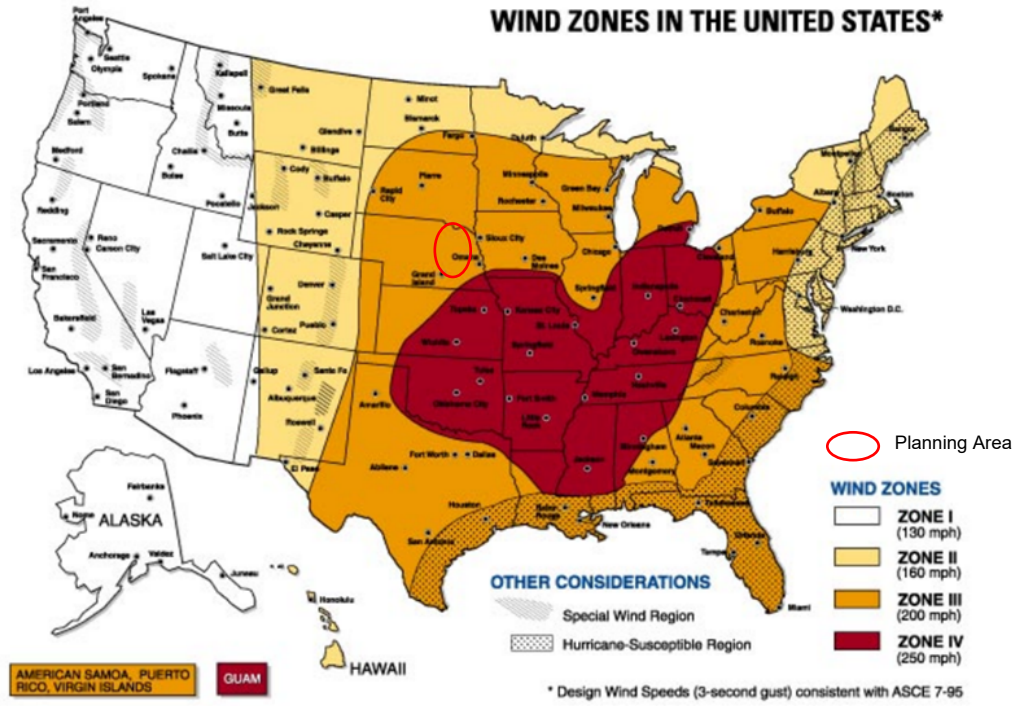
Once tornadoes are formed, they can be extremely violent and destructive. They have been recorded all over the world but are most prevalent in the American Midwest and South, in an area known as “Tornado Alley.” Tornadoes can travel distances of over 100 miles and reach over 11 miles above ground. Tornadoes usually stay on the ground for no more than ten minutes. In the northern Plains (which includes Nebraska), tornado season is typically in June or July. On average, 80 percent of tornadoes occur between noon and midnight.

Location

High winds and tornadoes can occur throughout the planning area. The impacts would be greater in more densely populated areas, such as David City, Fremont, Schuyler and Wahoo. The Tornado Tracks figure below shows the historical track locations across the planning area according to the Midwestern Regional Climate Center.

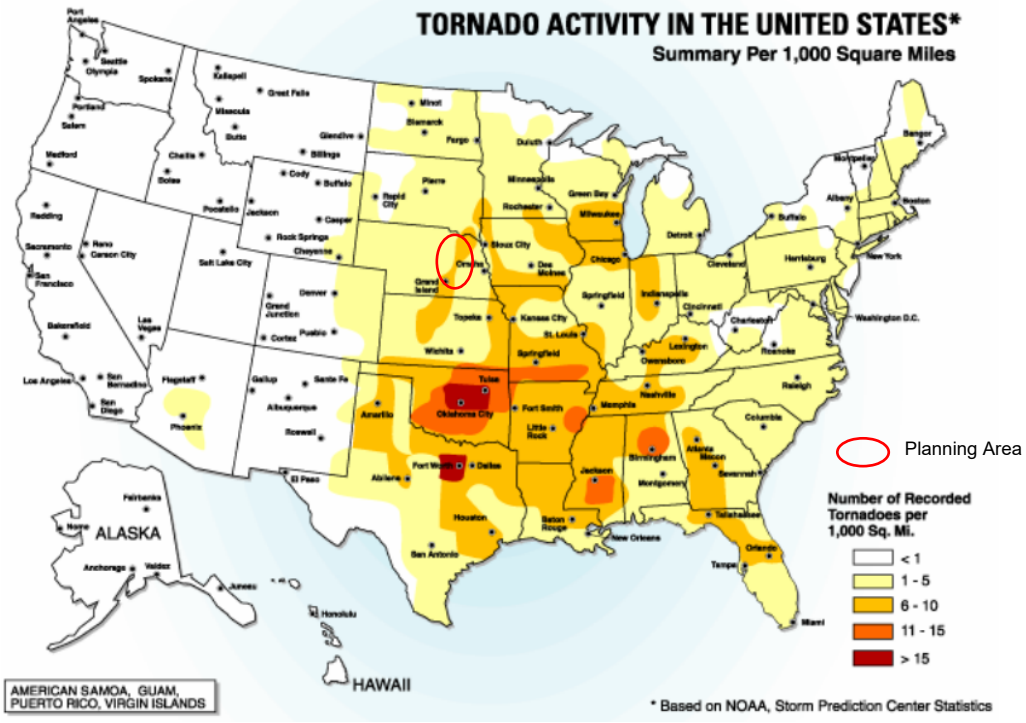
[154] National Weather Service. 2017. “Glossary”. http://w1.weather.gov/glossary/index.php?letter=h.

Wind Zones in the U.S.



Source: FEMA[155]

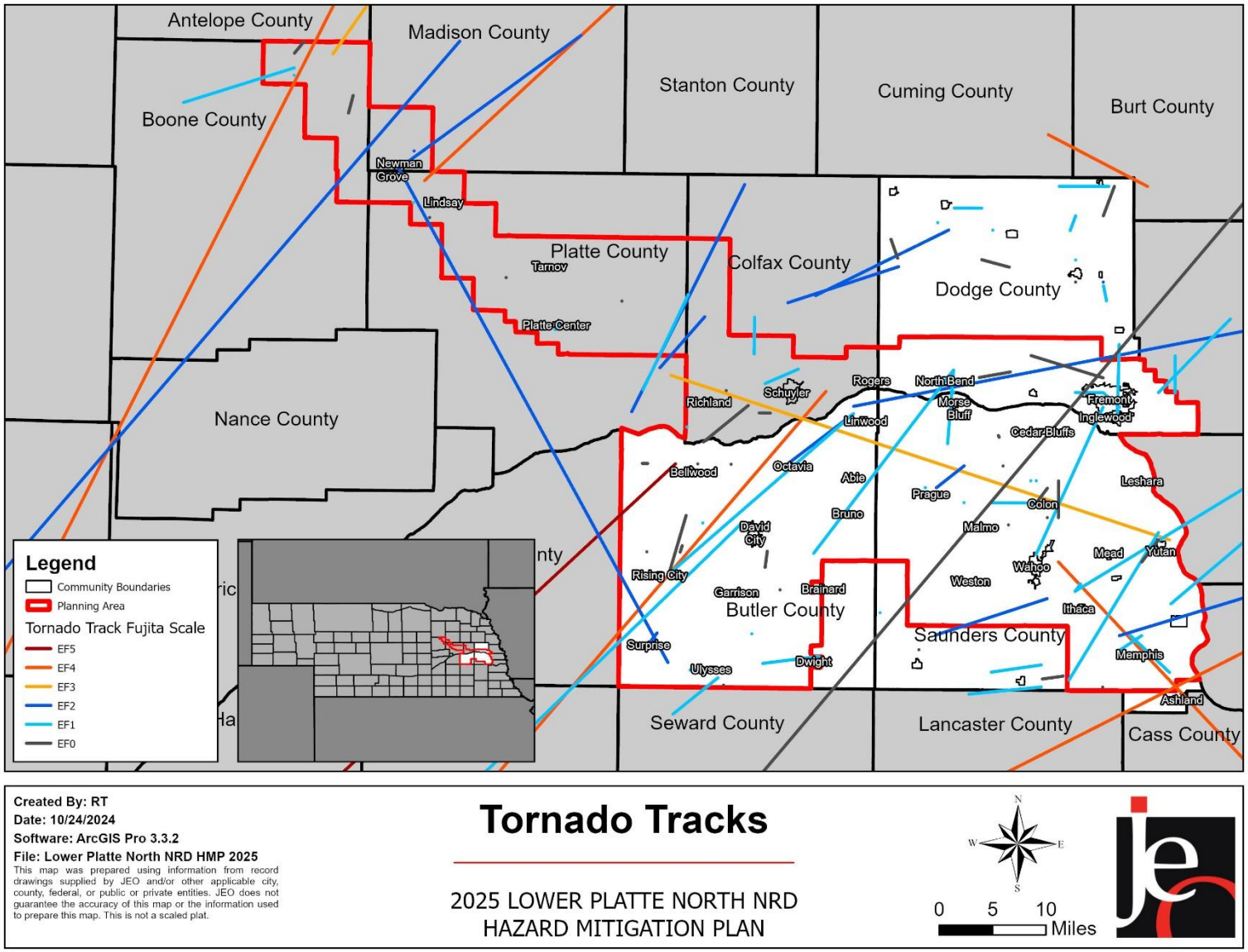
Figure 2: Tornado Activity in the United States



Source: FEMA

[155] FEMA. "Section 1: Understanding Hazards". Accessed December 2022. https://www.fema.gov/pdf/library/ism2_s1.pdf.

Tornado Tracks (1950-2022)



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.

Beaufort Wind Ranking

Beaufort Wind Force Ranking	Range of Wind	Conditions
0	<1 mph	Smoke rises vertically
1	1-3 mph	Smoke drift indicates wind direction; still wind vanes
2	4-7 mph	Wind felt on face; leaves rustle; wind vanes begin to move
3	8-12 mph	Leaves and small twigs constantly moving; light flags extended
4	13-18 mph	Dust, leaves, and loose paper lifted; small tree branches move
5	19-24 mph	Small trees in leaf begin to sway
6	25-31 mph	Large branches moving; whistling in wires
7	32-38 mph	Whole trees moving; resistance felt walking against wind
8	39-46 mph	Twigs breaking off trees; generally impedes progress
9	47-54 mph	Slight structural damage; slate blows off roofs
10	55-63 mph	Trees broken or uprooted; considerable structural damage
11	64-72 mph	Widespread damages; very rarely experienced
12	72+ mph	Hurricane; devastation

Source: Storm Prediction Center[156]

After a tornado passes through an area, an official rating category is determined, which provides a common benchmark that allows comparisons to be made between different tornadoes. 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.

[156] Storm Prediction Center: National Oceanic and Atmospheric Administration. 1805. “Beaufort Wind Scale”. http://www.spc.noaa.gov/faq/tornado/beaufort.html.

The following tables summarize the Enhanced Fujita Scale and damage indicators. According to 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.[157]

Enhanced Fujita Scale

Storm Category	3 Second Gust (mph)	Damage Level	Damage Description
EF0	65-85 mph	Gale	Chimneys are damaged, tree branches are broken, shallow-rooted trees are toppled.
EF1	86-110 mph	Weak	Roof surfaces are peeled off, windows are broken, some tree trunks are snapped, unanchored mobile homes are overturned, attached garages may be destroyed.
EF2	111-135 mph	Strong	Roof structures are damaged, mobile homes are destroyed, debris becomes airborne (missiles are generated), large trees are snapped or uprooted.
EF3	136-165 mph	Severe	Roofs and some walls are torn from structures, some small buildings are destroyed, non-reinforced masonry buildings are destroyed, most trees in forest are uprooted.
EF4	166-200 mph	Devastating	Well-constructed houses are destroyed, some structures are lifted from foundations and blown some distance, cars are blown some distance, large debris becomes airborne.
EF5	200+ mph	Incredible	Strong frame houses are lifted from foundations, reinforced concrete structures are damaged, automobile-sized missiles become airborne, trees are completely debarked.

Source: NOAA[158]; FEMA[159]

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
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

[157] 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".

[158] NOAA. 2006. "Enhanced F Scale for Tornado Damage". https://www.spc.noaa.gov/efscale/ef-scale.html.

[159] FEMA. "Section 1: Understanding Hazards". Accessed July 2024. https://www.fema.gov/pdf/library/ism2_s1.pdf.

Number	Damage Indicator	Number	Damage Indicator
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

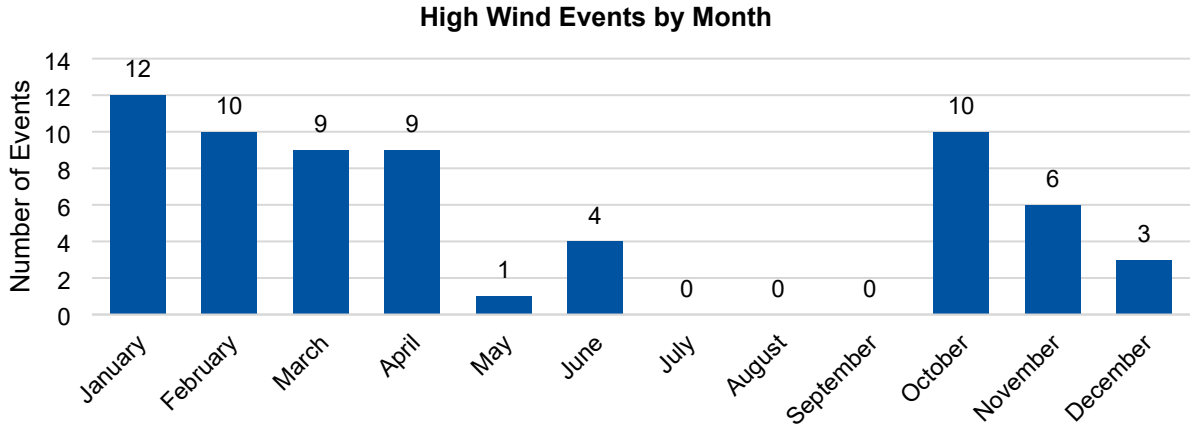
Source: NOAA

Using the NCEI reported events since 1996, the average high wind event in the planning area is a level nine on the Beaufort Wind Ranking scale. The reported high wind events ranged from 35 mph to 58 mph, with an average speed of 49 mph. Based on the historical record, it is most likely that tornadoes that occur within the planning area will be of EF0 strength. Of the 44 reported tornado events, 21 were EF/F0, 19 were EF/F1, three were EF/F2, and one was EFU.[160]

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.

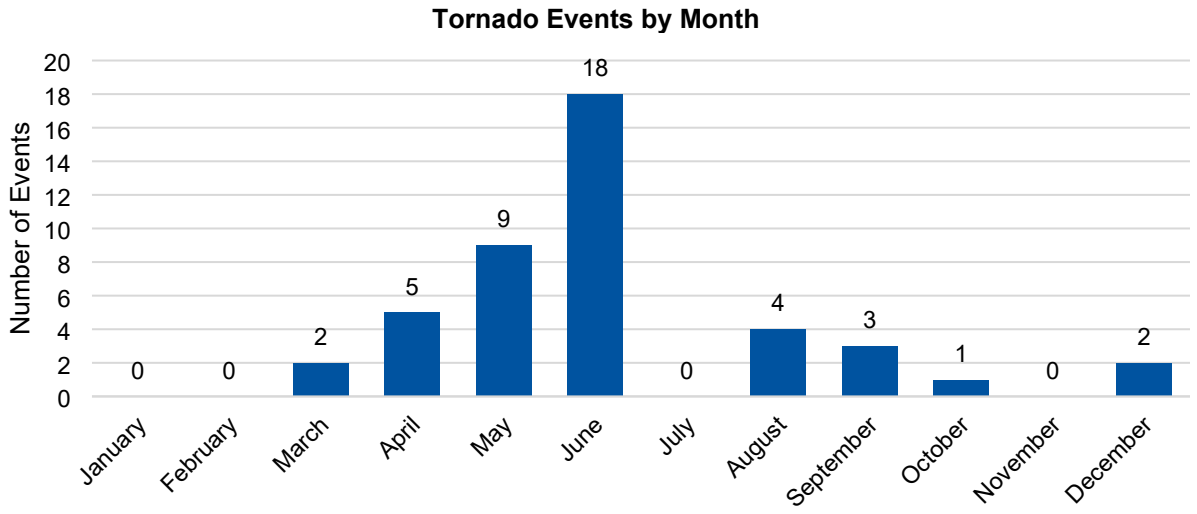
Historical Occurrences

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 64 high wind events and 44 tornadic events that occurred between 1996 and December 2023 ranging from a magnitude of EFU to EF2. These events were responsible for $2,098,000 in property damage and $6,843,864 in crop damage. No injuries or deaths were reported from these events. As seen in the following figures, most high wind events occur in the spring and winter months, while most tornado events occur in May and June.



Source: NCEI, 1996-December 2023

[160] NOAA National Centers for Environmental Information. December 2023. "Storm Events Database". https://www.ncdc.noaa.gov/stormevents/.



Source: NCEI, 1996-December 2023

Event descriptions from NCEI for the events that caused the most injuries, and the most damaging events are provided below.

- **June 23, 1998, Tornado** – $500,000 in property damage in Dodge County. An F1 tornado went through Dodge County where several outbuildings and grains were destroyed. A house, machine she, and hog barn were also destroyed, and a chimney was blown of the back porch of a house.[161]

- **August 28, 2007, Tornado** – $300,000 in property damage was reported in Dodge County from an EF1 tornado. A tornado occurred from about four miles west of Uehling to just east of Highway 77 in Uehling. The maximum path width was around 1500 feet. The tornado was rated an EF-1 on the Enhanced Fujita Scale with maximum winds around 90 mph. According to Emergency Management Officials, 10 homes sustained minor damage due to falling tree limbs. Homes and buildings lost a considerable number of shingles. Immediately west of Uehling, there was damage to bleachers and fencing at a ballpark, numerous large tree limbs were blown down, and a few trees were uprooted or snapped at the base of the tree trunk. There were numerous patches of flattened corn west of the park area.[162]

- **December 15, 2021, Tornado** – A tornado developed just north of the Jack Sinn Memorial Wildlife Management area, producing damage to farm buildings and then moving off toward the northeast, and eventually the north northeast as observed by a storm chaser. The tornado caused damage to several barns and outbuildings along the track, including complete destruction of barns near Road 11 and Road F. The tornado also overturned several pivot irrigation systems and snapped wooden power poles at multiple locations, including numerous poles along Highway 92 which prompted a multi-day closure of the

[161] NOAA National Centers for Environmental Information. December 2023. "Storm Events Database". https://www.ncdc.noaa.gov/stormevents/.

[162] NOAA National Centers for Environmental Information. December 2023. "Storm Events Database". https://www.ncdc.noaa.gov/stormevents/.

highway. The tornado also impacted the University of Nebraska Farm where a video was taken of the small fast-moving tornado and several buildings sustained damage. The tornado ended one mile northwest of Yutan where a farm outbuilding was blown for a significant distance and trees were damage. Significant downburst winds on the east flank of the tornado circulation were evident on radar and damage to pivot irrigation systems and other structures throughout the duration of the tornado.

- **May 12, 2023, Tornado** – The tornado touched down just south of Highway 275, damaging a home, power poles and numerous trees as it entered the Elkhorn River valley. It caused EF-2 damage to a home just south of the Elkhorn River where a porch was ripped off and large trees damaged. The tornado crossed the Elkhorn River where significant tree damage was noted and several center pivots were flipped over. The tornado became wider and impacted additional farmsteads with EF-2 damage, especially as it approached County Road F up to the Dodge and Burt county line. At these farmsteads, several hog barns, machine sheds, and well-built outbuildings were destroyed. Farm equipment was significantly damaged. Windows were broken out of homes, roofs damaged, porches ripped off, and garage doors sucked out. Several people noted that their ears still hurt a day later due to the pressure drop during the tornado. Numerous livestock were injured or killed. The maximum width of this tornado approached one mile as it moved between County Road F and County Road B. A large cattle feedlot was impacted in northeast Dodge County where very large grain bins and well-built barns were destroyed. This tornado exhibited multiple vortex damage patterns at times. The tornado dissipated just north of County Road F in Burt County before developing a new tornado to the north. Additionally, a satellite tornado was reported near the end of this tornado's life cycle.[163]

Average Annual Damages

The average damage per event estimate was determined based upon NCEI Storm Events Database since 1996. This does not include losses from displacement, functional downtime, economic loss, injury or loss of life. It is estimated that high wind events can cause an average of $179 per year in property damage and $284,386 and per year in crop damage. Tornadoes have caused an average of over $74,750 per year in property damage and $776 per year in crop damage; however, damages from tornadoes vary greatly depending on the severity or magnitude of each event.

High Winds and Tornado Losses

Hazard Type	# of Events[1]	Average # events per year	Total Property Loss[1]	Average Annual Property Loss	Total Crop Loss[2]	Average Annual Crop Loss
High Winds	64	2.3	$5,000	$179	$6,825,252	$284,386
Tornadoes	44	1.6	$2,093,000	$74,750	$18,612	$776
Total	**108**	**3.9**	**$2,098,000**	**$74,929**	**$6,843,864**	**$285,161**

Source: 1 NCEI (1996-Nov 2023), 2 USDA RMA (2000-2023)

[163] NOAA National Centers for Environmental Information. December 2023. "Storm Events Database". https://www.ncdc.noaa.gov/stormevents/.

Historical Probability & Future Likelihood

Given the historic record of occurrence for high wind events (14 out of 28 years with reported events), the annual historical probability of a high wind event is 50 percent. 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 (20 out of 28 years with reported events), for the purposes of this plan, the annual historical probability of a tornado occurrence is 71 percent. Even with the uncertainty of how extreme weather changes along with future development will impact severe events like tornadoes and high winds, the future likelihood of a high wind and a tornado event is very likely.

Historical Probability & Future Likelihood – Tornadoes and High Winds

Hazard	Historical Probability	Extreme Weather Changes Impact	Future Development Impact	Future Likelihood
High Winds	50%	Uncertain	Neither Increase nor Decrease in Frequency. Increase in Exposure	**Very Likely**
Tornadoes	71%	Uncertain	Neither Increase nor Decrease in Frequency. Increase in Exposure	**Very Likely**

Changing Extreme Weather

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."[164]

Future Development

Any future development and population growth elevates exposure of property and people to the impacts of tornadoes and high winds. Future development should take steps to reduce potential damage from these events. 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 or construct a tornado shelter on their property. 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.

Regional Vulnerabilities

The following table provides information related to regional vulnerabilities; for jurisdictional specific vulnerabilities, refer to *Section Eight*.

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

Regional Tornado and 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
Community Lifelines	-Downed power lines and power outages -All above ground infrastructure at risk to damages -Impassable roads due to debris blocking roadways - All community lifelines are at risk to damages

Jurisdictions Ranking Tornadoes and High Winds as a Prioritized Hazard of Concern

The following lists jurisdictions and stakeholders which identified tornadoes and high winds as a prioritized hazard of concern.

- Butler County
- Cedar Bluff Public Schools
- City of Fremont
- City of North Bend
- City of Wahoo
- City of Yutan
- Colon Volunteer Fire District
- David City
- Dodge County
- Four Corners Health Department
- Mead Public Schools
- Methodist Health System – Fremont
- North Bend Central Public Schools
- North Bend Volunteer Fire Department
- Pohocco Township
- Rising City Rural Fire Department
- Schuyler Volunteer Fire Department
- Three Rivers Public Health Department
- Village of Abie
- Village of Bruno
- Village of Cedar Bluffs
- Village of Colon
- Village of Dwight
- Village of Inglewood
- Village of Leshara
- Village of Lindsay
- Village of Linwood
- Village of Malmo
- Village of Mead
- Village of Octavia
- Village of Prague
- Village of Richland
- Village of Rogers
- Village of Surprise
- Village of Ulysses

- Weston Volunteer Fire and Rescue
- Woodcliff Lakes SID #

Appendix B: Planning Process Documentation

Table of Contents

Table of Contents 1
Introduction 2
Public Involvement and Outreach 2
Round 1 Meeting Invitations 26
Round 1 Sign-In Sheets 29
Round 1 Example Participant Profile with Questions 35
Round 1 Plan Integration Worksheet 46
Round 1 Stakeholder Worksheet 52
Round 2 Meeting Invitation 58
Round 2 Sign-In Sheets 60
Round 2 Example Participant Profile with Questions 64
Round 2 NFIP Worksheet 76
Public Review Notification Email 79
Public Review Comments Received 79
Adoption Resolution Template 80

Introduction

The following appendix provides documentation for the planning process that was discussed in *Section 4: Planning Process Summary*. This appendix provides information on public involvement and outreach, notified stakeholders, notified neighboring jurisdictions, meeting invitation letters, meeting sign-in sheets, meeting worksheets, public review comments, and adoption resolutions that have been gathered.

Public Involvement and Outreach

Notified Stakeholder Groups

Organizations	Type
Valmont Industries	Major Employers
Wholestone Farms	Major Employers
Lincoln Premium Poultry	Major Employers
Omaha Steel	Major Employers
City of Hooper – Hooper Dam	High Hazard Dams
Village of Dodge – Dodge Dam	High Hazard Dams
Cottonwood Creek 7-A	High Hazard Dams
Cottonwood Creek 21-A	High Hazard Dams
Lake Wanahoo Dam	High Hazard Dams
Four Corners Public Health Department	Health Department
Methodist Health System	Health Department
Methodist Fremont Health	Health Department
Southeast Nebraska Healthcare Coalition	Health Department
Omaha Metropolitan Healthcare Coalition	Health Department
Red Cross Southeast Nebraska	Red Cross
Red Cross Omaha-Council Bluffs & SW Iowa Chapter	Red Cross
The Salvation Army Western Division	Salvation Army
David Place	Nursing Home
St. Joseph's Villa, Inc	Nursing Home
Parkview Home, Inc	Nursing Home
Dunklau Gardens	Nursing Home
Nye Legacy Health & Rehabilitation Center	Nursing Home
Saunders Medical Center	Nursing Home
South Haven Living Center	Nursing Home
David City Municipal Airport	Airport
Wahoo Municipal Airport	Airport
Butler County Chamber of Commerce	Chamber of Commerce
Fremont Area Chamber of Commerce	Chamber of Commerce
North Bend Area Chamber of Commerce	Chamber of Commerce
Wahoo Chamber of Commerce	Chamber of Commerce
Schuyler Area Chamber of Commerce	Chamber of Commerce

Organizations	Type
Butler Public Power District	Public Power District
Polk County Rural Public Power District	Public Power District
Nebraska Public Power District	Public Power District
Midland University	Private Universities/Schools
Aquinas Catholic Schools	Private Universities/Schools
Trinity Lutheran Elem Schools	Private Universities/Schools
Archbishop Bergan School	Private Universities/Schools
St Wenceslaus Elementary School	Private Universities/Schools
Bishop Neumann High School	Private Universities/Schools
Lutheran Family Services	Faith Based Organizations
Catholic Charities	Faith Based Organizations
Rapid Response	Faith Based Organizations
NE Extension Engagement Coordinator	Nebraska Extension Offices
John Shephard	Private Resident
NEMA	State Agency
NeDNR	State Agency
FEMA	Federal Agency

Notified Neighboring Jurisdictions

Notified Neighboring Jurisdictions		
Lower Platte South NRD	Upper Big Blue NRD	Central Platte NRD
Upper Elkhorn NRD	Lower Elkhorn NRD	Papio-Missouri River NRD
Boone County	Colfax County	Madison County
Platte County	City of Ashland	Village of Brainard
Village of Ceresco	Village of Valparaiso	Village of Dodge
City of Hooper	Village of Nickerson	City of Scribner
Village of Snyder	Village of Uehling	Village of Winslow

Website

The project website was used to communicate with the public, participating jurisdictions, and stakeholders about the plan update, meeting information, and other critical information. A link to the website can be found here: https://jeo.com/lower-platte-north-nrd-hazard-mitigation-plan-update/.

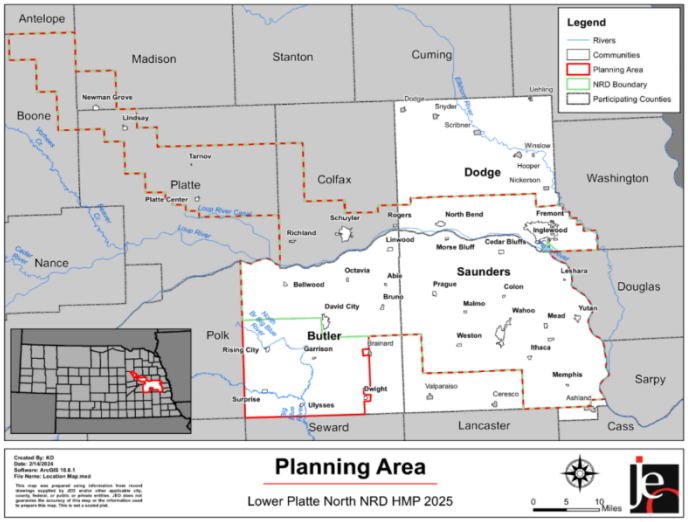
Project Website

JEO CONSULTING GROUP

The Lower Platte North Natural Resources District (LPNNRD) is updating their Hazard Mitigation Plan (HMP) with the assistance of JEO Consulting Group. An HMP is a *community-guided* document that determines vulnerabilities to natural and man-made hazards, then identifies mitigation projects to reduce or eliminate those vulnerabilities. An approved HMP is a requirement of the Federal Emergency Management Agency (FEMA) for jurisdictions to become eligible for Hazard Mitigation Assistance grants. An HMP will enable your community to be stronger and more resilient by:

1. Reducing your community's risk and impacts from disasters;
2. Gaining eligibility for pre- and post-disaster mitigation grants; and
3. Building partnerships with stakeholders within your community and region.

HMPs must be updated and approved every five years. The LPNNRD last updated their HMP in 2020. Throughout the planning process, members of the community, (including school districts, fire departments, drainage districts, local health departments, and others,) are invited to participate by attending public meetings and providing information for the plan.



PROJECT MEETINGS

The planning process includes public meetings to provide an opportunity for participants and interested stakeholders to learn about the plan and provide input. The first round of meetings took place in late June. For those not able to attend, a meeting recording is available here: https://vimeo.com/970852167/f7c55bccee

Meeting worksheets can be downloaded by visiting this Google Drive link: https://bit.ly/LowerPlatteNorth-GoogleDrive.

Project Announcement

A project announcement and a notification of the first round of meetings were made in local newspapers, the NRD newsletter, and NRD website to help spread the word about the hazard mitigation plan and public survey. All potential participants were also mailed a letter regarding the project and their eligibility to participate. Below are copies of the letter and the announcements that were made by the Regional Planning Team.

Project Flyer (English)

Lower Platte North NRD Hazard Mitigation Plan Update 2025

The Lower Platte North NRD is leading the planning effort to update its Hazard Mitigation Plan. Residents across the NRD are encouraged to participate in the planning process.

Hazard Mitigation Plan

A Hazard Mitigation Plan is a community-driven, living document that assesses vulnerability to natural hazards and identifies mitigation strategies to reduce vulnerability.

Why This is Important to Your Community:

Gains eligibility for FEMA mitigation grant programs.

Identifies strategies to reduce your community's risk to hazards and disasters.

Builds relationships within your community and region that foster resilience across a larger geographic area.

YOU can make a difference today! Provide feedback on this survey.

In English

In Español

Ryan Chapman
Assistant Manager, Lower Platte North NRD
rchapman@lpnnrd.org | 402-443-4675

Becky Appleford
Project Manager, JEO Consulting Group
rappleford@jeo.com | 402-392-9915

Project Flyer (Spanish)

Lower Platte North NRD
Actualización del Plan de Mitigación de Peligros 2025

Lower Platte North NRD está liderando el esfuerzo de planificación para actualizar el Plan de Mitigación de Peligro. Se les anima a los residentes de todo lado de NRD a participar en el proceso de planificación.

PLAN DE MITIGACION DE PELIGRO

Un Plan de Mitigación de Peligro es un plan impulsado por la comunidad, documento vivo que evalúa la vulnerabilidad a los peligros naturales e identifica estrategias de mitigación para reducir la vulnerabilidad.

POR QUE ESTO ES IMPORTANTE PARA SU COMUNIDAD:

Obtiene elegibilidad para la mitigación de FEMA y programas de subvenciones.

Identifica estrategias para reducir su riesgo de peligros y desastres de su comunidad.

Construye relaciones dentro de tu comunidad y región que fomentan resiliencia en un área geográfica más grande.

¡USTED puede hacer una diferencia hoy! Proporcionar comentarios en esta encuesta.

In inglés

In español

Ryan Chapman
Asistente de Gerente, Lower Platte North NRD
rchapman@lpnnrd.org | 402-443-4675

Becky Appleford
Gerente de Proyectos, JEO Consulting Group
rappleford@jeo.com | 402-392-9915

Project Announcement in the Lower Platte North NRD Newsletter

First Phase of Hazard Mitigation Plan Update



A trickle of water during 2023 drought conditions.

The first phase of the Lower Platte North Natural Resources District's (LPNNRD) update of the Hazard Mitigation Plan (HMP) is progressing with the assistance of JEO Consulting Group. The HMP is a community-guided document that identifies threats and potential vulnerabilities from both natural and man-made disasters. The goal of the plan is to reduce risk and vulnerability to lessen impacts to life, the economy, and infrastructure by identifying mitigation actions and strategies.

This plan examines regional and local vulnerabilities including but not limited to flooding, severe winter storms severe thunderstorms, hazardous materials release, and drought. HMPs must be updated and approved every five years. The LPNNRD last updated their HMP in 2020. Throughout the planning process, local jurisdictions such as communities, counties, fire districts, drainage districts, and others are invited to participate by attending public meetings and providing information for the plan.

Meeting information, the 2020 HMP plan and other useful resources can be found at jeo.com/lpnnrd-hmp

Local jurisdictions are required to attend a meeting in order to participate in the plan. Once a community, county, or district (School District, Fire District, Drainage District, etc.) is part of an approved plan, they become eligible for up to 75% cost-share from the Federal Emergency Management Agency for a variety of mitigation projects listed in the plan.

Virtual Round 1 Meeting Announcement on the Lower Platte North NRD Website

SPECIAL MEETINGS & HEARINGS

Hazard Mitigation Plan Virtual Public Meeting

Wednesday, June 26 at 10:00 a.m. via Zoom

Details at https://www.jeo.com/lpnnrd-hmp

Public Survey

A public survey was used to gather information from the general public. The survey was available online (https://forms.office.com/r/PKxUDR7vMF) as well as by hard copy. A hard copy version of the survey can be found below.

Public Survey (English) Page 1 of 5

Lower Platte North NRD Hazard Mitigation Plan 2025 Update

Public Survey

As part of the Lower Platte North NRD Hazard Mitigation Plan, the planning team is seeking your input on hazards that impact the NRD, counties, and communities in the district. Please take a few moments to answer the following questions and be part of the planning process.

1. What affiliation within the planning area do you have? (Check all that apply)

☐	**Resident**
☐	**Business Owner**
☐	**Employed within the Lower Platte North NRD Boundary, Butler County, Saunders County, or Dodge County**

2. Please select which jurisdiction you live in.

☐	**Abie**	☐	**Newman Grove**
☐	**Bellwood**	☐	**North Bend**
☐	**Bruno**	☐	**Octavia**
☐	**Cedar Bluffs**	☐	**Platte Center**
☐	**Colon**	☐	**Prague**
☐	**David City**	☐	**Richland**
☐	**Dwight**	☐	**Rising City**
☐	**Fremont**	☐	**Rogers**
☐	**Garrison**	☐	**Schuyler**
☐	**Inglewood**	☐	**Surprise**
☐	**Ithaca**	☐	**Tarnov**
☐	**Leshara**	☐	**Ulysses**
☐	**Lindsay**	☐	**Wahoo**
☐	**Linwood**	☐	**Weston**
☐	**Malmo**	☐	**Woodcliff Lakes SID #8**
☐	**Mead**	☐	**Yutan**
☐	**Memphis**	☐	**Unincorporated Areas of the NRD**
☐	**Morse Bluff**	☐	**Other: _____**

3. What types of hazards have you experienced in your community/work? (Check all that apply)

☐	**Animal and Plant Disease**	☐	**Hazardous Materials Release**
☐	**Dam Failure**	☐	**Levee Failure**
☐	**Drought**	☐	**Severe Thunderstorms**
☐	**Extreme Temperatures**	☐	**Severe Winter Storms**
☐	**Flooding**	☐	**Terrorism and Cyber Attack**
☐	**Grass/Wildfire**	☐	**Tornadoes and High Winds**

Public Survey (English) Page 2 of 5

4. Please rank your level of concern regarding these hazard events occurring in your jurisdiction or impacting your residence or workplace. Please rate each hazard as follows:

1 = No Concern, 2 = Some Concern, 3 = High Concern, 4 = Extreme Concern.

Animal & Plant Disease		**Flooding**		**Severe Thunderstorms**	
Dam Failure		**Grass/Wildfire**		**Severe Winter Storms**	
Drought		**Hazardous Materials Release**		**Terrorism & Cyber Attack**	
Extreme Temperatures		**Levee Failure**		**Tornadoes & High Winds**	

5. Preparing for a disaster can take many forms. Of the following items, please circle your level of importance to you.

Protecting People	Not Important	Neutral	Somewhat Important	Very Important
Protecting Private Property	Not Important	Neutral	Somewhat Important	Very Important
Protecting Community Assets (Parks, Community Buildings)	Not Important	Neutral	Somewhat Important	Very Important
Protecting Critical Infrastructure (Hospitals, Fire/Police Stations, Utilities)	Not Important	Neutral	Somewhat Important	Very Important
Preventing Development in Hazardous Areas (ex. Flood Prone Areas)	Not Important	Neutral	Somewhat Important	Very Important
Protecting Natural Environment	Not Important	Neutral	Somewhat Important	Very Important
Protecting Historical/Cultural Landmarks	Not Important	Neutral	Somewhat Important	Very Important
Protecting Economic Drivers and Tourist Locations	Not Important	Neutral	Somewhat Important	Very Important
Improving Emergency Response Capabilities (fire/police/emergency management equipment and training)	Not Important	Neutral	Somewhat Important	Very Important

Public Survey (English) Page 3 of 5

6. Of the following projects, select up to **3** that would be most important to your community to reduce risk and be more resilient?

- ☐ **Alert/Warning Sirens**
- ☐ **Backup Generators**
- ☐ **Creating Drought Response Protocol**
- ☐ **Cyber Security Improvements**
- ☐ **Drainage Study**
- ☐ **Hazardous Tree Removal**
- ☐ **Levee Construction or Improvements**
- ☐ **Public Education on Hazards**
- ☐ **Safe Rooms and Storm Shelters**
- ☐ **Stormwater System Improvements (Bank Stabilization, Drainage Improvements, Culvert Upsizing, etc.)**
- ☐ **Updated Planning Mechanisms (Comprehensive Plan, Building Codes, Zoning Regulations, etc.)**
- ☐ **Utility Protective Measures (Electric, Gas, etc.)**
- ☐ **Water & Sanitary Sewer System Protective Measures**
- ☐ **Wildfire Fuels Reduction / Fuel Break Creation**
- ☐ **Other: _____**

7. How has drought impacted you in the past? (Check all that apply)

- ☐ **Voluntary Water Restrictions**
- ☐ **Mandatory Water Restrictions**
- ☐ **Crop Loss**
- ☐ **Planted Different Crops**
- ☐ **Increased Grass/Wildfires**
- ☐ **Private Well Levels Dropped**
- ☐ **Private Well Ran Out of Water**
- ☐ **Reduced Your Water Use**
- ☐ **Water Quality Issues**
- ☐ **Worsened Mental Health**
- ☐ **Other: _____**

Public Survey (English) Page 4 of 5

8. Please rank your level of support for the following drought management actions if they were to be taken by the **NRD** during a prolonged drought event.

1 = Very Unsupportive, 2 = Somewhat Unsupportive, 3 = Neutral, 4 = Somewhat Supportive, 5 = Very Supportive

Public Education and Outreach		**Prohibit New Irrigated Agriculture Acres Development**	
Drought Newsletter		**Prohibit Transfer or Irrigated Acres**	
Require Flow Meters on Irrigation Equipment		**Prohibit Supplemental Wells**	
Require Transducers on Wells		**Water-Use Restrictions for Upcoming Year**	
Increased Irrigation Monitoring		**Reduction in Irrigated Acres Allowed**	
Encourage Preventative or Alternative Planting		**Allocation of Water Use on Irrigated Acres**	
Encourage Communities to Implement Water Restrictions		**Reduction in Industrial Well Use**	

9. Please rank your level of support for the following drought management actions if they were to be taken by your **community** during a prolonged drought event.

1 = Very Unsupportive, 2 = Somewhat Unsupportive, 3 = Neutral, 4 = Somewhat Supportive, 5 = Very Supportive

Public Education and Outreach		**Implementing Voluntary Water Restrictions**	
Increased Monitoring of Well Levels and Water Quality		**Implementing Every Other Day Watering Restrictions**	
Encourage Planting of Drought Tolerant Landscapes		**Implementing No Watering of Lawns or Car Washing**	
Reducing or Eliminating Irrigation of Public Parks and Other Public Spaces		**Reducing the Amount of Water Local Businesses Can Use**	

10. What is one thing you'd like your community to do to help reduce risk to natural disasters or severe weather events in the future?

Public Survey (English) Page 5 of 5

Thank you for your time! Completed surveys may be dropped off, mailed, or emailed to:

Lower Platte North NRD
Attn: Ryan Chapman
511 Commercial Park Road
Wahoo, NE 68066
rchapman@lpnnrd.org

Or to: JEO Consulting Group
Attn: Karl Dietrich
2000 Q Street, Ste 500
Lincoln, NE 68503
kdietrich@jeo.com

For more information on the plan, please visit https://www.jeo.com/lpnnrd-hmp.

Public Survey (Spanish) Page 1 of 5

Actualización del Plan de Mitigación de Peligro de Lower Platte North NRD 2025

Encuesta Pública

Como parte del Plan de Mitigación de Peligro de Lower Platte North NRD, el equipo de planificación está buscando su opinión sobre los peligros que afectan al NRD, los condados y las comunidades del distrito. Tómese unos momentos para responder las siguientes preguntas y ser parte del proceso de planificación.

1. ¿Qué afiliación dentro del área de planificación tiene? (Marque todo lo que corresponda)

☐	**Residente**
☐	**Dueño de Negocio**
☐	**Empleado dentro del Lower Platte North NRD limites, condado de Butler, condado de Saunders o el condado de Dodge**

2. Por favor seleccione en que jurisdicción vive.

☐	**Abie**	☐	**Newman Grove**
☐	**Bellwood**	☐	**North Bend**
☐	**Bruno**	☐	**Octavia**
☐	**Cedar Bluffs**	☐	**Platte Center**
☐	**Colon**	☐	**Prague**
☐	**David City**	☐	**Richland**
☐	**Dwight**	☐	**Rising City**
☐	**Fremont**	☐	**Rogers**
☐	**Garrison**	☐	**Schuyler**
☐	**Inglewood**	☐	**Surprise**
☐	**Ithaca**	☐	**Tarnov**
☐	**Leshara**	☐	**Ulysses**
☐	**Lindsay**	☐	**Wahoo**
☐	**Linwood**	☐	**Weston**
☐	**Malmo**	☐	**Woodcliff Lakes SID #8**
☐	**Mead**	☐	**Yutan**
☐	**Memphis**	☐	**Áreas no incorporadas del NRD**
☐	**Morse Bluff**	☐	**Otro: _____**

3. ¿Qué tipos de peligros ha experimentado en su comunidad/trabajo? (Marque todo lo que corresponda)

☐	**Enfermedades animales y vegetales**	☐	**Materiales de Peligrosos Liberadas**
☐	**Falla de la presa**	☐	**Falla del dique**
☐	**Sequía**	☐	**Tormentas eléctricas severas**
☐	**Temperaturas extremas**	☐	**Tormentas invernales severas**
☐	**Inundación**	☐	**Terrorismo y ataques cibernéticos**
☐	**Pasto/Incendio forestal**	☐	**Tornados y Alto Vientos**

Public Survey (Spanish) Page 2 of 5

4. Por favor, clasifique su nivel de preocupación con respecto a estos eventos de peligro que ocurren en su jurisdicción o que impacte su residencia o lugar de trabajo. Por favor califique cada peligro de la siguiente manera:

1 = Sin preocupación, 2 = Alguna preocupación, 3 = Preocupación alta, 4 = Preocupación extrema.

Enfermedades de animales y plantas		**Inundación**		**Tormentas eléctricas severas**	
Falla de la presa		**Pasto/Incendio forestal**		**Tormentas invernales severas**	
Sequía		**Materiales Peligrosos Liberadas**		**Terrorismo y ataques cibernéticos**	
Temperaturas extremas		**Falla del dique**		**Tornados y Alto Vientos**	

5. Prepararse para un desastre puede tomar muchas formas. De los siguientes elementos, por favor marque con un círculo tu nivel de importancia para usted.

Protegiendo a las personas	No es importante	Neutral	Algo importante	Muy importante
Protegiendo de la propiedad privada	No es importante	Neutral	Algo importante	Muy importante
Protegiendo de los bienes de la comunidad (parques, edificios comunitarios)	No es importante	Neutral	Algo importante	Muy importante
Protegiendo de infraestructuras críticas (hospitales, estaciones de bomberos/policía, servicios públicos)	No es importante	Neutral	Algo importante	Muy importante
Prevención del desarrollo en áreas peligrosas (por ejemplo, áreas propensas a inundaciones)	No es importante	Neutral	Algo importante	Muy importante
Protegiendo del medio ambiente natural	No es importante	Neutral	Algo importante	Muy importante
Protegiendo de puntos de referencia históricos/culturales	No es importante	Neutral	Algo importante	Muy importante
Protegiendo a los impulsores económicos y a los turistas ubicaciones	No es importante	Neutral	Algo importante	Muy importante
Mejorando las capacidades de respuesta a emergencias (bomberos/policía/emergencia de gestión y formación)	No es importante	Neutral	Algo importante	Muy importante

Public Survey (Spanish) Page 3 of 5

6. De los siguientes proyectos, seleccione hasta 3 que serían más importantes a su comunidad reducir riesgo y ser más resiliente.

- ☐ **Sirenas de alerta/advertencia**
- ☐ **Generadores de respaldo**
- ☐ **Creando protocolo de respuesta a la sequía**
- ☐ **Mejoras de seguridad cibernética**
- ☐ **Estudio de drenaje**
- ☐ **Eliminación de árboles peligrosos**
- ☐ **Construcción o mejoras de diques**
- ☐ **Educación Pública sobre Peligros**
- ☐ **Habitaciones seguras y refugios para tormentas**
- ☐ **Mejoras en el sistema de aguas pluviales (estabilización de bancos, mejoras de drenaje, aumento del tamaño de las alcantarillas, etc.)**
- ☐ **Mecanismos de Planificación Actualizados (Plan Integral, Códigos de Construcción, Reglamentos de Zonificación, etc.)**
- ☐ **Medidas de protección de servicios públicos (electricidad, gas, etc.)**
- ☐ **Medidas de protección del sistema de agua y alcantarillado sanitario**
- ☐ **Reducción de Combustibles para Incendios Forestales / Creación de Pausas de Combustible**
- ☐ **Otro: _____**

7. ¿Cómo te ha afectado la sequía en el pasado? (Marque todo lo que corresponda)

- ☐ **Restricciones voluntarias de agua**
- ☐ **Restricciones obligatorias de agua**
- ☐ **Pérdida de cosechas**
- ☐ **Plantó diferentes cultivos**
- ☐ **Aumento de los incendios forestales y de pastizales**
- ☐ **Bajaron los niveles de pozos privados**
- ☐ **Pozo privado se quedó sin agua**
- ☐ **Reducción del consumo de agua**
- ☐ **Problemas de calidad del agua**
- ☐ **Empeoramiento de la salud mental**
- ☐ **Otro: _____**

Public Survey (Spanish) Page 4 of 5

8. Por favor, clasifique su nivel de apoyo a las siguientes acciones de gestión de la sequía si fueran tomadas por el **NRD** durante un evento de sequía prolongada.

1 = Muy En Contra, 2 = Contra, 3 = Neutral, 4 = A Favor, 5 = Muy A Favor

Educación Pública y Divulgación		**Prohibir el desarrollo de nuevas hectáreas agrícolas de regadío**	
Boletín de Sequía		**Prohibir la transferencia o los acres irrigados**	
Requerir medidores de flujo en equipos de riego		**Prohibir los pozos suplementarios**	
Requerir transductores en los pozos		**Restricciones en el uso del agua para el próximo año**	
Mayor monitoreo del riego		**Se permite la reducción de acres de regadío**	
Fomentar la siembra preventiva o alternativa		**Asignación del uso del agua en acres irrigados**	
Alentar a las comunidades a implementar restricciones de agua		**Reducción en el uso de pozos industriales**	

9. Por favor, clasifique su nivel de apoyo a las siguientes acciones de gestión de la sequía si fueran tomadas por su **comunidad** durante un evento de sequía prolongada.

1 = Muy En Contra, 2 = Contra, 3 = Neutral, 4 = A Favor, 5 = Muy A Favor

Educación Pública y Divulgación		**Implementación de restricciones voluntarias de agua**	
Mayor monitoreo de los niveles de los pozos y la calidad del agua		**Implementación de restricciones de regar cada dos días**	
Fomentar la plantación de paisajes tolerantes a la sequía		**Implementación de no regar del césped o el lavado de autos**	
Reducir o eliminar el riego de parques públicos y otros espacios públicos		**Reducir la cantidad de agua que pueden usar las empresas locales**	

10. ¿Qué le gustaría que hiciera su comunidad para ayudar a reducir el riesgo de desastres naturales o eventos climáticos severos en el futuro?

Public Survey (Spanish) Page 5 of 5

¡Gracias por su tiempo! Las encuestas completadas pueden entregarse, enviarse por correo postal o por correo electrónico a:

Lower Platte North NRD
Attn: Ryan Chapman
511 Commercial Park Road
Wahoo, NE 68066
rchapman@lpnnrd.org

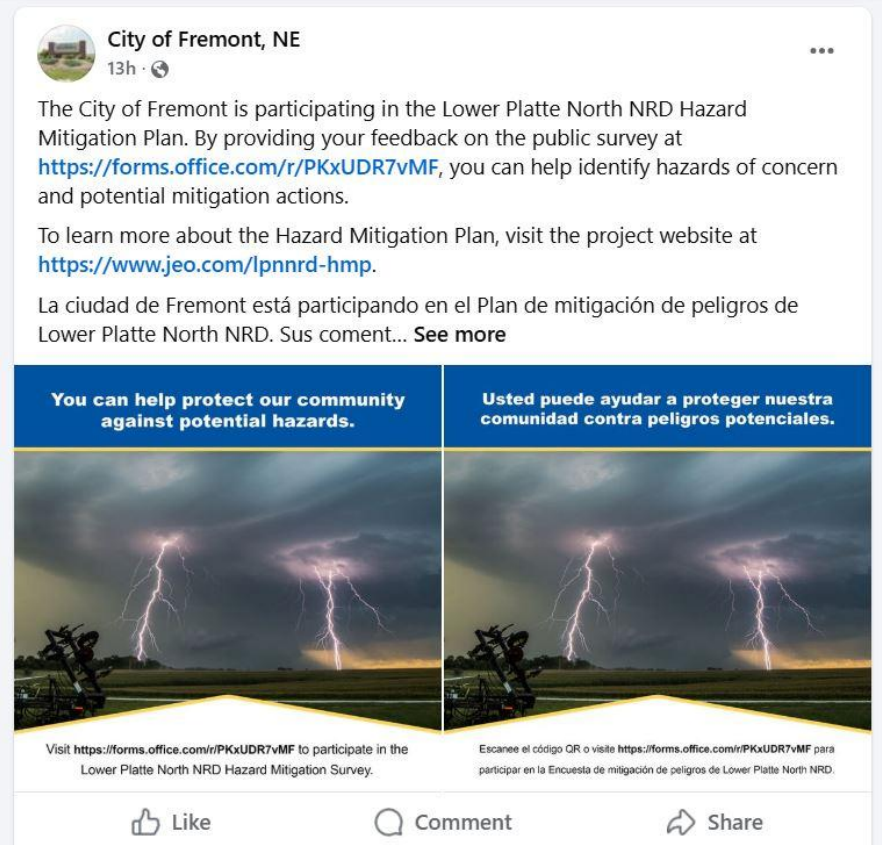
O para: JEO Consulting Group
Attn: Karl Dietrich
2000 Q Street, Ste 500
Lincoln, NE 68503
kdietrich@jeo.com

Para obtener más información sobre el plan, por favor visite https://www.jeo.com/lpnnrd-hmp.

Public Survey Postings

All participants were asked to post the survey on their website and on social media. Below is an example of a social media post about the survey. The survey was also posted on the NRD website and social media, county websites and social media, economic development websites, and was sent to vulnerable populations identified during the kickoff meeting.

One of Several Social Media Posts for the Public Survey

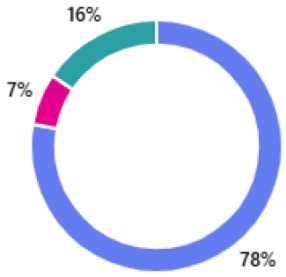


Public Survey Summarized Responses

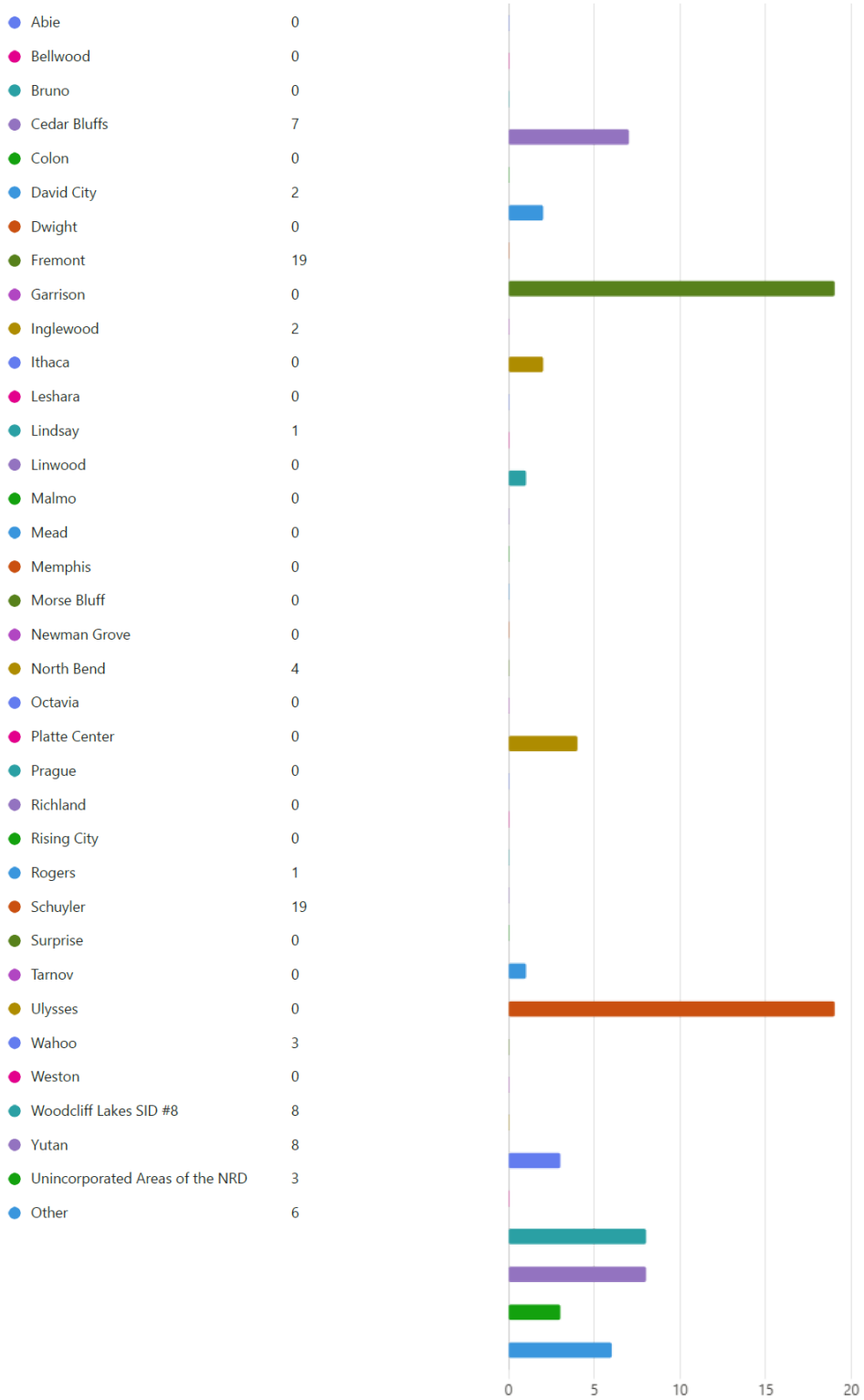
Results of the public survey can be found below. In total there were 80 responses from members of the public. Results of the public survey were shared with participating jurisdictions during the Round 2 meeting. Due to the low number of responses, the results could only be used by a few communities to help influence hazard prioritization and mitigation actions selected by local planning teams.

1. What affiliation within the planning area do you have? (Check all that apply)

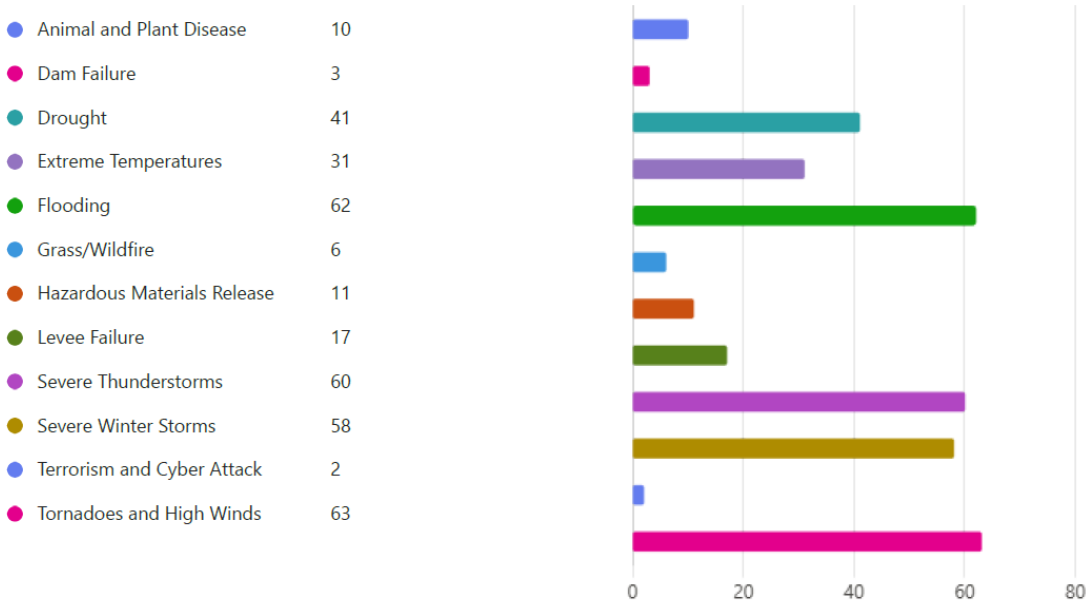
Resident	70
Business Owner	6
Employed within the Lower Platte North NRD Boundary, Butler County, Saunders County, or Dod...	14



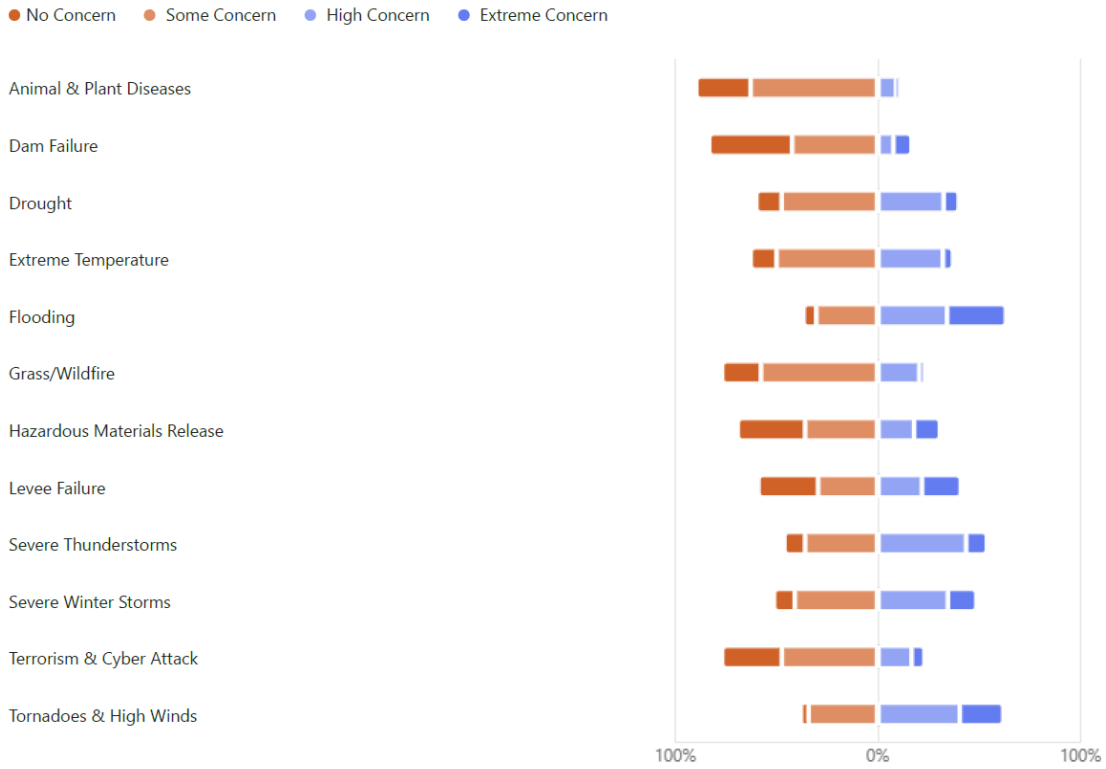
2. Please select which jurisdiction you live in.



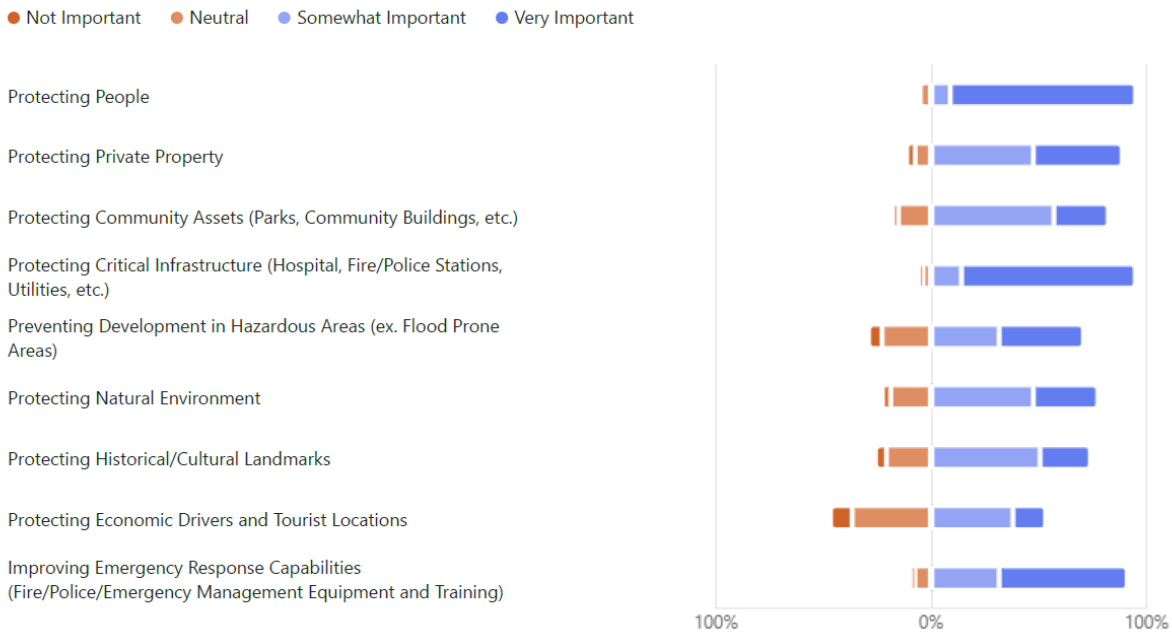
3. What types of hazards have you experienced in your community/work? (Check all that apply)



4. Please rank your level of concern regarding these hazard events occurring in your jurisdiction or impacting your residence or workplace.



5. Preparing for a disaster can take many forms. Of the following items, please circle your level of importance to you.

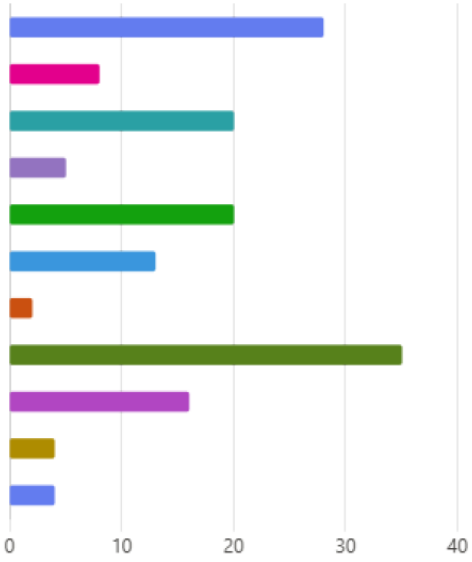


6. Of the following projects, select up to **3** that would be most important to your community to reduce risk and be more resilient?

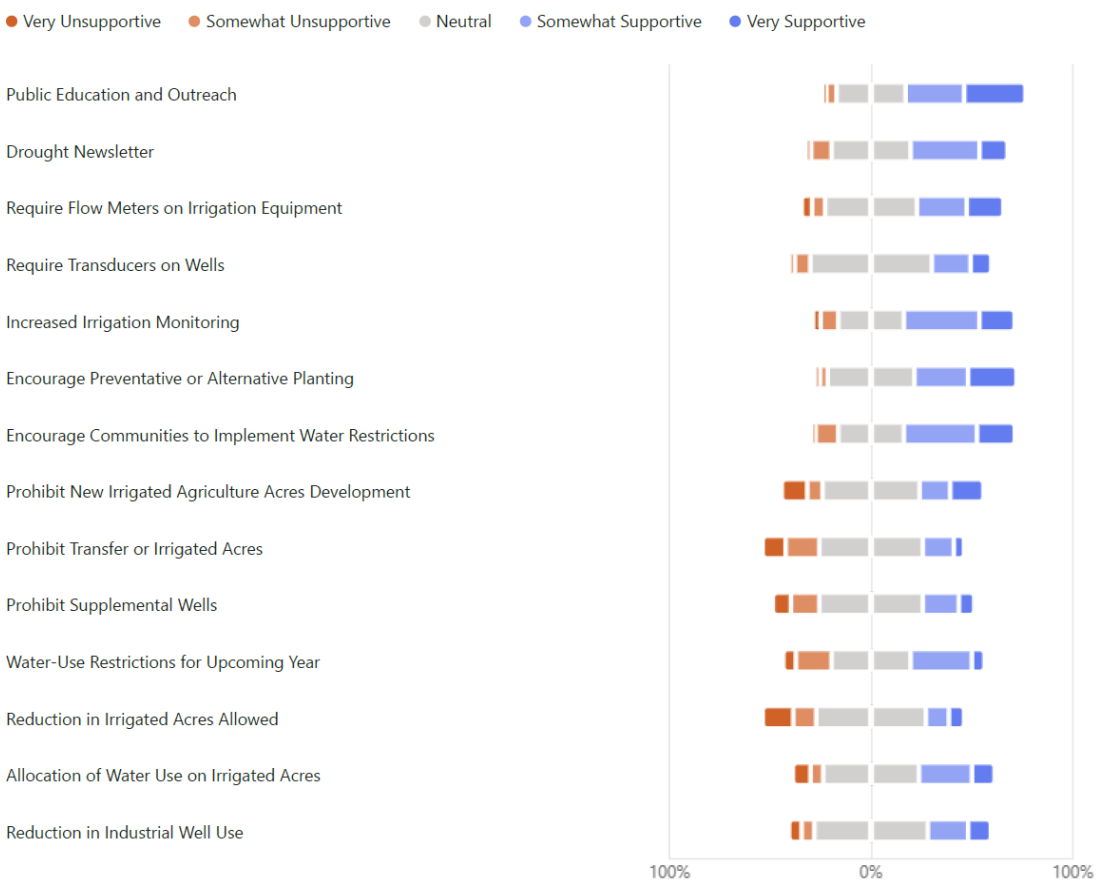


7. How has drought impacted you in the past? (Check all that apply)

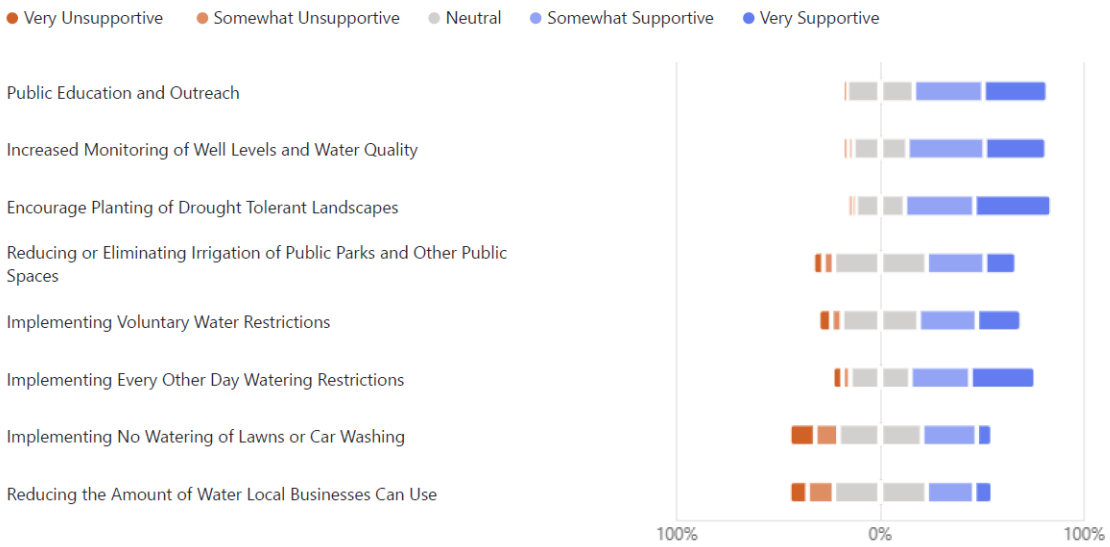
Voluntary Water Restrictions	28
Mandatory Water Restrictions	8
Crop Loss	20
Planted Different Crops	5
Increased Grass/Wildfires	20
Private Well Levels Dropped	13
Private Well Ran Out of Water	2
Reduced Your Water Use	35
Water Quality Issues	16
Worsened Mental Health	4
Other	4



8. Please rank your level of support for the following drought management actions if they were to be taken by the **NRD** during a prolonged drought event.



9. Please rank your level of support for the following drought management actions if they were to be taken by your **community** during a prolonged drought event.

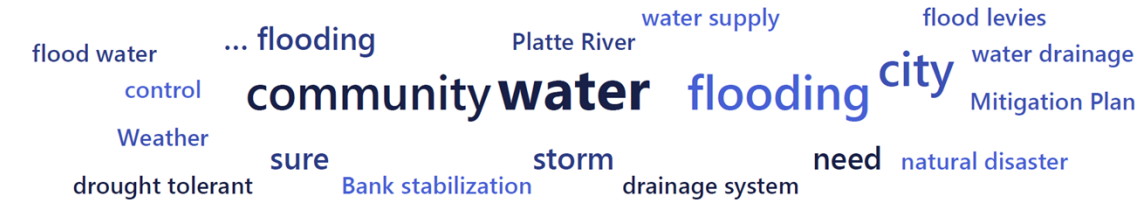


10. What is one thing you'd like your community to do to help reduce risk to natural disasters or severe weather events in the future?

40
Responses

Latest Responses
"Better control of sirens. Have been 30 minutes early, no notification until afterwar... "
...

7 respondents (18%) answered water for this question.



Round 1 Meeting Invitations

Participating Jurisdictions Round 1 Meeting Invitation

May 17, 2024

RE: Lower Platte North NRD Hazard Mitigation Plan Round One Public Meeting

Dear Hazard Mitigation Planning Participant,

The Lower Platte North NRD is beginning the first phase of its Hazard Mitigation Plan update. A hazard mitigation plan examines regional and local vulnerabilities to a range of hazards (e.g., flooding, severe winter storms, drought, etc.) and identifies strategies and projects to reduce their impact. Your jurisdiction is required to attend a meeting in order to participate in the plan. Once a community, county, or district (School District, Fire District, Drainage District, etc.) is part of an approved plan, they become eligible for up to a 75% cost share from the Federal Emergency Management Agency (FEMA) for a variety of projects listed in the plan.

FEMA requires at least one representative from your jurisdiction to attend planning meetings. Each meeting will last approximately 1 to 1.5 hours. The first two meeting options **can be attended in**-person or virtually. The third meeting option is virtual only. Please **attend one** of the three options.

The first round of planning meetings will be held in:

- Wahoo: Monday, **June 17, 2:00 pm** at the Clint Johannes (Lake Wanahoo) Education Building, 1655 County Road 16, Wahoo, NE 68066
  - Or Join Online at https://us02web.zoom.us/j/83988928199
- David City: Thursday, **June 20, 6:30 pm** at the Hruska Memorial Library, 399 N 5th St, David City, NE 68632
  - Or Join Online at https://us02web.zoom.us/j/82665220770
- Virtual Option: Wednesday, **June 26, 10:00 am**
  - Join Online at https://us02web.zoom.us/j/89276107971

If you are joining online, you can access and download your jurisdiction's meeting worksheets starting June 14th by visiting this Google Drive link: https://bit.ly/LowerPlatteNorth-GoogleDrive.

Lower Platte North NRD is working with JEO Consulting Group to help update the plan. **Please RSVP** to one of the meetings by contacting Anthony Kohel, JEO Planner, at (402) 474-8753 or akohel@jeo.com. For more information, you can visit the project website at https://www.jeo.com/lpnnrd-hmp. If you have any questions, please contact the Lower Platte North NRD, JEO, or your county emergency manager. We are looking forward to seeing you at the first round of meetings!

Sincerely,

Anthony Kohel, Planner
JEO Consulting Group
On behalf of Lower Platte North NRD

cc. Ryan Chapman, Lower Platte North NRD
Mark Doehling, Butler County EM; Tom Smith, Dodge County EM; Terry Miller, Saunders County EM; Tim Hofbauer, Platte County EM; Mark Arps, Colfax County EM

JEO CONSULTING GROUP, INC.
JEO ARCHITECTURE, INC.
p: 402.435.3080
f: 402.435.4110
2000 Q Street, Suite 500
Lincoln, Nebraska 68503
jeo.com

Stakeholders Round 1 Meeting Invitation

June 5, 2024

RE: Lower Platte North NRD Hazard Mitigation Plan Round One Public Meeting

Dear Hazard Mitigation Planning Stakeholder,

The Lower Platte North NRD is beginning the first phase of its Hazard Mitigation Plan update. You are receiving this letter because you are a potential stakeholder for this planning effort. The hazard mitigation plan examines regional and local vulnerabilities to a range of hazards (i.e. flooding, severe winter storms, drought, chemical spills, etc.) and identifies strategies and projects to reduce their impact.

As a stakeholder, you are encouraged to provide input to the planning process to ensure identified mitigation efforts are appropriate and consistent with the special needs of the organization you represent. Your input will be integrated into the larger community profile prepared by your community's local representatives. The first two meeting options can be attended in-person or virtually. The third meeting option is virtual only. Please **attend one** of the three options.

The first round of planning meetings will be held in:

- Wahoo: Monday, **June 17, 2:00 pm** at the Clint Johannes (Lake Wanahoo) Education Building, 1655 County Road 16, Wahoo, NE 68066
  - Or Join Online at https://us02web.zoom.us/j/83988928199
- David City: Thursday, **June 20, 6:30 pm** at the Hruska Memorial Library, 399 N 5th St, David City, NE 68632
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- Virtual Option: Wednesday, **June 26, 10:00 am**
  - Join Online at https://us02web.zoom.us/j/89276107971

Lower Platte North NRD is working with JEO Consulting Group to help update the plan. **Please RSVP** to one of the meetings by contacting Anthony Kohel, JEO Planner, at (402) 474-8753 or akohel@jeo.com.

A Public Survey was also created to better understand the impacts and concerns of stakeholders in the planning area. The survey can be found here: https://forms.office.com/r/PKxUDR7vMF

For more information, you can visit the project website at https://www.jeo.com/lpnnrd-hmp. If you have any questions, please contact the Lower Platte North NRD, JEO, or your county emergency manager. We are looking forward to seeing you at the first round of meetings!

Sincerely,

Anthony Kohel, Planner
JEO Consulting Group
On behalf of Lower Platte North NRD

cc. Ryan Chapman, Lower Platte North NRD
Mark Doehling, Butler County EM; Tom Smith, Dodge County EM; Terry Miller, Saunders County EM; Tim Hofbauer, Platte County EM; Mark Arps, Colfax County EM

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p: 402.435.3080
f: 402.435.4110
2000 Q Street, Suite 500
Lincoln, Nebraska 68503
jeo.com

Neighboring Jurisdictions Round 1 Meeting Invitation

May 17, 2024

RE: Lower Platte North NRD Hazard Mitigation Plan Round One Public Meeting

To Whom it May Concern:

This letter is being sent to inform your jurisdiction of a planning effort underway by the Lower Platte North NRD to update its Hazard Mitigation Plan (HMP), with assistance from JEO Consulting Group. FEMA requires that neighboring communities be notified of this planning effort and are encouraged to attend the public informational meetings.

An HMP is a community-guided document that identifies both vulnerability to natural hazards and mitigation measures to reduce or eliminate this vulnerability. Neighboring jurisdictions are encouraged to provide input to the planning process or attend meetings to ensure identified mitigation efforts are regionally appropriate and consistent with those identified within other communities in the region. The first two meeting options can be attended in-person or virtually. The third meeting option is virtual only.

The first round of planning meetings will be held in:

- Wahoo: Monday, **June 17, 2:00 pm** at the Clint Johannes (Lake Wanahoo) Education Building, 1655 County Road 16, Wahoo, NE 68066
  - Or Join Online at https://us02web.zoom.us/j/83988928199
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  - Or Join Online at https://us02web.zoom.us/j/82665220770
- Virtual Option: Wednesday, **June 26, 10:00 am**
  - Join Online at https://us02web.zoom.us/j/89276107971

Please RSVP to one of the meetings by contacting Anthony Kohel, JEO Planner, at (402) 474-8753 or akohel@jeo.com.

For more information, you can visit the project website at https://www.jeo.com/lpnnrd-hmp. We are looking forward to seeing you at the first round of meetings!

Sincerely,

Anthony Kohel, Planner
JEO Consulting Group
On behalf of Lower Platte North NRD

cc. Ryan Chapman, Lower Platte North NRD
Mark Doehling, Butler County EM; Tom Smith, Dodge County EM; Terry Miller, Saunders County EM; Tim Hofbauer, Platte County EM; Mark Arps, Colfax County EM

JEO CONSULTING GROUP, INC.
JEO ARCHITECTURE, INC.
p: 402.435.3080
f: 402.435.4190
7000 G Street, Suite 500
Lincoln, Nebraska 68503
jeo.com

Round 1 Sign-In Sheets

In Person Sign-In Sheets

Wahoo Round 1 Meeting Sign-In Sheet Page 1 of 3

Lower Platte North NRD Hazard Mitigation Plan Update
Round 1 Meeting
Wahoo, NE – June 17th, 2024 – 2:00 PM

NAME	TITLE	DISTRICT/JURISDICTION Represented	ADDRESS Street #, Street Name, City, Zip	PHONE	EMAIL	SIGNATURE
Becky Appleford	Project Manager	JEO Consulting	11213 Davenport St, Ste 200 Omaha, NE 68154	402-392-9915	rappleford@jeo.com	
Mary Baker	Resiliency Strategist	JEO Consulting	2000 Q St, Ste 500 Lincoln, NE 68503	402-474-8748	mbaker@jeo.com	
Ruva Tsoka	Community Planner	JEO Consulting	11213 Davenport St, Ste 200 Omaha, NE 68154	402-934-3680	rtsoka@jeo.com	
Tom Smith	Emergency Manager	Dodge County	435 N Park Fremont, NE 68025	402-727-2785	emergencymanagement@dodgecountyne.gov	
Mark L. Arps	Emergency Manager	Colfax County	411 E 11th St Schuyler, NE 68661	402-352-7958	marps@colfaxne.com	
David Polacek	Clerk	Village of Abie	207 Ash St, Abie, NE 68001	402-367-2948	davep335@gmail.com	
Theresa Busse	Clerk/Floodplain Administrator	City of North Bend	PO Box 401 607 Main Street, North Bend, NE 68649	402-652-3584	cinoben@gpcom.net	
Kimberly Shanahan	Board Chairperson/Floodplain Administrator	Village of Cedar Bluffs	PO Box 249 Cedar Bluffs, NE 68015	402-628-3115	Kimberly.d.shanahan@gmail.com	
Cynthia Ourada	Clerk	Village of Colon	PO BOX 10 Colon, NE 68010-0010	402-443-6251	villageofcolon@yahoo.com	
June Moline	Clerk/Floodplain Administrator	Village of Mead	PO Box 46 Mead, NE 68041	402-624-2495	meadclerk1@hotmail.com	
Jeremy Stanislav	Board Member	Village of Prague	PO BOX 207 Prague, NE 68050-0207			
Debi Wade	Board Member	Village of Prague	PO BOX 207 Prague, NE 68050-0207			
Robert Costa	Floodplain Administrator	City of Yutan	PO Box 215 Yutan, NE 68073	402-625-2112	rcosta@cityofyutan.com	
Jason Cline	Superintendent	Lakeview Community Schools	3744 83rd St. Columbus, NE 68601	402-564-8518	jcline@lakeview.esu7.org	
Michael Eason	Chairman	Cotterell Diking and Drainage District				
Dan Ellsworth	Network Operations Director	Educational Service Unit #7	2657 44th Ave. Columbus, NE 68601	402-564-5753 Ext.1037	ellsworth@esu7.org	
Jerry Abrahamson	VICE CHAIRMAN	Village of Inglewood	140 Boulevard Street Inglewood, NE 68025	402-720-4565	JERRY ABRAHAMSON @YAHOO.COM	
Gary Swartz	Clerk/Floodplain Admin	Village of Malmo	PO Box 24 Malmo, NE 68040	(402) 642-5247	gswartz@cornerstoneconnect.com	
Melissa Harrell	City Administrator	City of Wahoo	605 North Broadway Wahoo, NE 68066	(402) 443-3222	harrell@wahoo.ne.us	

Please Sign In!

Wahoo Round 1 Meeting Sign-In Sheet Page 2 of 3

Lower Platte North NRD Hazard Mitigation Plan Update
Round 1 Meeting
Wahoo, NE – June 17th, 2024 – 2:00 PM

NAME	TITLE	DISTRICT/JURISDICTION Represented	ADDRESS Street #, Street Name, City, Zip	PHONE	EMAIL	SIGNATURE
Fred Hoefer	Board Chairperson	Village of Lindsay	PO Box 66 Lindsay, NE 68644	402 936 5610	hoefer@gmail.com	Fred Hoefer
Shari Auge	Clerk	City of Newman Grove	PO Box 446 Newman Grove, NE 68758	(402) 447-6444	SAUGE@CITYOFNEWMANGROVE.COM	
Jim Ondracek	Fire Chief	Colon Vol Fire Dept/ Pohocco Township	PO BOX 66 Colon, NE 68018	402-721-4953	jimondracek@hotmail.com	
Brian Juranek	Clerk	Bone Creek Township	4431 O Rd. Bellwood, NE 68624	402-954-0121		
Tyler Williams	Materials Manager	Omaha Steel	921 East 12th Street Wahoo, NE 68066	402-650-0909	twilliams@omahasteel.com	
Erin Wendt	Outreach & NFIP Specialist	NeDNR	245 Fallbrook Blvd Lincoln, NE 68521		Erin.Wendt@nebraska.gov	
Platt Valley	Dike					
Ron Dreier	Chairman		R163 Co RS Yutan	4025715151	None	
Kim Novak	CED	FSA - Dodge Sarpy Douglas		402-276-6477	Kim.novak@usda.gov	
Grant Hansen	President	Amos Dike Dist	1387 old Lincoln Hwy Amos NE	402-995-1162		
Bubba Brabec	President	Wahoo township	1110 Cdr K Mead Ne, 68041	402) 480-2596	Bubbabrabec@gmail.com	
Sean Elliott	Projects/Rural Water	LPNNRD	po Box 126	402-443-4675	SELLIOTT@LPNNRD.ORG	
Lacey Sebatka	Information Coordinator	LPNNRD	"	"	lsebatka@lpnnrd.org	
Ryan Chapman	NRD Assistant Manager	LPNNRD	"	"	rchapman@lpnnrd.org	
Tom Soth	Dodge County Em	Dodge County	—	—	—	

Please Sign In!

Wahoo Round 1 Meeting Sign-In Sheet Page 3 of 3

Lower Platte North NRD Hazard Mitigation Plan Update
Round 1 Meeting
Wahoo, NE – June 17th, 2024 – 2:00 PM

NAME	TITLE	DISTRICT/JURISDICTION Represented	ADDRESS Street #, Street Name, City, Zip	PHONE	EMAIL	SIGNATURE
Dennis Polacek	Chairman		Ab. Co		dennis.polacek@nrd.ne.gov	
Jim Ondracek	Fire Chief Township treasurer	Colon Fire Dept/Dist Polacco Township	2350 C R 12 Fremont NE 68025	402-720-1816	jimondracek@hotmail.com	
TERRY MILLER	DIRECTOR	SAUNDERS CO EMA	387 N chestnut	402 443 5645	tmiller@saundersCounty.ne.gov	Terry Miller

Please Sign In!

David City Round 1 Meeting Sign-In Sheet Page 1 of 2

Lower Platte North NRD Hazard Mitigation Plan Update
Round 1 Meeting
David City, NE – June 20, 2024 – 6:30 PM

NAME	TITLE	DISTRICT/JURISDICTION Represented	ADDRESS Street #, Street Name, City, Zip	PHONE	EMAIL	SIGNATURE
Karl Dietrich	Hazard Mitigation Planner	JEO Consulting Group	2000 Q St. Ste 500 Lincoln, NE 68503	402-742-7213	kdietrich@jeo.com	
Anthony Kohel	Hazard Mitigation Planner	JEO Consulting Group	2000 Q St. Ste 500 Lincoln, NE 68503	402-474-8753	akohel@jeo.com	
Ryan Chapman	Assistant Manager	Lower Platte North NRD	PO Box 126 Wahoo, NE 68066	402-443-4675	rchapman@lpnnrd.org	
Tami L. Comte	Clerk/City Administrator (Interim)	David City	PO Box 191 David City, NE 68632	402-367-3135	tcomte@davidcityne.com	
Jean Andrews	Floodplain Administrator	Dodge County	435 North Park Avenue Room 204 Fremont, NE 68025	(402) 727-2724	zoning@dodgecountyne.gov	
John R. Wood	Treasurer	Savannah Township	1141 43 ½ Rd Bellwood, NE 68624	402-367-2039		
Kathy Eaton	Clerk/ Secretary	Village of Linwood/ Platte Township	PO BOX 104 Linwood, NE 68036		villageoflinwood@hotmail.com	
Eileen Kopecky	Clerk	Village of Octavia	545 Dix St Octavia, NE 68632	(402) 539-2315		
Rolland Kavan	Treasurer	Bohemia Township	2849 County Road 27 Morse Bluff, NE 68648	402-666-5356		
Keith Strizek		Newman Township	2945 County Road H Valparaiso, NE 68065	402-642-5616		
Jeremy Cihal	Chairperson	Plum Creek Township	1470 26 Rd. Dwight, NE 68635	402-525-8295		
Ted Glock	Treasurer	Reading Township	2911 F Rd. Rising City, NE 68658	402-367-7551	tedglock@outlook.com	
Larry Polivka	Floodplain Administrator	Village of Bruno	PO Box 152 Bruno, NE 68014	(402) 954-0674		
Matthew Sobota	Utilities Superintendent	City of Schuyler	1103 B Street Schuyler, NE 68661	(402) 352-5444	msobota@schuylerdou.org	
Frank Fichtl	Treasurer	Summit Township	3461 G Rd. David City, NE 68632	402-367-2352	Frankfichtl@hotmail.com	
Dan Coufal	President	Richardson	P.O. Box 7 Dwight	402-367-3115		
MARK DOESHLINE	EMERGENCY MANG.	BUTLER CO.		402-643-5539	MDOESHLINE@BUTLERCOUNTYNE.GOV	
George Vrana	Chairman	Sarpy Rebuin	3021 Linwood Rd Linwood NE			
Karl Gaiser	Chairman	Village of Surprise	480 Main St Surprise	402 954 8356	kegaiser@protonmail.com	

Please Sign In!

David City Round 1 Meeting Sign-In Sheet Page 2 of 2

Lower Platte North NRD Hazard Mitigation Plan Update
Round 1 Meeting
David City, NE – June 20, 2024 – 6:30 PM

NAME	TITLE	DISTRICT/JURISDICTION Represented	ADDRESS Street #, Street Name, City, Zip	PHONE	EMAIL	SIGNATURE
DON CARLEY	CHAIRMAN	Summit Township	240 ROAD 35	5124231322	DDCARLEY@AOL.COM	Don Carley
Roger Svoboda	Clerk	Franklin	1740 34RD	402-367-4616		Roger Svoboda
Barbara Rezac	Clerk	Newman Saunders County	1040 C&RD 28 Weston	642-5525		Barbara Rezac
Jeannie Zygan	treasurer	Village of Odell	383 Fremont	402-917-3519	—	Jeannie Zygan
Roger Tupil	Chairman	Rising City Rural Fire Dist	3241 C ROAD	402-942-5012	topewtnp2@hotmail.com	Roger
Beth Beringe	Board member	Octavia Village	437 D'X ST	402 539 2598		Beth Beringe
BRIAN Juranek	Clerk	Bone Creek Township	4431 ORD Lot 22	402-954-0121	juranekfarms@yhoo.com	Brian Juranek
Jim Reruche	SECRETARY operator	Skull Creek Township	2161 35rd Bruno NE.	402-641-3801	jimanabrund@gmail.com - DNA	Jim Reruche
Marianne Ziethen	Secretary	UNION Township	105 Holmes ST	402 367-4612		Marianne Ziethen

Please Sign In!

Round 1 Meeting Virtual Attendees

Wahoo (Hybrid) – June 17	David City (Hybrid) - June 20	Virtual Attendees – June 26
Theresa Busse – City of North Bend	Rex Pfeil – David City Public Schools	Darlene Divis – Village of Rogers
Harlan Ptomey – Cedar Bluffs Public School	Kathy Eaton	Tami Comte – City of David City
Jason Cline – Lakeview Community Schools		Lora Johnson – City of Schuyler
PJ Quinn – Mead Public Schools		Raiko Martinez – City of David City
Justin Krafka – Alexis Township		Ryan Chapman – Lower Platte North NRD
Tonja Frank – Morse Bluff Township		Lonnie Marht – Woodcliff Lakes SID #8
Jeff Hines – Morse Bluff Township		Bruce Arp – Weston Fire & Rescue
Erin Wendt – NeDNR		Terrence St.Hilaire – Village of Dwight
Jacob Dunn – Three Rivers Public Health Department		Kathy Eaton – Village of Linwood/Platte Township (Butler County)
Shari Auge' – City of Newman Grove		Mel Ruhe-Langfeldt – Village of Leshara
James Wilcynski – Lake Ventura SID		Grant Fitzgerald – North Cedar Township
Ron – Lake Ventura SID		Daryl Andersen – Lower Platte North NRD
Nicholas Walsh – Methodist Health System		
Jake Herre – Methodist Health System		
Mitch Hoffer – Educational Service Unit #2		
Lalit Jha – JEO Consulting Group		
Marisa Alveres – NEMA		
Angelina Allen – NEMA		

Round 1 Example Participant Profile with Questions

Community Profile

Village of Abie

Lower Platte North NRD
Hazard Mitigation Plan 2025

Name(s): _____

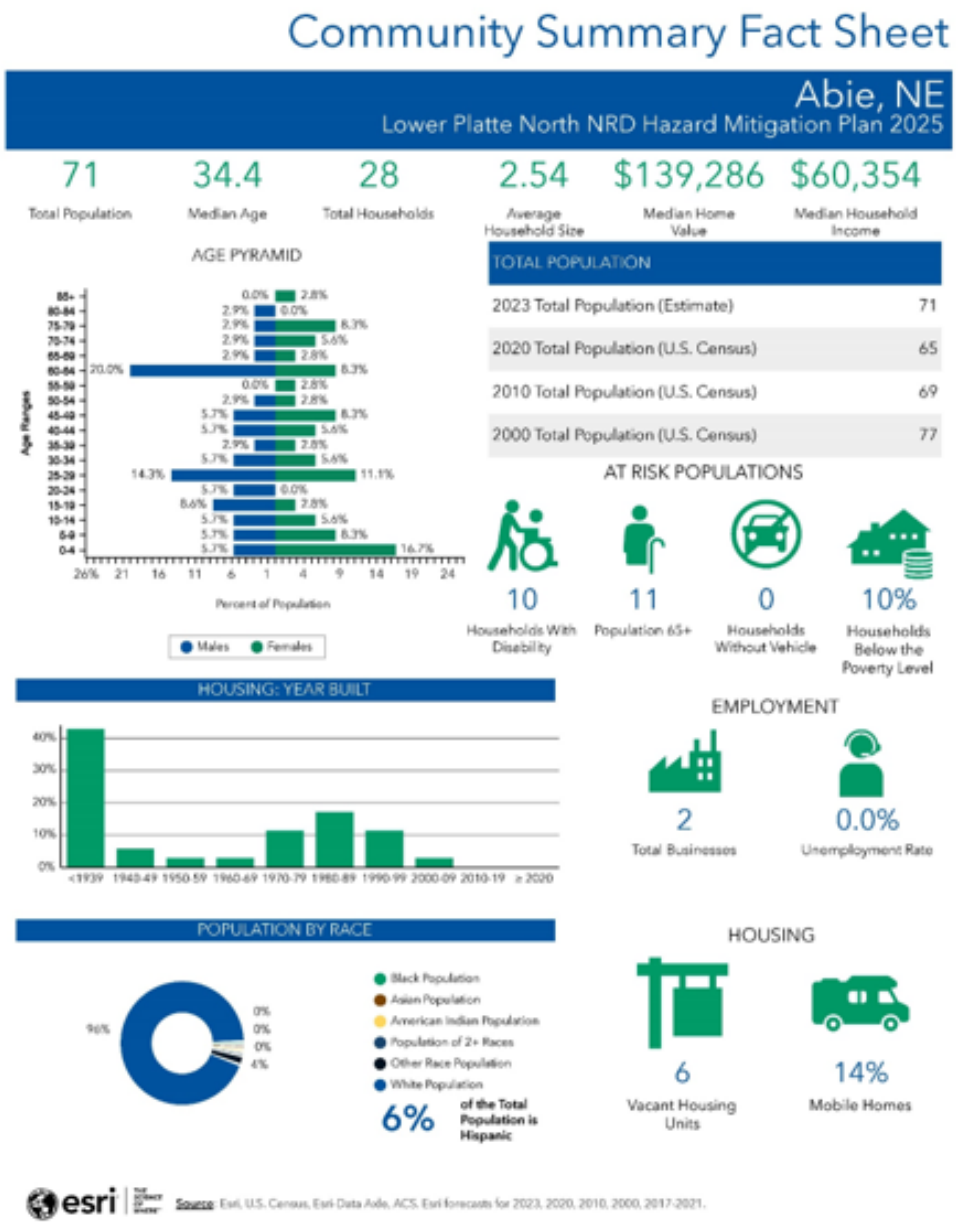
Date: _____

Worksheets Due By: _____

Please answer the questions in red italics. Your responses are critical for completing this Community Profile.

Completed Community Profiles and other worksheets can be returned to JEO Consulting Group, Attn: Karl Dietrich, 2000 Q Street Ste 500, Lincoln, NE 68503 or kdietrich@jeo.com. If you have any questions, please call 402-742-7213.

Community Fact Sheet



Local Planning Team

Abie Local Planning Team

Name	Title	Jurisdiction	Round 1 Meeting	Round 2 Meeting

Plan Maintenance

Information will be added for the Round 2 meeting.

Capability Assessment

The planning team assessed the Village of Abie's hazard mitigation capabilities by reviewing planning and regulatory capabilities, administrative and technical capabilities, fiscal capabilities, and education and outreach capabilities.

Please check the right column in the following table for your community. The table includes responses from the 2020 HMP. If there have been changes or updates, please cross out the answer and provide the updated answer. Fill in any missing information highlighted in red.

Abie Capability Assessment

Capability/Planning Mechanism		Yes/No
Planning & Regulatory Capability	Comprehensive Plan	No
	Capital Improvements Plan	No
	Economic Development Plan	No
	Emergency Operations Plan	County
	Floodplain Management Plan	No
	Storm Water Management Plan	No
	Zoning Ordinance	No
	Subdivision Regulation/Ordinance	No
	Floodplain Ordinance	No
	Building Codes	No
	Water System Emergency Response Plan	
	Wellhead Protection Plan	
	National Flood Insurance Program	No
	Community Rating System	No
	Community Wildfire Protection Plan	Yes (Regional)
	Other (if any)	
Administrative & Technical Capability	Planning Commission	No
	Floodplain Administrator	No
	GIS Capabilities	No
	Chief Building Official	No

Capability/Planning Mechanism		Yes/No
	Civil Engineering	Yes
	Grant Manager	No
	Mutual Aid Agreement	Yes
	Other (if any)	
Fiscal Capability	1- & 6-Year Plan	
	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	No
	Gas/Electric/Water/Sewer Service Fees	No
	Storm Water Service Fees	No
	Development Impact Fees	No
	General Obligation Revenue or Special Tax Bonds	No
	Other (if any)	
Education & Outreach Capability	Local Citizen Groups or Non-Profit Organizations Focused on Environmental Protection, Emergency Preparedness, Access and Functional Needs Populations, etc.	No
	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	No
	Other (if any)	

Please rate your jurisdiction's overall capability in the following ways (Limited, Moderate, or High)

Abie Overall Capability

Capability	Limited/Moderate/High
Financial Resources to Implement Mitigation Projects	
Staff/Expertise to Implement Projects	
Public Support to Implement Projects	
Time to Devote to Hazard Mitigation	
Ability to Expand and Improve the Identified Capabilities to Achieve Mitigation	

National Flood Insurance Program (NFIP)

Abie NFIP Information

NFIP Overview	
Date of NFIP Participation:	N/A
Floodplain Administrator:	N/A
Is Floodplain Administrator a Certified Floodplain Manager?	N/A
Is Floodplain Management an Auxiliary Function?	N/A
Number of NFIP Policies In-Force:	N/A
Total NFIP Premium ($):	N/A
Total NFIP Coverage ($):	N/A
Number of Claims Paid Out:	N/A
Total Amount of Claims Paid Out ($:)	N/A
Number of Repetitive Loss Structures:	N/A
Number of Severe Repetitive Loss Structures:	N/A
Is the Community Currently Suspended from the NFIP?	N/A
Any Outstanding Compliance Issues?	N/A
FIRMs Digital or Paper?	Digital
Located in a RISK Map Area?	No

Parcel Improvements and Valuation

The planning team acquired GIS parcel data from the County Assessor to analyze the location, number, and value of property improvements (e.g. buildings, garages, sheds etc.) located in the 100-year and 500-year floodplains 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 tables.

Data to be included at Round 2 Meeting.

Abie Parcel Improvements and Value in the 100-Year Floodplain

Number of Improvements	Total Improvement Value	Number of Improvements in Floodplain	Value of Improvements in Floodplain	Percentage of Improvements in Floodplain

Source: County Assessor, 2024

Abie Parcel Improvements and Value in the 500-Year Floodplain

Number of Improvements	Total Improvement Value	Number of Improvements in Floodplain	Value of Improvements in Floodplain	Percentage of Improvements in Floodplain

Source: County Assessor, 2024

Plans and Studies

Please fill out the plan integration worksheet to add this information.

Future Development Trends

What has changed over the past five years? (For example: new housing or businesses? Demolished buildings? New roads or areas of improvement?) Where did these changes take place?

Were any new structures developed in the floodplain or other hazardous areas? (For example, near chemical sites, the Wildland-Urban Interface, dam or levee inundation areas?) If so, what types of structures and where were they developed?

Are any new housing developments or new businesses/industry planned in the near future? Where? Are they going to be located in the floodplain or other hazardous areas?

Does your community have a future land use map? If yes, please provide a copy.

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.



Please review the table of community lifelines identified in the past plan and provide any changes as needed. Remove any lifelines by crossing them out.

Abie Community Lifelines

CL Number	Name	Generator (Y/N)
1	Fire Hall	Yes
2	Water Tower	No
3	Well	Yes
4	Well	Yes

Please provide a list of additional community lifelines (not identified above) for your community in the table below. Include the address and if they have a backup generator.

Name	Address or Intersection	Generator (Y/N)

Abie Community Lifelines Map
Map will be added before the Round 2 Meetings

Hazard Prioritization and Mitigation Strategy

The Lower Platte North 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 Abie 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 Village of Abie. 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 Five* and *Appendix A*.

Please review the following section and answer the provided questions. Note that reported data in the following paragraphs is from the 2020 plan and does not reflect new data available through 2024.

Hazardous Materials Release

Anhydrous ammonia is the most likely chemical to spill at a fixed chemical storage site in Abie. While no spills have happened in the community to date, a future spill could have acute effects on the community because some residential homes are located within two blocks of the local co-op. These residents have been educated about the threat and appropriate response to a spill. The local volunteer fire department and their mutual aid has the appropriate gear and training to respond to a spill.

Anhydrous ammonia is frequently transported to and from the local co-op. Highway Spur 12B is the transportation route of most concern because it is the one most heavily traveled with vehicles transporting chemicals. This route is especially busy during the spring and fall when agricultural chemicals from the co-op are being applied in the area. Residential homes are located along this route.

Is this hazard still of concern for your community? (circle one) Yes No
If no, please skip the following questions.

Have there been any changes since the last plan? Does this accurately describe your community's risk or concern related to this hazard? Please describe any recent events and their impacts on the community.

What has the community done to mitigate risk to this hazard?

What needs to be done to reduce the risk to this hazard?

Severe Thunderstorms

Room damage is the most pressing concern regarding hailstorms. Critical facilities are not fitted with hail resistant building materials but are insured against hail damage. The village does not have a tree board to protect trees from damage and they do not educate residents on building with hail resistant building materials.

Is this hazard still of concern for your community? (circle one) Yes No
If no, please skip the following questions.
Have there been any changes since the last plan? Does this accurately describe your community's risk or concern related to this hazard? Please describe any recent events and their impacts on the community.

What has the community done to mitigate risk to this hazard?

What needs to be done to reduce the risk to this hazard?

Severe Winter Storms

The water tower, wells, and fire hall are all vulnerable to damage during severe winter storms. Only approximately 20% of the power lines in the village are buried, making them vulnerable to heavy snow and ice storms. Snow removal is done by a private contractor using their motor-grader, and usually takes about two hours depending on the amount of snow.

Is this hazard still of concern for your community? (circle one) Yes No
If no, please skip the following questions.

Have there been any changes since the last plan? Does this accurately describe your community's risk or concern related to this hazard? Please describe any recent events and their impacts on the community.

What has the community done to mitigate risk to this hazard?

What needs to be done to reduce the risk to this hazard?

Tornadoes and High Winds

Abie has not experienced a tornado in the past, but a future event could be catastrophic. Municipal records are not protected from a disaster with a backup system. The village's siren reaches all areas of the town however, there are no FEMA certified safe rooms so residents must seek shelter in their own homes. County Emergency Management offers text alerts to the fire department. The local fire department offers a yearly course on tornado safety. In case of a disaster Mutual Aid Agreements are in place with all communities in the county.

Is this hazard still of concern for your community? (circle one) Yes No
If no, please skip the following questions.

Have there been any changes since the last plan? Does this accurately describe your community's risk or concern related to this hazard? Please describe any recent events and their impacts on the community.

What has the community done to mitigate risk to this hazard?

What needs to be done to reduce the risk to this hazard?

The following hazards are evaluated in the Hazard Mitigation Plan. From this list, please circle any other hazards which your community is concerned about and/or pursuing mitigation efforts for.

If top concerns are already identified for your community, please skip this section.

Animal & Plant Disease
Dam Failure
Drought
Extreme Temperatures
Flooding
Grass/Wildfires
Hazardous Materials Release
Levee Failure
Severe Thunderstorms
Severe Winter Storms
Terrorism and Cyber Attack
Tornadoes and High Winds

As part of hazard prioritization, please provide some detail for each of the hazards you identified as to why they are of top concern, including past event descriptions, impacts to vulnerable populations, injuries, fatalities, property/crop damages, and current or future mitigation efforts.

Hazard #1: _____

Describe past events which have impacted your community. Please include the date of event, any property damages, or repairs that were required.

Why was this hazard selected as a top concern for the community? What specific vulnerabilities does the community have to this hazard?

Have you completed any projects to reduce your risk to this hazard?

What projects are needed in the future to reduce risk to your community?

Hazard #2: _____

Describe past events which have impacted your community. Please include the date of event, any property damages, or repairs that were required.

Why was this hazard selected as a top concern for the community? What specific vulnerabilities does the community have to this hazard?

Have you completed any projects to reduce your risk to this hazard?

What projects are needed in the future to reduce risk to your community?

DRAFT

Round 1 Plan Integration Worksheet



Lower Platte North NRD

HAZARD MITIGATION PLAN

PLAN INTEGRATION WORKSHEET

JEO CONSULTING GROUP
JUNE 2024

Name(s): _____

Jurisdiction: _____

1

INTRODUCTION

Thank you for participating in the Lower Platte North NRD Hazard Mitigation Plan.

The Hazard Mitigation Plan determines vulnerabilities to natural and human-caused hazards in your jurisdiction, then identifies mitigation projects to reduce or eliminate those vulnerabilities. An approved HMP is a requirement of the Federal Emergency Management Agency (FEMA) for jurisdictions to become eligible for Hazard Mitigation Assistance grants.

FEMA encourages jurisdictions to integrate their hazard mitigation plan with other planning mechanisms, such as their building codes, comprehensive plans, zoning ordinances, etc. to ensure that plans across a jurisdiction are consistent and reflect overall goals.

This worksheet will identify the ways that other plans in your jurisdiction are, or could be, aligned with hazard mitigation principles. The information you provide will be used to develop the plan integration section of your jurisdictional profile.

Please complete these worksheets and return them to JEO Consulting Group by Friday July 26, 2024.

Email: kdietrich@jeo.com

Phone: 402-742-7213

Mail: JEO Consulting Group
Attn: Karl Dietrich
2000 Q Street Suite 500
Lincoln, NE 68503

STEP 1

Please complete the following table.

Which of these plans/ordinances does your jurisdiction have?

Plan/Ordinance	Yes/No	Year of most recent update
Comprehensive Plan		
Zoning Ordinance		
Subdivision Regulations		
Floodplain Regulations/Ordinance		
Building Code		
Capital Improvements Plan		
Wellhead Protection Plan		
Water System Emergency Response Plan		
Community Wildfire Protection Plan		
Drought Ordinance / Drought Management Plan		
Other:		
Other:		

For any additional plans your community has, e.g. Evacuation Plan, Stormwater Management Plan, etc., please send JEO a copy.

STEP 2

For the plans/ordinances which your community has, please complete the relevant pages in this worksheet. **You do not have to complete the sections for plans/ordinances which your community does not have.**

COMPREHENSIVE PLAN

Does the comprehensive plan discuss natural hazards? ☐ Yes ☐ No

If yes, which hazards are discussed?

Does your comprehensive plan:

Contain goals/objectives aimed at Safe Growth: ☐ Yes ☐ No ☐ In future update

Direct development away from the floodplain: ☐ Yes ☐ No ☐ In future update

Direct housing away from chemical storage facilities: ☐ Yes ☐ No ☐ In future update

Direct housing and vulnerable populations away from major transportation routes: ☐ Yes ☐ No ☐ In future update

Encourage infill development: ☐ Yes ☐ No ☐ In future update

Encourage elevation of structures located in the floodplain: ☐ Yes ☐ No ☐ In future update

Identify areas that need emergency shelters: ☐ Yes ☐ No ☐ In future update

Has the hazard mitigation plan been integrated with the comprehensive plan? If yes, how?

Is there a plan or timeline to update your comprehensive plan? ☐ Yes ☐ No

If yes, explain the plan or timeline.

BUILDING CODE

If the building codes are based on the International Building Codes, what year/version is in effect? Have any amendments to the Code been made? If yes, please describe.

How is enforcement of the building code done?

Has the hazard mitigation plan been integrated with the building code? If yes, how?

ZONING ORDINANCE / FLOODPLAIN ORDINANCE / SUBDIVISION REGULATIONS

Is there a plan or timeline to update your Zoning Ordinance / Floodplain Ordinance / Subdivision Regulations?

☐ Yes ☐ No

If yes, explain the plan or timeline.

Do the Zoning Ordinance / Floodplain Regulations / Subdivision Regulations:

Restrict Development in hazard prone areas?	☐ Yes ☐ No ☐ In future update
Prohibit development within the floodplain?	☐ Yes ☐ No ☐ In future update
Discourage development in the floodplain?	☐ Yes ☐ No ☐ In future update
Limit population density in the floodplain?	☐ Yes ☐ No ☐ In future update
Require **more** than one foot of elevation above Base Flood Elevation in the floodplain?	☐ Yes ☐ No ☐ In future update
Discourage housing and vulnerable populations near chemical storage sites?	☐ Yes ☐ No ☐ In future update
Consider wildfire and the wildland urban interface?	☐ Yes ☐ No ☐ In future update
Do the subdivision regulations restrict subdivision of land within or adjacent to the floodplain?	☐ Yes ☐ No ☐ In future update
Include well setback requirements?	☐ Yes ☐ No ☐ In future update
Include the ability to implement water restrictions?	☐ Yes ☐ No ☐ In future update

Has the hazard mitigation plan been integrated into these planning documents? If yes, how?

DROUGHT ORDINANCE / DROUGHT MANAGEMENT PLAN / WELLHEAD PROTECTION PLAN / WATER SYSTEM EMERGENCY RESPONSE PLAN

Please provide an electronic copy or a link of the plan(s) to JEO.

CAPITAL IMPROVEMENT PLAN

Is there a plan or timeline to update your Capital Improvement Plan? ☐ Yes ☐ No

If yes, explain the plan or timeline.

Does the Capital Improvement Plan include:

Stormwater projects?	☐ Yes ☐ No ☐ In future update
Upsizing of culverts and drainage structures?	☐ Yes ☐ No ☐ In future update
Upgrading storm sewer systems?	☐ Yes ☐ No ☐ In future update
Improving transportation routes for drainage?	☐ Yes ☐ No ☐ In future update
Widening roadways that would improve evacuations?	☐ Yes ☐ No ☐ In future update
Bridge improvements?	☐ Yes ☐ No ☐ In future update
Installing new municipal wells?	☐ Yes ☐ No ☐ In future update
Upsizing water distribution pipes?	☐ Yes ☐ No ☐ In future update
Installing water meters for residential structures?	☐ Yes ☐ No ☐ In future update
Updating electrical distribution system?	☐ Yes ☐ No ☐ In future update
Burying powerlines?	☐ Yes ☐ No ☐ In future update
Installing emergency generators in critical facilities?	☐ Yes ☐ No ☐ In future update
Constructing a new fire hall?	☐ Yes ☐ No ☐ In future update
Constructing a new police headquarters?	☐ Yes ☐ No ☐ In future update
Constructing a new public works facility?	☐ Yes ☐ No ☐ In future update
Constructing a new community center?	☐ Yes ☐ No ☐ In future update
Constructing a community storm shelter?	☐ Yes ☐ No ☐ In future update
Constructing a new water treatment facility?	☐ Yes ☐ No ☐ In future update

Has the hazard mitigation plan been integrated with the capital improvement plan? If yes, how?

Round 1 Stakeholder Worksheet

Lower Platte North NRD
2025 Hazard Mitigation Plan
Hazard Prioritization

Organization_____ **Name(s)** _____

As part of the Lower Platte North NRD Hazard Mitigation Plan, the following hazards are evaluated at the regional level. Stakeholders are encouraged to participate in this planning process by identifying top hazards of concern which may impact their organization or community they are a part of. Furthermore, your input to the planning process ensures identified mitigation efforts are appropriate and consistent with the communities you work with or the populations you serve and represent. Top hazards of concern may include those which have produced significant damage to facilities, power outages, injuries or fatalities, or a lack of adequate resources, etc.

From the list below, please identify your top hazards of concern (3 to 5 hazards).

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

Which of the above hazards are of top concern?

1. _____
2. _____
3. _____
4. _____
5. _____

Lower Platte North NRD Hazard Mitigation Plan | 2025 1

As part of the hazard prioritization, please provide some detail for each of the hazards you identified as to why they are of top concern, including past event descriptions, impacts to vulnerable populations, injuries, fatalities, property/crop damages, and current or future mitigation efforts.

Hazard #1: _____

- Describe past events which have impacted your agency or organization. Please include the date of event, any property damages, or repairs that were required.

- What are your top concerns for this hazard? (e.g., injuries or fatalities, blocked transportation routes, crop damages, impacts on vulnerable populations, disruption of services, etc.)

- Have you completed any projects to reduce your risk to this hazard?

- What projects are <u>needed in the future</u> to reduce risk to the community or your organization?

Hazard #2: _____

- Describe past events which have impacted your agency or organization. Please include the date of event, any property damages, or repairs that were required.

- What are your top concerns for this hazard? (e.g., injuries or fatalities, blocked transportation routes, crop damages, impacts on vulnerable populations, disruption of services, etc.)

- Have you completed any projects to reduce your risk to this hazard?

- What projects are <u>needed in the future</u> to reduce risk to the community or your organization?

Hazard #3: _____

- Describe past events which have impacted your agency or organization. Please include the date of event, any property damages, or repairs that were required.

- What are your top concerns for this hazard? (e.g., injuries or fatalities, blocked transportation routes, crop damages, impacts on vulnerable populations, disruption of services, etc.)

- Have you completed any projects to reduce your risk to this hazard?

- What projects are <u>needed in the future</u> to reduce risk to the community or your organization?

Hazard #4: _____

- Describe past events which have impacted your agency or organization. Please include the date of event, any property damages, or repairs that were required.

- What are your top concerns for this hazard? (e.g., injuries or fatalities, blocked transportation routes, crop damages, impacts on vulnerable populations, disruption of services, etc.)

- Have you completed any projects to reduce your risk to this hazard?

- What projects are <u>needed in the future</u> to reduce risk to the community or your organization?

Hazard #5: _____

- Describe past events which have impacted your agency or organization. Please include the date of event, any property damages, or repairs that were required.

- What are your top concerns for this hazard? (e.g., injuries or fatalities, blocked transportation routes, crop damages, impacts on vulnerable populations, disruption of services, etc.)

- Have you completed any projects to reduce your risk to this hazard?

- What projects are <u>needed in the future</u> to reduce risk to the community or your organization?

Round 2 Meeting Invitation

Participating Jurisdictions Round 2 Meeting Invitation

December 10, 2024

RE: Lower Platte North NRD Hazard Mitigation Plan Round Two Public Meeting

Dear Hazard Mitigation Planning Participant,

The Lower Platte North NRD is moving forward with the second phase and meetings of its Hazard Mitigation Plan update. **You are receiving this letter because your jurisdiction's attendance is required in order to continue participation in this planning effort.** The intent of these meetings is to gather and review vital information including updating previous mitigation alternatives, providing NFIP information, identifying new mitigation alternatives, and reviewing previously collected data.

FEMA requires at least one representative from your jurisdiction to attend planning meetings. This is the second and last meeting required in this planning process. Please **attend one** of the upcoming meetings shown below. Each meeting will last approximately 1 to 1.5 hours. The first two meeting options can be attended in-person or virtually. The third meeting option is virtual only.

The second round of planning meetings will be held in:

- Wahoo: Tuesday, **January 7, 2:00 pm** at the Clint Johannes (Lake Wanahoo) Education Building, 1655 County Road 16, Wahoo, NE 68066
  - Or Join Online at https://us02web.zoom.us/j/84700377899
- David City: Thursday, **January 16, 6:30 pm** at the Hruska Memorial Library, 399 N 5th St, David City, NE 68632
  - Or Join Online at https://us02web.zoom.us/j/88520740586
- Virtual Option: Tuesday, **January 21, 10:00 am**
  - Join Online at https://us02web.zoom.us/j/85636236937

If you are joining online, you can access and download your jurisdiction's meeting worksheets starting January 6th by visiting this Google Drive link: https://bit.ly/LowerPlatteNorth-GoogleDrive.

Please RSVP to one of the meetings by contacting Anthony Kohel, JEO Planner, at (402) 474-8753 or akohel@jeo.com. For more information, you can visit the project website at https://www.jeo.com/lpnnrd-hmp. If you have any questions, please contact the Lower Platte North NRD, JEO, or your county emergency manager. We are looking forward to seeing you at the second round of meetings!

Sincerely,

Anthony Kohel, Planner
JEO Consulting Group
On behalf of Lower Platte North NRD

cc. Ryan Chapman, Lower Platte North NRD
Mark Doehling, Butler County EM; Tom Smith, Dodge County EM; Terry Miller, Saunders County EM; Tim Hofbauer, Platte County EM; Mark Arps, Colfax County EM

JEO CONSULTING GROUP, INC.
JEO ARCHITECTURE, INC.
p: 402.435.3080
f: 402.435.4110
2000 Q Street, Suite 500
Lincoln, Nebraska 68503
jeo.com

Stakeholder Round 2 Meeting Invitation

December 11, 2024

RE: Lower Platte North NRD Hazard Mitigation Plan Round Two Public Meeting

Dear Hazard Mitigation Planning Stakeholder,

The Lower Platte North NRD is moving forward with the second phase and meetings of its Hazard Mitigation Plan update. **You are receiving this letter because you are a stakeholder in this planning effort.** The intent of these meetings is to gather and review vital information including updating previous mitigation alternatives, identifying new mitigation alternatives, and reviewing previously collected data.

As a stakeholder, you are encouraged to provide input to the planning process to ensure identified mitigation efforts are appropriate and consistent with the special needs of the organization you represent. Your input will be integrated into the larger community profile prepared by your community's local representatives. Please **attend one** of the upcoming meetings shown below. Each meeting will last approximately 1 to 1.5 hours. The first two meeting options can be attended in-person or virtually. The third meeting option is virtual only.

The second round of planning meetings will be held in:

- Wahoo: Tuesday, **January 7, 2:00 pm** at the Clint Johannes (Lake Wanahoo) Education Building, 1655 County Road 16, Wahoo, NE 68066
  - Or Join Online at https://us02web.zoom.us/j/84700377899
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  - Or Join Online at https://us02web.zoom.us/j/88520740586
- Virtual Option: Tuesday, **January 21, 10:00 am**
  - Join Online at https://us02web.zoom.us/j/85636236937

If you are joining online, you can download your community's meeting worksheets starting January 6th by visiting this Google Drive link: https://bit.ly/LowerPlatteNorth-GoogleDrive.

Please RSVP to one of the meetings by contacting Anthony Kohel, JEO Planner, at (402) 474-8753 or akohel@jeo.com. For more information, you can visit the project website at https://www.jeo.com/lpnnrd-hmp. If you have any questions, please contact the NRD, JEO, or your county emergency manager. We are looking forward to seeing you at the second round of meetings!

Sincerely,

Anthony Kohel, Planner
JEO Consulting Group
On behalf of Lower Platte North NRD

cc. Ryan Chapman, Lower Platte North NRD
Mark Doehling, Butler County EM; Tom Smith, Dodge County EM; Terry Miller, Saunders County EM; Tim Hofbauer, Platte County EM; Mark Arps, Colfax County EM

JEO CONSULTING GROUP, INC.
JEO ARCHITECTURE, INC.
p: 402.435.3080
f: 402.435.4110
2000 Q Street, Suite 500
Lincoln, Nebraska 68503
jeo.com

Round 2 Sign-In Sheets

In-Person Sign-in Sheets

Wahoo Round 2 Meeting Sign-In Sheet Page 1 of 2

Lower Platte North NRD Hazard Mitigation Plan Update
Round 2 Meeting
Wahoo, NE – January 7th, 2024 – 2:00 PM

NAME	TITLE	DISTRICT/JURISDICTION Represented	ADDRESS Street #, Street Name, City, Zip	PHONE	EMAIL	SIGNATURE
Barbara Shelton	Clerk	Village of Inglewood	140 Boulevard Street Inglewood, NE 68025		info@villageofinglewood.net	
Brandon Lavaley	Superintendent	Wahoo Public Schools	2201 N. Locust Street Wahoo, NE 68066	402-443-3051	blavaley@wahoowarriors.org	(Virtual)
Bruce Arp	Fire Chief	Weston Volunteer Fire & Rescue	PO BOX 72 Weston, NE 68070	402-642-5359	BARP@WESTONFIRE.COM	
Chris Gustafson	Fire Chief	Malmo Volunteer Fire Department	PO BOX 68 Malmo, NE 68040-0068	402-642-5658	mvfd@nntc.net	
Debi Wade	Board Member	Village of Prague	PO BOX 207 Prague, NE 68050-0207		villageofprague@nntc.net	
Grant Hansen	President	Ames Diking and Drainage District	1387 Old Lincoln Hwy Ames, NE 68621	402-995-1152	gchansen85@gmail.com	
June Moline	Clerk/Floodplain Administrator	Village of Mead	PO Box 46 Mead, NE 68041	402-624-2495	meadclerk1@hotmail.com	
Karl Dietrich	Planner	JEO Consulting	2000 Q St STE 500 Lincoln, NE 86503	402-742-7213	kdietrich@jeo.com	
Lonnie Mart	Chairperson	Woodcliff Lakes SID #8	980 County Road W Fremont, Nebraska 68025	402-680-4953	lonniemahrt@jjmsearch.com	(Virtual)
Lora Johnson	Clerk	City of Schuyler	1103 B Street Schuyler, NE 68661	402-352-5444	ljohnson@schuylerne.gov	(Virtual)
Marlene Wade	Board Member	Village of Prague	PO BOX 207 Prague, NE 68050-0207		villageofprague@nntc.net	
Robert Ball	Emergency Response Coordinator	Three Rivers Public Health	2400 North Lincoln Ave. Fremont, NE 68025	402-727-5396 ext. 127	robert@3rphd.ne.gov	
Ron Drews	Chairperson	Platte Valley Drainage District	1863 County Road 5 Yutan, NE 68073	402-517-5151		
Ruva Tsoka	Associate Planner	JEO Consulting	11213 Davenport St STE 200 Omaha, NE 68154	402-392-9901	rtsoka@jeo.com	
Ryan Chapman	Assistant Manager	Lower Platte North NRD	PO Box 125 Wahoo, NE 68066	402-443-4675	rchapman@lpnnrd.org	
Ryan Pokorny	Fire Chief	Weston Volunteer Fire & Rescue	PO BOX 72 Weston, NE 68070	402-277-0200	ryanpokorny77@gmail.com	
Ted Deturk	Executive Director	Educational Service Unit #2	PO Box 649 Fremont, NE 68026	402-721-7710	tdeturk@esu2.org	
Terry Miller	Emergency Manager	Saunders County	387 N. Chestnut Wahoo, NE 68066	402-443-5645	tmiller@co.saunders.ne.us	

Please Sign In!

Wahoo Round 2 Meeting Sign-In Sheet Page 2 of 2

Lower Platte North NRD Hazard Mitigation Plan Update
Round 2 Meeting
Wahoo, NE – January 7th, 2024 – 2:00 PM

NAME	TITLE	DISTRICT/JURISDICTION Represented	ADDRESS Street #, Street Name, City, Zip	PHONE	EMAIL	SIGNATURE
Theresa Busse	Clerk/Floodplain Administrator	City of North Bend	PO Box 401 607 Main Street, North Bend, NE 68649	402-652-3584	cinoben@gpcom.net	Theresa Busse
Tom Smith	Emergency Manager	Dodge County	435 N. Park Ave. Ste. 101B Fremont, NE 68025	402-727-2785	emergencymanagement@dodgecountyne.gov	
Brandon Beedle	GIS/Grants Coordinator	LPNNRD			bbeedle@lpnnrd.org	
Jacob Maslonka	Water Quality Program Coordinator	LPNNRD			jmaslonka@lpnnrd.org	
SEAN ELLIOT	RURAL WATER MGR	LPNNRD	PO BOX 126, WAHO		SELLIOTT@LPNNRD.ORG	
Dan Chvatal	trea Chester	Chester Township	2351 County Rd 28	402-443-2287		
Glenn Chvatal	clerk Chester Town	"	2615 Co Rd V	402-663-4386		
Mike Rerucha	Treasurer	Skull Creek Township	2310 37 Rd Bruno, NE 68014	402-430-3967	mrfarms99@windstream.net	
Jim Chvatal	Pres	Center Twp	1705 CR 16 Wahoo Ne 68066	443-6474		
Ron Papa	Treasurer	Bone Creek Township	4150 P Rd Dwd city Ne	649-2905	ronpapafarms@hotmail.com	
BOB MISSEL	CHAIRMAN	DODGE COUNTY	DODGE COUNTY COURTHOUSE	402 317 7832	BMISSEL@DODGECOUNTYNE.GOV	
dean Andreen	Zoning Admin Dodge Co	" "	435 N Park Rm 204 Fremont	402-727-2724	zoningedodgecountyne.gov	

Please Sign In!

David City Round 2 Meeting Sign-In Sheet

Lower Platte North NRD Hazard Mitigation Plan Update
Round 2 Meeting
David City, NE – January 16th, 2024 – 6:30 PM

NAME	TITLE	DISTRICT/JURISDICTION Represented	ADDRESS Street #, Street Name, City, Zip	PHONE	EMAIL	SIGNATURE
Anthony Kohel	Planner	JEO Consulting	2000 Q Street Ste 500 Lincoln, NE 68503	402-474-8753	akohel@jeo.com	
Becky Appleford	Project Manager	JEO Consulting	11213 Davenport Street Ste 200 Omaha, NE 68154	402-392-9915	rappleford@jeo.com	
~~Brad Sock~~ Andrew Sedlacek	Fire Chief	Schuyler Volunteer Fire Department	302 E 16TH ST Schuyler, NE 68661	402-352-5407	SCHUYLERFIREDEPT@YAHOO.COM	√ (Virtual)
Cynthia Ourada	Clerk	Village of Colon	PO BOX 10 Colon, NE 68010-0010	402-443-6251	villageofcolon@yahoo.com	
Darlene Divis	Clerk/Floodplain Administrator	Village of Rogers	160 Center Street Rogers, NE 68659-2809	402-606-9282	darlenedivis@gmail.com	√ (Virtual)
David Polacek	Clerk	Village of Abie	207 Ash St, Abie, NE 68001	402-367-2948	davep335@gmail.com	
Dennis Polacek	Chairman	Village of Abie	PO Box 334 Abie, NE 68001		dennispolacek@msn.com	
Eileen Kopecky	Clerk	Village of Octavia	545 Dix St Octavia, NE 68632	402-539-2315 (home)	eekopecky@hotmail.com	
Matthew Sobota	Utilities Superintendent (Interim)	City of Schuyler	1103 B Street Schuyler, NE 68661	402-352-5444	msobota@schuylerdou.org	
Raiko Martinez	City Administrator Intern	David City	PO Box 191 David City, NE 68632	402-367-3135	cityadministrator@davidcityne.gov	
Roger Svoboda	Clerk	Franklin Township	1740 34 Rd. David City, NE 68632	402-367-4646		
Samuel J. Strata Samual J. Strata	Chairperson	Ulysses Township	2550 J Rd. Ulysses, NE 68669	402-641-5853	[redacted]sam@staramachine.com	
Ted Glock	Treasurer	Reading Township	2911 F Rd. Rising City, NE 68658	402-367-7551	tedglock@outlook.com	
Marianne Liethen	Clerk	Linwin Township	105 Holmes St Garrison NE 68831	402-367-4612		
Brian Juranek	Clerk	Bone Creek Township		402-954-0121		
Mark Shonka	Treasurer	Read Township	341 24½ Rd Surprise	402 366-0845		
Mark Doehling	Em	Butler Co				Virtual

Please Sign In!

Virtual Sign-In Sheets

Round 2 Meeting Virtual Attendees

Wahoo (Hybrid) – January 7	David City (Hybrid) January 16	Virtual Attendees – January 27
Alyssa Grosse – NEMA	Andrew Jedlicka – Schuyler Volunteer Fire Department	Andrew Nelson – Village of Cedar Bluffs
Angeline Allen – NEMA	Darlene Divis – Village of Rogers	Angi Heller – UNL Extension
Ben Hansen – Cedar Bluffs Public School	Mark Doehling – Butler County Emergency Management	Anthony Kohel – JEO Consulting Group
Brandon Lavaley – Wahoo Public Schools		Cynthia Ourada – Village of Colon
Cody Osten – Lakeveiw Community Schools		Drew Walker – Morse Bluff Township
Erin Wendt – NeDNR		Fred Hoefer – Village of Lindsay
Harlan Ptomey – Cedar Bluffs Public School		Gary Swartz – Village of Malmo
Jan Mejstrik – City of Schuyler		John Haynes – Village of Lindsay
Jim Ondracek – Colon Volunteer Fire Department, Colon Rural Fire Protection District #9, Pohocco Township		Justin Watson – Omaha Metropolitan Healthcare Coalition (OMHCC)
Kathy Eaton – Village of Linwood, Platte Township		Karl Dietrich – JEO Consulting Group
Lonnie Marht – Woodcliff Lakes SID #8		Kevin Vyhlidal – Village of Morse Bluff
Lora Johnson – City of Schuyler		Molly Pofahl – East Central District Health Department
PJ Quinn – Mead Public Schools		Patrick Ningen – North Bend Central Public Schools
Terrence St. Hilaire – Village of Dwight		Raiko Martinez – City of David City
		Robert Costa – City of Yutan
		Tami Comte – City of David City
		Terra Uhing – Three Rivers Public Health Department
		Tonja Frank – Morse Bluff Township

Round 2 Example Participant Profile with Questions

Community Profile

Village of Abie

Lower Platte North NRD
Hazard Mitigation Plan 2025

Name(s): _____

Date: _____

Worksheets Due By: _____

Please answer the questions in red italics. Your responses are critical for completing this Community Profile.

Completed Community Profiles and other worksheets can be returned to JEO Consulting Group, Attn: Karl Dietrich, 2000 Q Street Ste 500, Lincoln, NE 68503 or kdietrich@jeo.com. If you have any questions, please call 402-742-7213.

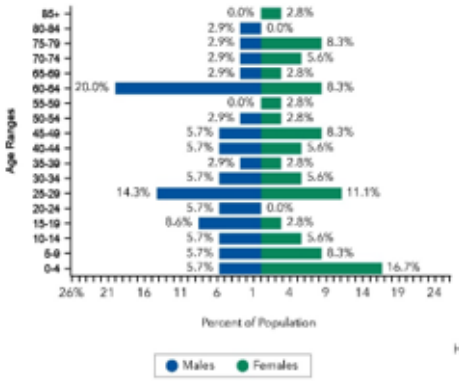
Community Fact Sheet

Community Summary Fact Sheet

Abie, NE
Lower Platte North NRD Hazard Mitigation Plan 2025

Total Population	Median Age	Total Households	Average Household Size	Median Home Value	Median Household Income
71	34.4	28	2.54	$139,286	$60,354

AGE PYRAMID



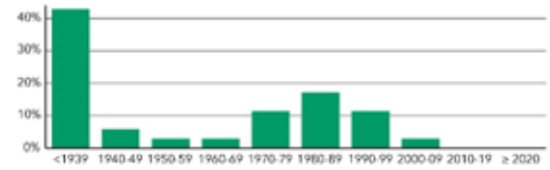
TOTAL POPULATION

2023 Total Population (Estimate)	71
2020 Total Population (U.S. Census)	65
2010 Total Population (U.S. Census)	69
2000 Total Population (U.S. Census)	77

AT RISK POPULATIONS

Households With Disability	Population 65+	Households Without Vehicle	Households Below the Poverty Level
10	11	0	10%

HOUSING: YEAR BUILT



EMPLOYMENT

Total Businesses	Unemployment Rate
2	0.0%

POPULATION BY RACE



- Black Population
- Asian Population
- American Indian Population
- Population of 2+ Races
- Other Race Population
- White Population

6% of the Total Population is Hispanic

HOUSING

Vacant Housing Units	Mobile Homes
6	14%

esri | Source: Esri, U.S. Census, Esri-Data Axle, ACS. Esri forecasts for 2023, 2020, 2010, 2000, 2017-2021.

Local Planning Team

Abie Local Planning Team

Name	Title	Jurisdiction	Round 1 Meeting	Round 2 Meeting
David Polacek	Clerk	Village of Abie	Attended, Materials Development	
Dennis Polacek	Chairman	Village of Abie	Attended, Materials Development	

Plan Maintenance

Hazard Mitigation Plans are living documents and should be updated regularly to ensure effectiveness and reflect changes in hazard events, priorities, and mitigation actions. These updates are encouraged to occur after every major disaster event, alongside planning document updates, before the Hazard Mitigation Assistance Grants cycle begins, and/or prior to other funding opportunity cycles beginning.

For your jurisdiction, what positions are responsible for reviewing and updating the profile outside of the five-year update?

Position: _____

Position: _____

Position: _____

Please indicate how frequently your jurisdiction intends to review/revise the profile. (circle one)

Every 6 months Annually Bi-annually

How will your jurisdiction notify and involve the public in the plan review and revision? (For example, social media, website updates, letters to all residents, board/council meetings, etc.)

Capability Assessment

The planning team assessed the Village of Abie's hazard mitigation capabilities by reviewing planning and regulatory capabilities, administrative and technical capabilities, fiscal capabilities, and education and outreach capabilities.

Abie Capability Assessment

Capability/Planning Mechanism		Yes/No
Planning & Regulatory Capability	Comprehensive Plan	No
	Capital Improvements Plan	No
	Economic Development Plan	No
	Emergency Operations Plan	Yes (County)

Capability/Planning Mechanism		Yes/No
	Floodplain Management Plan	No
	Storm Water Management Plan	No
	Zoning Ordinance	No
	Subdivision Regulation/Ordinance	No
	Floodplain Ordinance	No
	Building Codes	No
	Water System Emergency Response Plan	Yes
	Wellhead Protection Plan	Yes
	National Flood Insurance Program	No
	Community Rating System	No
	Community Wildfire Protection Plan	Yes (Regional)
	Other (if any)	-
Administrative & Technical Capability	Planning Commission	No
	Floodplain Administrator	No
	GIS Capabilities	No
	Chief Building Official	No
	Civil Engineering	Yes
	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	No
	Gas/Electric/Water/Sewer Service Fees	No
	Storm Water Service Fees	No
	Development Impact Fees	No
	General Obligation Revenue or Special Tax Bonds	No
	Other (if any)	-
Education & Outreach Capability	Local Citizen Groups or Non-Profit Organizations Focused on Environmental Protection, Emergency Preparedness, Access and Functional Needs Populations, etc.	No
	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

Capability/Planning Mechanism		Yes/No
	Firewise Communities Certification	No
	Tree City USA	No
	Other (if any)	-

Abie Overall Capability

Capability	Limited/Moderate/High
Financial Resources to Implement Mitigation Projects	Moderate
Staff/Expertise to Implement Projects	Moderate
Public Support to Implement Projects	Moderate
Time to Devote to Hazard Mitigation	Moderate
Ability to Expand and Improve the Identified Capabilities to Achieve Mitigation	Moderate

National Flood Insurance Program (NFIP)

Why does the village not participate in the National Flood Insurance Program?

Are you interested in joining the National Flood Insurance Program?

Abie NFIP Information

NFIP Overview	
Date of NFIP Participation:	N/A
Floodplain Administrator:	N/A
Is Floodplain Administrator a Certified Floodplain Manager?	N/A
Is Floodplain Management an Auxiliary Function?	N/A
Number of NFIP Policies In-Force:	N/A
Total NFIP Premium ($):	N/A
Total NFIP Coverage ($):	N/A
Number of Claims Paid Out:	N/A
Total Amount of Claims Paid Out ($:)	N/A
Number of Repetitive Loss Structures:	N/A
Number of Severe Repetitive Loss Structures:	N/A
Is the Community Currently Suspended from the NFIP?	N/A
Any Outstanding Compliance Issues?	N/A
FIRMs Digital or Paper?	Digital
Located in a RISK Map Area?	No

Buildings and Valuation in the Floodplain

The planning team acquired GIS parcel data from the County Assessor and Microsoft building footprint data to analyze the location, number, and value of buildings located in the 100-year and 500-year floodplains. A summary of the results of this analysis is provided in the following tables.

Abie Buildings and Value in the 100-Year Floodplain

Number of Buildings	Total Building Value	Number of Buildings in Floodplain	Value of Buildings in Floodplain	Percentage of Buildings in Floodplain
88	$6,842,280	1	$28,250	1.1%

Source: County Assessor, 2024; Microsoft, 2024

Abie Buildings and Value in the 500-Year Floodplain

Number of Buildings	Total Building Value	Number of Buildings in Floodplain	Value of Buildings in Floodplain	Percentage of Buildings in Floodplain
88	$6,842,280	0	$0	0%

Source: County Assessor, 2024; Microsoft, 2024

Plans and Studies

The Village of Abie 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 village 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 update.

Butler County Local Emergency Operations Plan (2021)

The Butler County Local Emergency Operations Plan (LEOP) establishes standardized policies, plans, guidelines, and procedures for emergency resources and governmental entities to respond and recover when a disaster event occurs. It contains information regarding direction and control, communications and warning, damage assessment, emergency public information, evacuation, fire services, health and human services, law enforcement, mass care, protective shelters, and resource management. This plan is updated every five years. The hazard mitigation plan has been integrated with this plan and includes the top hazards that would affect the county and its populations. Flooding, dam failure, and mass shelter information from the LEOP was used to inform hazard prioritization and community lifelines.

Southeast Nebraska Community Wildfire Protection Plan (2020)

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. Projects identified in the CWPP were reviewed for inclusion in this community profile. This document is updated every five years.

Water System Emergency Response Plan

A water system emergency response plan serves as a guideline for water operators and village board to minimize the disruption of normal services to consumers and to provide public health protection during an emergency event. The document identifies several natural and human-caused events and discusses the water system's response during those events. The water system emergency response plan is reviewed and updated annually.

Has the hazard mitigation plan been integrated into the water system emergency response plan? If yes, how?

Wellhead Protection Plan

The purpose of wellhead protection plans is to protect the public drinking water supply wells from contamination. It includes identifying potential sources of groundwater contamination in the area and managing the potential contaminant sources.

Has the hazard mitigation plan been integrated into the wellhead protection plan? If yes, how?

Future Development Trends

Over the last five years, old buildings (bar, bank, and café) on Main Street were demolished due to being unsafe and were replaced with new buildings to be used by a local construction company. With the removal of old buildings, the community is likely less vulnerable to hazards like severe thunderstorms, severe winter storms, and tornadoes and high winds. In the next five years, there are currently no planned housing or commercial developments in the community.

For hazards like drought, extreme heat, severe thunderstorms, severe winter storms, and tornadoes and high winds, all new and future developments could be impacted regardless of where they are located. According to the local planning team no new developments occurred in any known hazard locations.

Community Lifelines

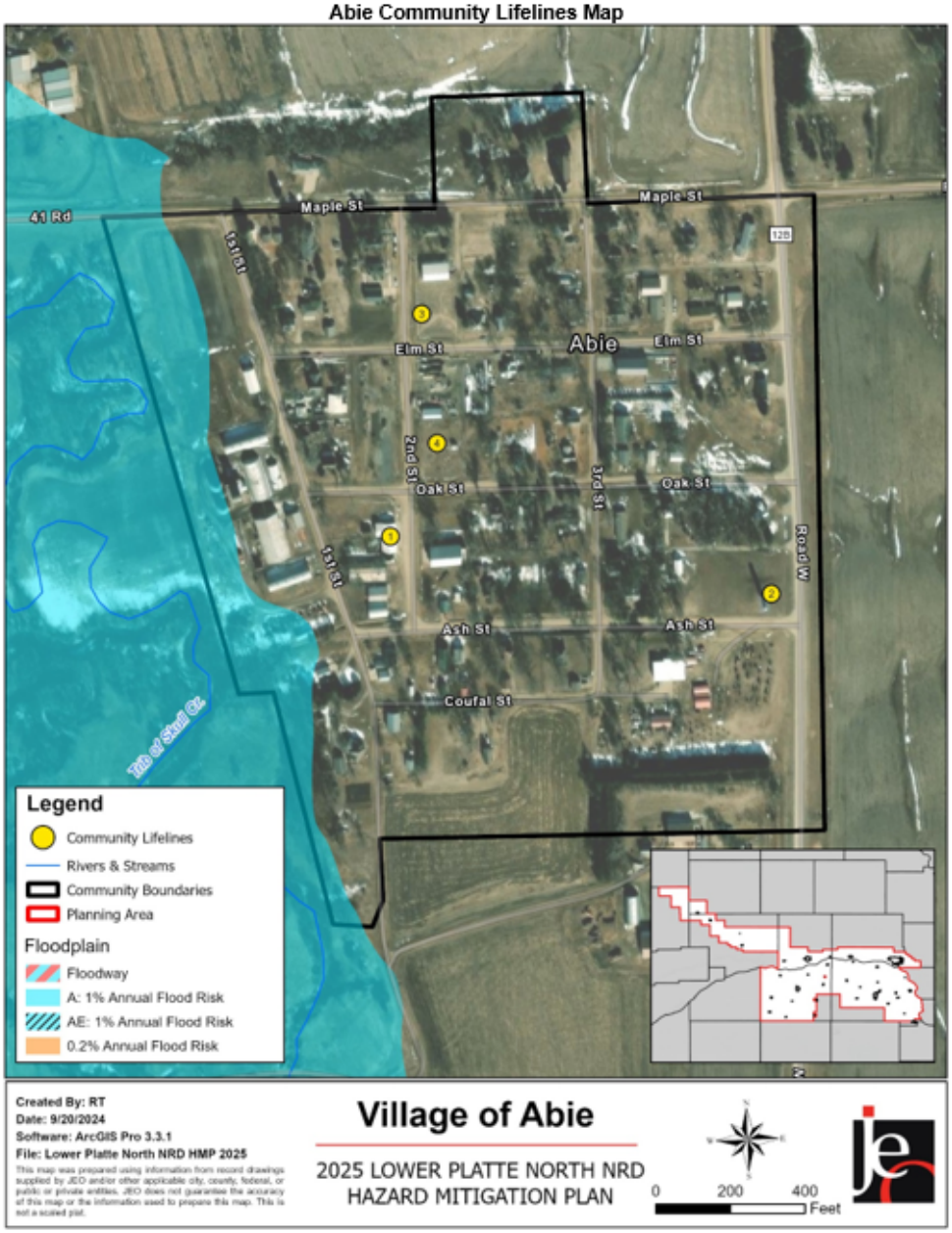
As listed in the following table, each participating jurisdiction identified community lifelines that are vital for disaster response and essential for returning the jurisdiction's functions to normal during and after a disaster per the FEMA Community Lifelines guidance. The FEMA lifeline categories include Safety and Security; Food, Water, and Shelter; Health and Medical; Energy; Communication; Transportation; and Hazardous Material Facilities.



Abie Community Lifelines

CL Number	Name	Community Lifeline Type	Generator (G) Shelter (S)	Floodplain (Y/N)
1	Fire Hall	Safety & Security	G	N
2	Water Tower	Food, Water, Shelter	-	N
3	Well	Food, Water, Shelter	G	N
4	Well	Food, Water, Shelter	G	N

Abie Community Lifelines Map



Hazard Prioritization and Mitigation Strategy

The Lower Platte North 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 Abie 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 Village of Abie. 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 Five* and *Appendix A*.

Hazardous Materials Release

Anhydrous ammonia is the most likely chemical to spill in Abie. There is a co-op facility in the area that transports anhydrous ammonia. Highway Spur 12B is the transportation route of most concern because it is the most heavily traveled with vehicles transporting chemicals. This route is especially busy during the spring and fall, when agricultural chemicals from the co-op are being applied in the area. While no spills have happened in the community to date, a future spill could have acute effects on the community because some residential homes are located within two blocks of the local co-op. These residents have been educated about the threat and appropriate response to a spill. The local volunteer fire department and their mutual aid has the appropriate gear and training to respond to a spill.

Severe Thunderstorms

In the spring and summer of 2024, the village experience several thunderstorms that caused damage to trees and buildings. Since those events damaged trees have been removed and property owners repaired building damage. Building damage is the most pressing concern regarding severe thunderstorms. Community lifelines are not fitted with hail resistant building materials but are insured against hail and wind damage. In the event of power loss, the village has a portable generator that can be hooked to either well for backup power.

Severe Winter Storms

In November of 2022, the Village of Abie had a severe ice storm, followed by snow which caused tree damage and power loss. The water tower, wells, and fire hall are all vulnerable to damage during severe winter storms. Only approximately 20% of the power lines in the village are buried, making them vulnerable to heavy snow and ice storms. Snow removal is done by a private contractor using their motor-grader, and usually takes about two hours depending on the amount of snow. The village will continue to work on trimming trees near power lines and buildings to mitigate risks during severe winter weather.

Tornadoes and High Winds

Abie experienced an F1 tornado on June 20, 1996, with an estimated $150,000 in property damage. Future tornado and high wind events could be catastrophic. Some municipal records are stored on a computer and protected from a disaster with a backup system. The village's siren reaches all areas of the town however, there are no FEMA certified safe rooms so residents must seek shelter in their own homes. County Emergency Management offers text alerts to the fire department. The village will continue to educate people on risks and what to do in the event of this hazard occurring. The local fire department offers a yearly course on tornado and high winds safety. In case of a disaster Mutual Aid Agreements are in place with all communities in the county.

Review Mitigation and Strategic Actions

Please review the following mitigation and strategic actions identified in the previous HMP, make any changes needed, and fill in missing information. Mark if each action has been completed, kept, or should be removed and describe the current status of the action.

Note: FEMA now requires that every hazard identified in the plan must have at least one mitigation action that addresses it.

Action	Backup and Emergency Generators		
Description & Location	Identify and evaluate current backup and emergency generators. Obtain additional generators based on identification and evaluation. Provide portable or stationary source of backup power to redundant power supplies, municipal wells, lift stations, and other critical facilities and shelters.		
Hazard(s) Addressed	Dam & Levee Failure, Extreme Heat, Flooding, Grass/Wildfires, Severe Thunderstorms, Severe Winter Storms, Terrorism & Cyber-Attack, Tornadoes and High Winds		
Estimated Cost	$30,000 - $50,000		
Local Funding			
Timeline	1 Year	2-5 Years	5+ Years
Priority	High	Medium	Low
Lead Agency	Village Board		
Update (circle one)	Completed	Keep	Remove
Status	What is the current status of this project?		

Action	Implement Drought Water Conservation Regulations		
Description & Location	Develop a plan and implement a program to conserve water use by the citizens during elongated periods of drought. Potential restrictions on water could include limitation on lawn watering, car washing, and other non-essential residential uses.		
Hazard(s) Addressed	Drought, Grass/Wildfire		
Estimated Cost	$0		
Local Funding			
Timeline	1 Year	2-5 Years	5+ Years
Priority	High	Medium	Low
Lead Agency	Village Board		
Update (circle one)	Completed	Keep	Remove
Status	What is the current status of this project?		

New Mitigation and Strategic Actions

Please Identify any new mitigation actions your jurisdiction is interested in pursuing or interested in applying for grant funding. Complete the table(s) below. Please fill out all rows. For examples of mitigation actions, review the provided FEMA Handbook (https://www.fema.gov/sites/default/files/2020-06/fema-mitigation-ideas_02-13-2013.pdf) or reach out to a JEO Project Contact.

Action			
Description & Location			
Hazard(s) Addressed			
Estimated Cost			
Local Funding			
Timeline	1 Year	2-5 Years	5+ Years
Priority	High	Medium	Low
Lead Agency			
Status			

Action			
Description & Location			
Hazard(s) Addressed			
Estimated Cost			
Local Funding			
Timeline	1 Year	2-5 Years	5+ Years
Priority	High	Medium	Low
Lead Agency			
Status			

Action			
Description & Location			
Hazard(s) Addressed			
Estimated Cost			
Local Funding			
Timeline	1 Year	2-5 Years	5+ Years
Priority	High	Medium	Low
Lead Agency			
Status			

Action			
Description & Location			
Hazard(s) Addressed			
Estimated Cost			
Local Funding			
Timeline	1 Year	2-5 Years	5+ Years
Priority	High	Medium	Low
Lead Agency			
Status			

Round 2 NFIP Worksheet

NATIONAL FLOOD INSURANCE PROGRAM

National Flood Insurance Program (NFIP) Worksheet

LOWER PLATTE NORTH NRD HAZARD MITIGATION PLAN 2025

JEO CONSULTING GROUP
DECEMBER 2024

Name(s):_____

Jurisdiction:_____

Please return this worksheet to JEO Consulting Group by Monday, February 17, 2025. It can be emailed to Karl Dietrich at kdietrich@jeo.com or mailed to JEO Consulting Group, Attn: Karl Dietrich, 2000 Q Street Suite 500, Lincoln, NE 68503.

1

NFIP QUESTIONS

Is your Floodplain Administrator a Certified Floodplain Manager? ☐ Yes ☐ No

Does your Floodplain Administrator have duties other than floodplain management? ☐ Yes ☐ No

Does your community plan to continue involvement with the NFIP in the future?

Please explain your community's floodplain permitting process.

How does your community enforce local floodplain regulations and ensure compliance?

Do your floodplain regulations exceed FEMA or State of Nebraska Requirements? If yes, in what ways?

What digital tools (FEMA Map Service Center, National Flood Hazard Layer) or non-regulatory tools does your Floodplain Administrator use?

How does your community identify substantially damaged structures after a flood event?

How does your community identify substantially improved structures?

What are the barriers (if any) to running your NFIP program effectively?

Describe any areas of flood risk in your community that have limited NFIP Policy Coverage. Why do they have limited coverage?

How does your community educate property owners or other stakeholders about the importance of flood insurance?

How are Letters of Map Change tracked and compiled?

Final Notice Letter

April 28, 2025

RE: **FINAL NOTICE** - Lower Platte North Natural Resources District Hazard Mitigation Plan Update 2025

Dear Potential Hazard Mitigation Planning Participant,

The Lower Platte North Natural Resources District (NRD) has secured grant funding from the Federal Emergency Management Agency (FEMA) and is finalizing the process of updating the Hazard Mitigation Plan (HMP). **You are receiving this letter and are encouraged to participate in this planning effort because your jurisdiction was identified as an eligible participant. There are no costs associated with participating. Participating in the HMP will make your community or jurisdiction eligible for certain FEMA hazard mitigation grant programs.**

HMPs identify vulnerabilities, possible impacts, and losses within participating jurisdictions to various natural and human-caused hazards (i.e., drought, chemical spills, drought, tornadoes, etc.). The HMP identifies projects and strategies to enhance community resilience and preparedness for specific hazards.

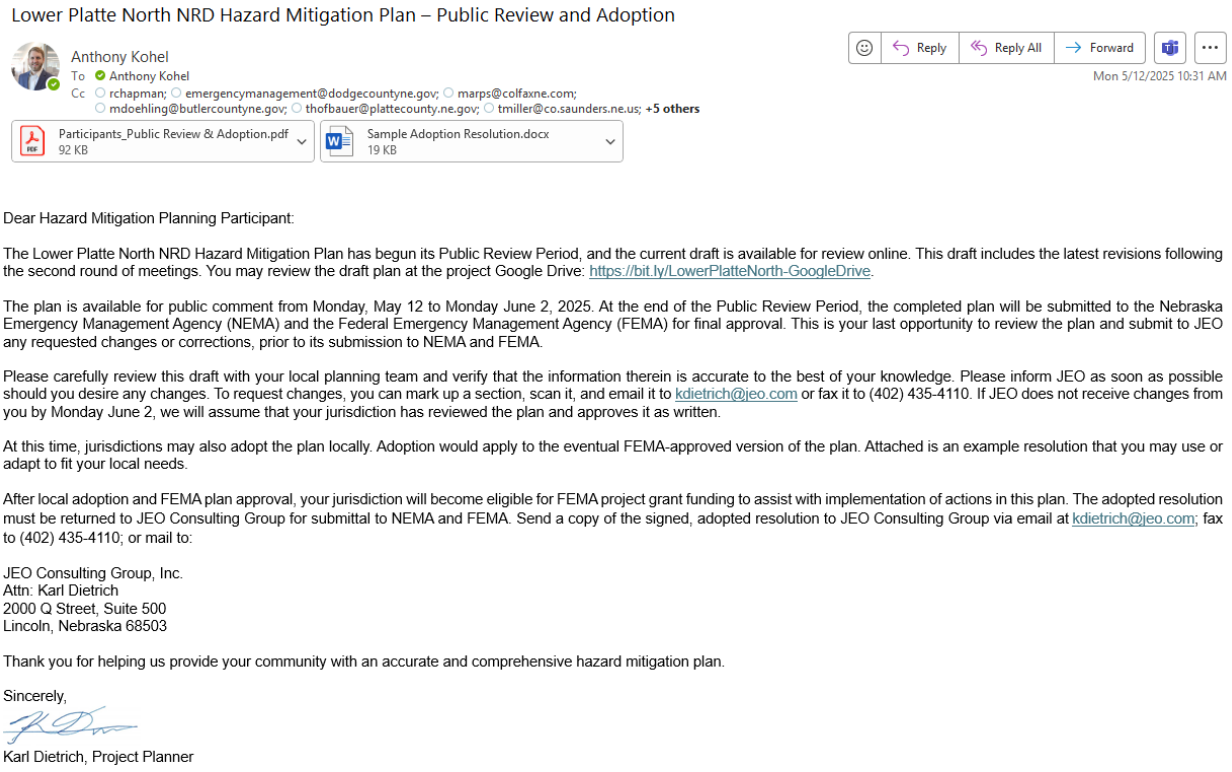
This letter will be your final notice regarding participation in the Lower Platte North NRD HMP. If you wish to participate, please get in touch with Karl Dietrich at kdietrich@jeo.com or 402-742-7213 for the steps that need to be taken and the worksheets that need to be completed to be recognized as a participating jurisdiction. **If we do not hear back from you by Monday, May 12th, 2025, we will assume that your community or jurisdiction does not wish to participate in the hazard mitigation plan.**

Sincerely,

[Add Signature]

Public Review Notification Email

Once the HMP draft was completed, a public review period was opened to allow participants and community members at large to review the plan, provide comments, and request changes. The public review period was open from May 12, 2025, through June 2, 2025. Participating jurisdictions were emailed or mailed a letter notifying them of this public review period. That email can be seen below.



Lower Platte North NRD Hazard Mitigation Plan – Public Review and Adoption

Anthony Kohel
To Anthony Kohel
Cc rchapman; emergencymanagement@dodgecountyne.gov; marps@colfaxne.com; mdoehling@butlercountyne.gov; thofbauer@plattecounty.ne.gov; tmiller@co.saunders.ne.us; **+5 others**

Reply | Reply All | Forward

Mon 5/12/2025 10:31 AM

Participants_Public Review & Adoption.pdf 92 KB

Sample Adoption Resolution.docx 19 KB

Dear Hazard Mitigation Planning Participant:

The Lower Platte North NRD Hazard Mitigation Plan has begun its Public Review Period, and the current draft is available for review online. This draft includes the latest revisions following the second round of meetings. You may review the draft plan at the project Google Drive: https://bit.ly/LowerPlatteNorth-GoogleDrive.

The plan is available for public comment from Monday, May 12 to Monday June 2, 2025. At the end of the Public Review Period, the completed plan will be submitted to the Nebraska Emergency Management Agency (NEMA) and the Federal Emergency Management Agency (FEMA) for final approval. This is your last opportunity to review the plan and submit to JEO any requested changes or corrections, prior to its submission to NEMA and FEMA.

Please carefully review this draft with your local planning team and verify that the information therein is accurate to the best of your knowledge. Please inform JEO as soon as possible should you desire any changes. To request changes, you can mark up a section, scan it, and email it to kdietrich@jeo.com or fax it to (402) 435-4110. If JEO does not receive changes from you by Monday June 2, we will assume that your jurisdiction has reviewed the plan and approves it as written.

At this time, jurisdictions may also adopt the plan locally. Adoption would apply to the eventual FEMA-approved version of the plan. Attached is an example resolution that you may use or adapt to fit your local needs.

After local adoption and FEMA plan approval, your jurisdiction will become eligible for FEMA project grant funding to assist with implementation of actions in this plan. The adopted resolution must be returned to JEO Consulting Group for submittal to NEMA and FEMA. Send a copy of the signed, adopted resolution to JEO Consulting Group via email at kdietrich@jeo.com; fax to (402) 435-4110; or mail to:

JEO Consulting Group, Inc.
Attn: Karl Dietrich
2000 Q Street, Suite 500
Lincoln, Nebraska 68503

Thank you for helping us provide your community with an accurate and comprehensive hazard mitigation plan.

Sincerely,

Karl Dietrich, Project Planner

Public Review Comments Received

During public review, jurisdictions and the public could provide comments via mail or email. A review of the comments and who they were from will be updated at a later date.

Adoption Resolution Template

RESOLUTION NUMBER _____

WHEREAS, the Federal Disaster Mitigation Act of 2000 was signed in to 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 Multi-Jurisdictional Hazard Mitigation Plan was prepared by the Lower Platte North Natural Resources District, with assistance from JEO Consulting Group, Inc.

WHEREAS, the purpose of the mitigation plan was to lessen the effects of disasters by increasing the disaster resistance of the counties and participating jurisdictions located within the planning boundary by identifying the hazards that affect _____ 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 _____ in the form of a resolution and further requesting approval of the plan at the Federal Level; and

NOW, THEREFORE, the governing body of _____ does herewith adopt the most recent and FEMA approved version of the Lower Platte North NRD Hazard Mitigation Plan in its entirety; and

PASSED AND APPROVED this _____ day of _____, 2025.

_____
President of the Board

ATTEST:

_____
Clerk

Appendix C: Planning Area Profile

Table of Contents

Appendix C: Planning Area Profile 1
Table of Contents 1
Introduction 2
Location and Geography 2
Demographics 4
Housing 9
Employment and Economics 11
Social Vulnerability 11
Rural Capacity Index 12
Historical Sites 12

Introduction

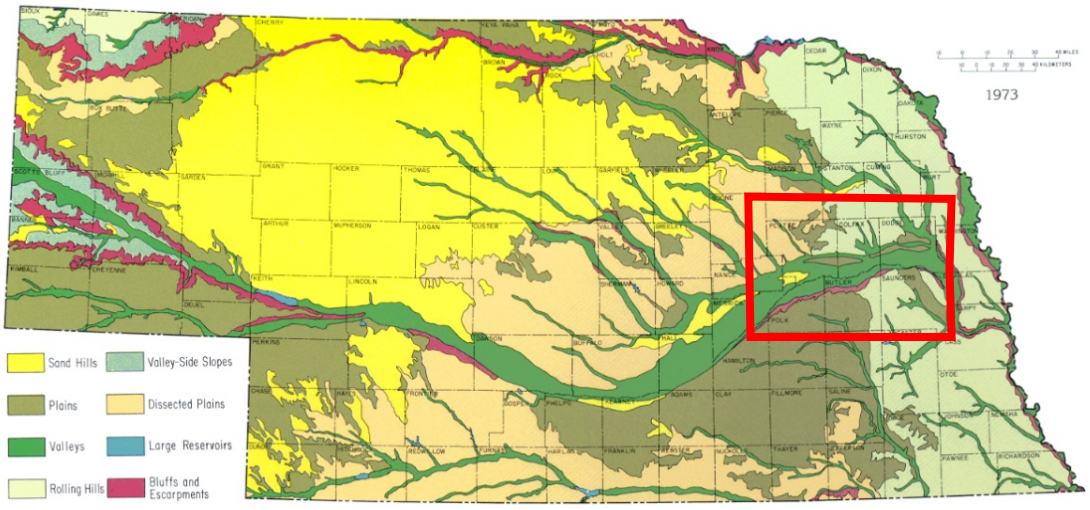
The following appendix provides a deeper look at the county and community characteristics that may not have been discussed fully in *Section 3: Planning Area Overview* or individual participant profiles. Some specific characteristics are covered in each jurisdiction's profile, redundant information will not be covered in this appendix. This appendix will highlight at-risk populations and characteristics of the built environment that add to regional and local vulnerabilities. Special jurisdictions such as fire districts and school districts may not be discussed in depth in this appendix as information is not always available for these entities.

Location and Geography

The Lower Platte North NRD hazard mitigation planning area is in eastern Nebraska. It includes portions of seven counties: Saunders, Butler, Dodge, Platte, Colfax, Madison, and Boone. Butler, Dodge, and Saunders participated in this plan update and make up the majority of the planning area, spanning approximately 1,894 square miles. There are 33 incorporated communities in the planning area. The figure on the next page shows the planning area, incorporated communities, major transportation routes, major waterways, and location within the state. The planning area has a diverse range of topographic regions including plains, valleys, bluffs and escarpments, sandhills, and rolling hills. Descriptions of these topographic regions are below.

- **Dissected Plains**: Hilly land with moderate to steep slopes and sharp ridge crests.
- **Bluffs and Escarpments:** Rugged land with very steep and irregular slopes.
- **Plains**: Flat-lying land that lies above the valley. The materials of the plains are sandstone or stream-deposited silt, clay, sand and gravel overlain by wind-deposited silt.
- **Rolling Hills**: Hilly land with moderate to steep slopes and rounded ridge crests.
- **Valley-Side Slopes**: Moderately sloping land between escarpments and major stream valleys in western Nebraska.
- **Sandhills**: Hilly land composed of low to high dunes of sand stabilized by grass cover.
- **Valleys**: Flat-lying land along the major streams.[1]

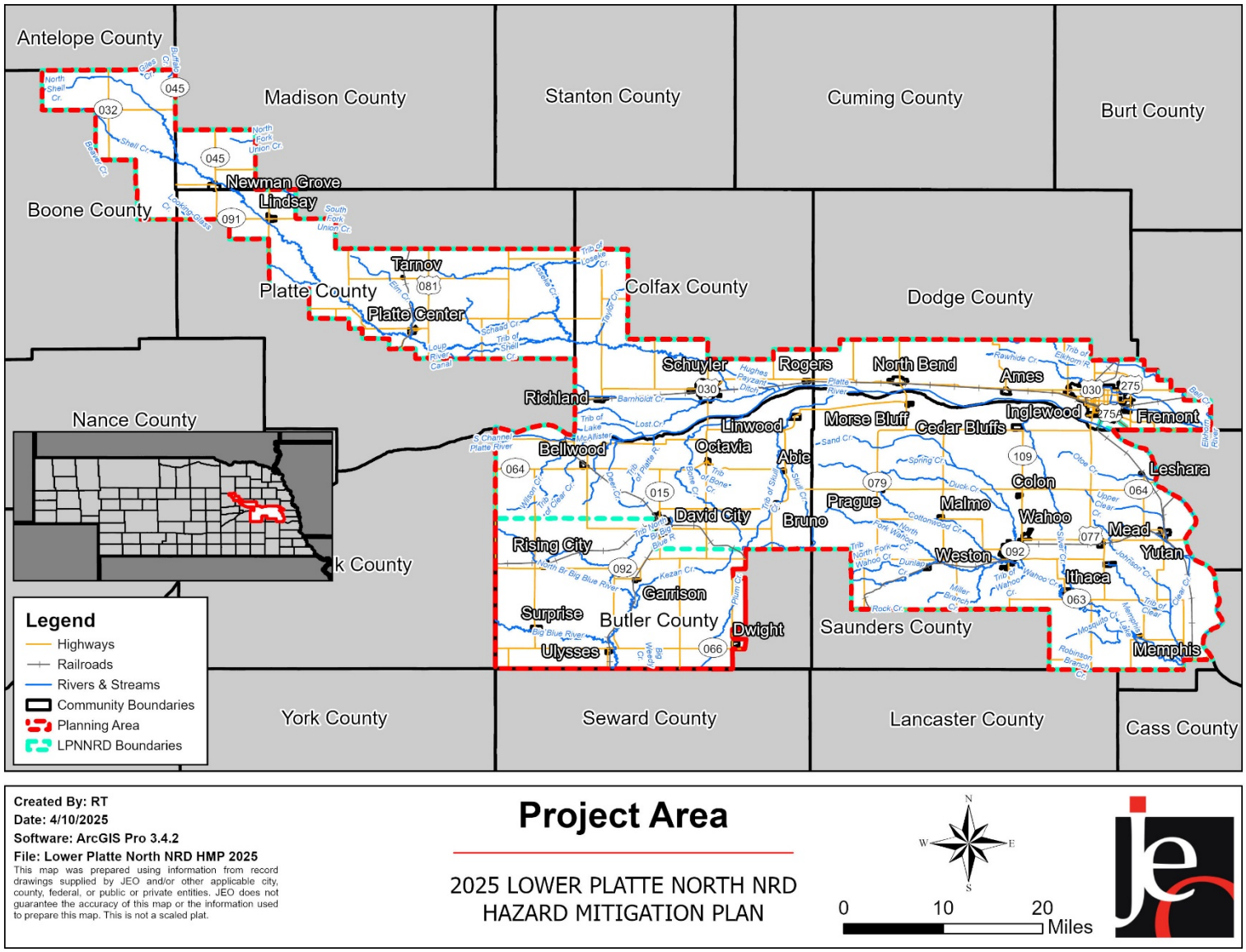
Topography of Nebraska



Source: University of Nebraska-Lincoln

1 University of Nebraska-Lincoln, 1973. "Topographic Regions Map". https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1461&context=conservationsurvey.

Lower Platte North NRD Planning Area



Created By: RT
Date: 4/10/2025
Software: ArcGIS Pro 3.4.2
File: Lower Platte North NRD HMP 2025

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.

Project Area

2025 LOWER PLATTE NORTH NRD
HAZARD MITIGATION PLAN

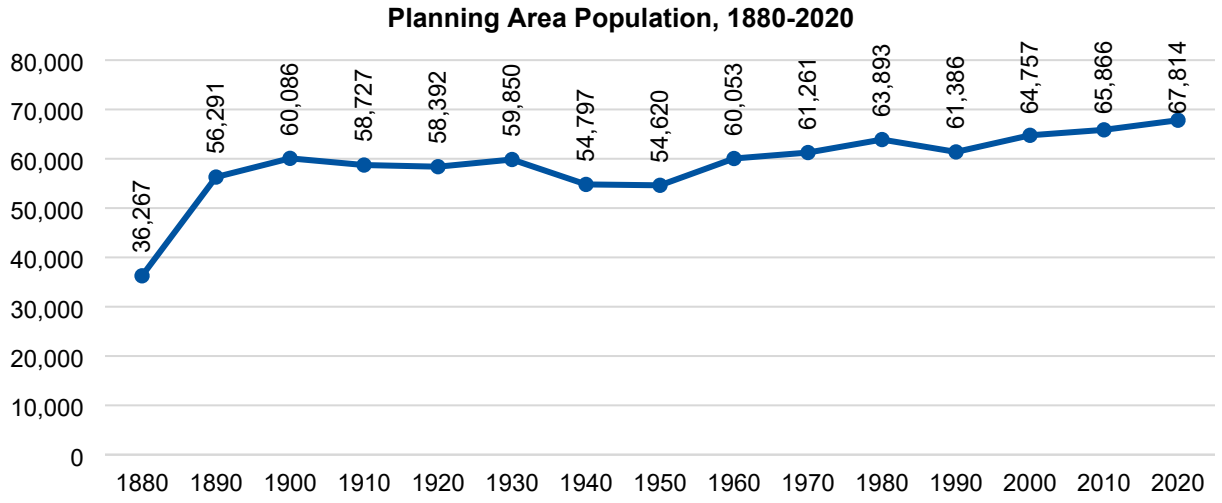
N
W E
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0 10 20 Miles

Major transportation routes include U.S. Highways 30, 77, 81, 275 and State Highways 15, 32,45, 63, 64, 66, 79, 91, 92, and 109. Major waterways in the district include the Big Blue River, North Branch Big Blue River, Elkhorn River, and the Platte River. There are 82 creeks and tributaries within the planning area, which include Pebble Creek, Shell Creek, and Wahoo Creek. Other bodies of water include Czechland Lake, Homestead Lake, and Lake Wanahoo.

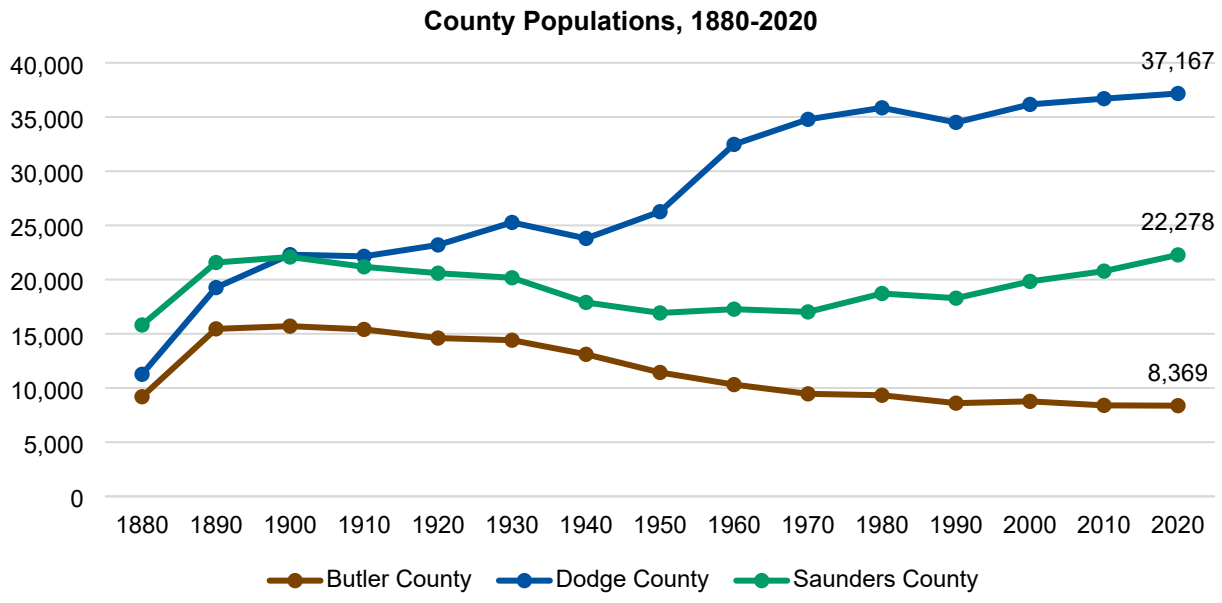
Demographics

As noted above, the majority of the planning area includes Butler, Dodge, and Saunders Counties. The U.S. Census Bureau collects specific demographic information for each county. The population of the three-county planning area is 67,814.[2] Community and regional vulnerability are impacted by growing or declining populations. Communities and regions growing quickly may lack resources to provide services for all members of the area in a reasonable timeframe including snow removal, emergency storm shelters, repairs to damaged infrastructure, or even tracking the location of vulnerable populations. Communities and regions experiencing population decline may be more vulnerable to hazards because of vacant and/or dilapidated structures, an inability to properly maintain critical infrastructure, and higher levels of unemployment. It is important for communities and regions to monitor their population changes and ensure that potential issues are incorporated into hazard mitigation plans, as well as other planning mechanisms. The planning area has displayed decades with a slightly declining population and decades with a slightly increasing population. Individual community population change over time can be found in the *Participant Profile Appendices*. The figures below show the population over time for the three-county planning area and broken down by county.



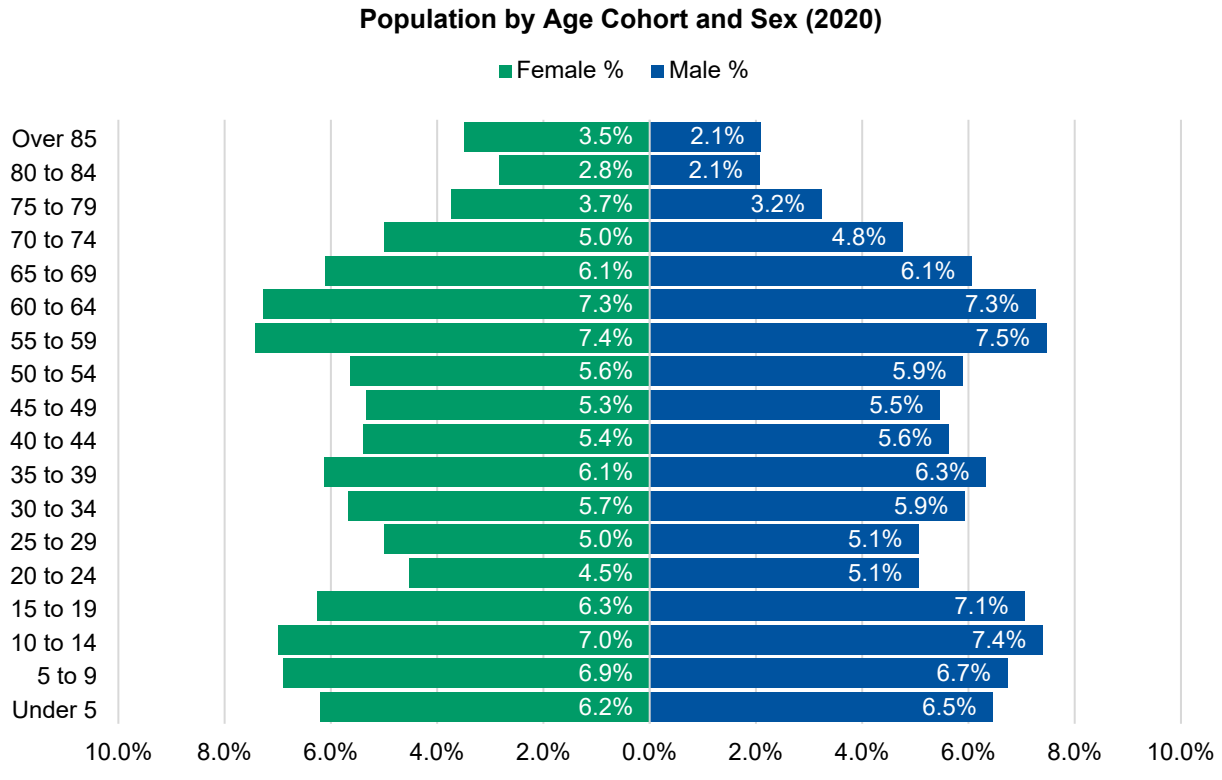
Source: U.S. Census Bureau[3]

2 United States Census Bureau. "2020 Census Bureau Decennial Census: P1: Race." https://data.census.gov/.
3 United States Census Bureau. "2020 Census Bureau Decennial Census: P1: Race." https://data.census.gov/.



Source: U.S. Census Bureau[4]

Looking at the age cohort breakdown of the planning area, there is a large majority of the population between the ages 0 to 19, 35 to 39, and 55 to 69. This suggests a steady population and a need for elderly care, childcare, and schools in the future.



Source: U.S. Census Bureau[5]

4 United States Census Bureau. "2020 Census Bureau Decennial Census: P1: Race." https://data.census.gov/.
5 United States Census Bureau. "2020 Census Bureau Decennial Census: P1: Race." https://data.census.gov/.

At-risk Populations

In general, certain populations may have increased vulnerability due to difficulty with medical issues, extremes in age, and communication issues due to language barriers. However, outliers may be considered when discussing potentially at-risk populations.

- 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."[6] The information below outlines at-risk population information for the planning area. Individual community at-risk population information can be found in the *Participant Profile Appendices*.

Dependent children under 20 years old are one of the most vulnerable populations to disasters.[7] The majority of people in this age group do not have access to independent financial resources and transportation. They lack the practical knowledge necessary to respond appropriately during a disaster. Despite this vulnerability, children are generally overlooked in disaster planning because the presence of a caretaker is assumed. With 27% of the planning area's population younger than 20, children are a key vulnerable group to address in the planning process.

Schools house a high number of children and adults 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 the map on the next page shows the school district boundaries. School districts that participated in this plan update include Cedar Bluffs Public Schools, Mead Public Schools, and North Bend Central Public Schools.

School Districts in the Planning Area

School District	Total Enrollment (2022-2023)
Ashland-Greenwood Public Schools	1,099
Cedar Bluffs Public School	469
David City Public Schools	676
East Butler Public Schools	297
Fremont Public Schools	5,217
Logan View Public Schools	590
Mead Public Schools	283
Newman Grove Public Schools	219
North Bend Central Public Schools	591
Scribner-Snyder Community Schools	171
Wahoo Public Schools	1,085
Yutan Public Schools	506
Total	**11,203**

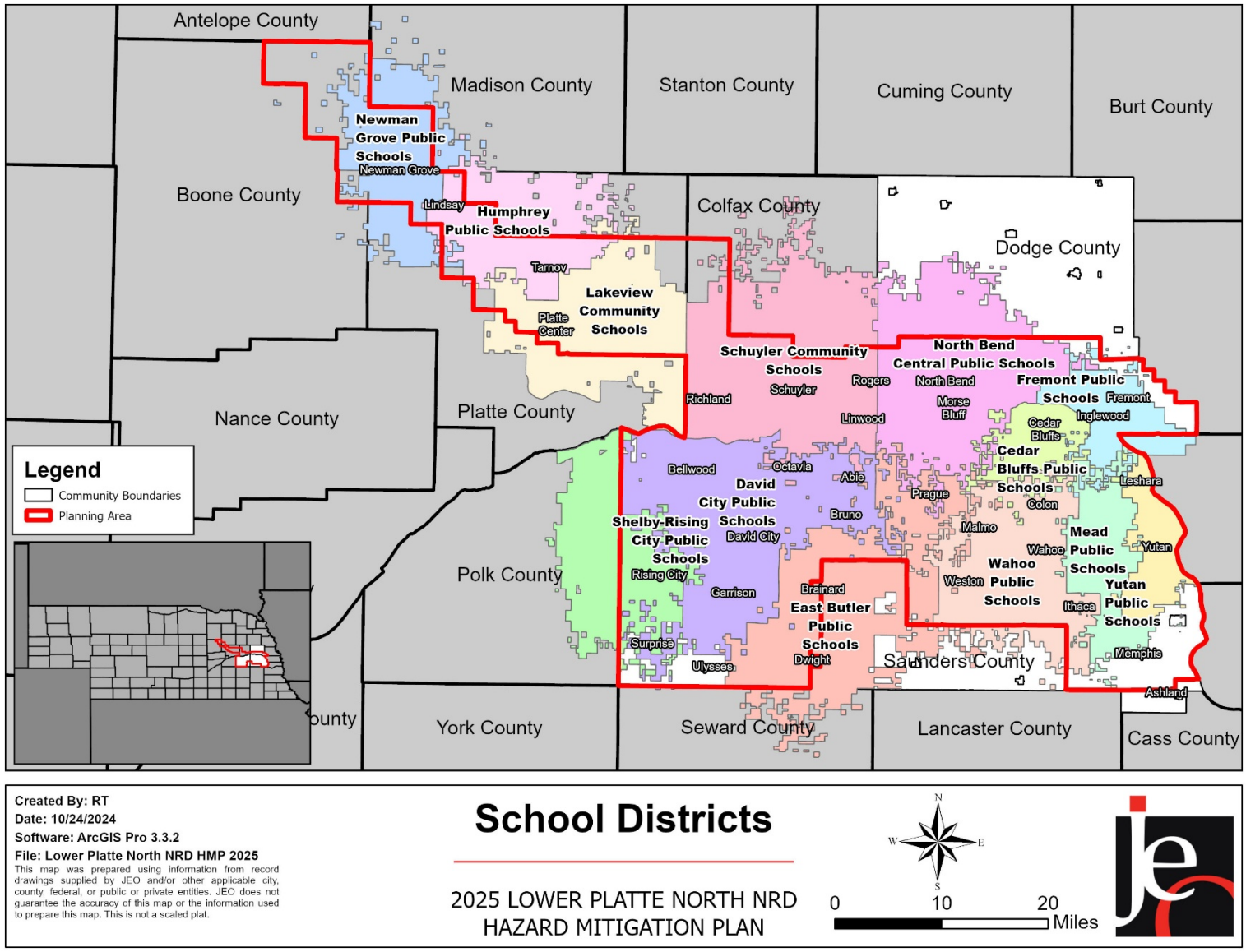
Source: Nebraska Department of Education[8]

6 United States Department of Homeland Security. October 2019. "National Response Framework Third Edition." https://www.fema.gov/media-library/assets/documents/117791.

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

8 Nebraska Department of Education. October 2023. "Nebraska Education Profile". https://nep.education.ne.gov/.

Planning Area School Districts



Like minors, seniors (age 65 and greater) are often more significantly impacted by hazards and temperature extremes. During prolonged heat waves or periods of extreme cold, 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. 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.[9] The study found that on average there are 11,500 injuries and 100 deaths annually related to snow removal. Men over the age of 55 are 4.25 times more likely to experience cardiac events during snow removal.

While elderly populations live throughout the planning area, there is the potential that they will be in higher concentrations at care facilities. The table below identifies the number and location of care facilities throughout the planning area.

Inventory of Care Facilities

County	Hospitals	Hospital Beds	Rural Health Clinics	Long Term Care Facilities	Long Term Care Facilities Beds	Assisted Living Homes	Assisted Living Beds
Butler County	1	20	1	2	144	1	26
Dodge County	1	75	0	4	313	6	263
Saunders County	1	16	1	2	145	2	96
Total	**3**	**111**	**3**	**8**	**605**	**9**	**385**

Source: Nebraska Department of Health and Human Services[10]

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 of hazard events. 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 acting in a timely manner. Further, educational materials related to 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. The cities of Schuyler and Fremont have higher populations who speak English as a second language.

Racial minorities may also face increased vulnerability as they 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

9 Center for Injury Research and Policy. January 2011. “Snow Shoveling Safety.” http://www.nationwidechildrens.org/cirp-snow-shoveling.

10 Nebraska Department of Health and Human Services. December 2023. “Rosters of Facilities And Services”. https://dhhs.ne.gov/licensure/Pages/Rosters-of-Facilities-and-Services.aspx.

possession of financial stability. The table on the next page shows the racial composition of the planning area.

Racial Composition Trends

Race	2010		2020		% Change
	Number	% of Total	Number	% of Total	
White, Not Hispanic	61,730	93.7%	59,170	87.3%	-4.15%
Black	300	0.5%	355	0.5%	1.67%
American Indian and Alaskan Native	244	0.4%	457	0.7%	87.3%
Asian	301	0.5%	299	0.4%	-0.66%
Native Hawaiian and Other Pacific Islander	76	0.1%	26	0.0%	-65.79%
Other Races	2,417	3.7%	3,699	5.5%	53.04%
Two or More Races	798	1.2%	3,808	5.6%	377.19%
Total Population	**65,866**	**-**	**67,814**	**-**	**2.96%**

Source: U.S. Census Bureau[11,12]

Housing

The U.S. Census Bureau provides information related to housing units. Potential areas of vulnerability are described below for the planning area. Individual community housing information can be found in the *Participant Profile Appendices*.

Of the occupied housing units in the planning area, nearly 27.4 percent are renter occupied. Renter-occupied housing units often do not receive many of the updates and retrofits that are needed to make them resilient to disaster impacts. Communities may consider enacting landlord outreach programs aimed at educating property owners about the threats in their area and what they can do to help reduce the vulnerability of the tenants living in their housing units.

Unoccupied homes may not be maintained as well as occupied housing, thus adding to vulnerability. During disaster events like high winds, these structures may fail and result in debris which can impact other structures as well as people, resulting in injuries or fatalities, as well as higher damage totals.

Occupied, Vacant, Owner, and Renter Housing

Jurisdiction	Total Housing Units					Occupied Housing Units			
	Occupied		Vacant			Owner		Renter	
	#	%	#	%		#	%	#	%
Butler County	3,508	87.0%	524	13.0%		2,843	81.0%	665	19.0%
Dodge County	14,624	89.5%	1,724	10.5%		9,613	65.7%	5,011	34.3%
Saunders County	8,789	87.6%	1,243	12.4%		7,082	80.6%	1,707	19.4%

11 United States Census Bureau. "2010 Census Redistricting Data (Public Law 94-171): P1: Race." https://data.census.gov.
12 United States Census Bureau. "2020 Census Bureau Decennial Census: P1: Race." https://data.census.gov/.

Total	**26,921**	**88.5%**	**3,491**	**11.5%**		**19,538**	**72.6%**	**7,383**	**27.4%**

Source: U.S. Census Bureau[13]

The U.S. Census Bureau provides information related to housing units and potential areas of vulnerability. The selected characteristics examined in the table below include lacking complete plumbing facilities; lacking complete kitchen facilities; broadband internet subscription; housing units that are mobile homes; and housing units with no vehicles.

Selected Housing Vulnerabilities

Housing Characteristics	Butler County	Dodge County	Saunders County	Total
Occupied Housing Units	3,508 (87.0%)	14,624 (89.5%)	8,789 (87.6%)	**26,921**
Lacking Complete Plumbing Facilities	1.0%	0.2%	0%	**59 (0.2%)**
Lacking Complete Kitchen Facilities	2.4%	1.9%	0.1%	**363 (1.4%)**
Broadband Internet Subscription	85.0%	85.8%	89.5%	**23,394 (86.9%)**
No Vehicles Available	2.7%	4.8%	3.5%	**1,111 (4.1%)**
Mobile Homes	7.1%	4.8%	4.0%	**1,465 (4.8%)**

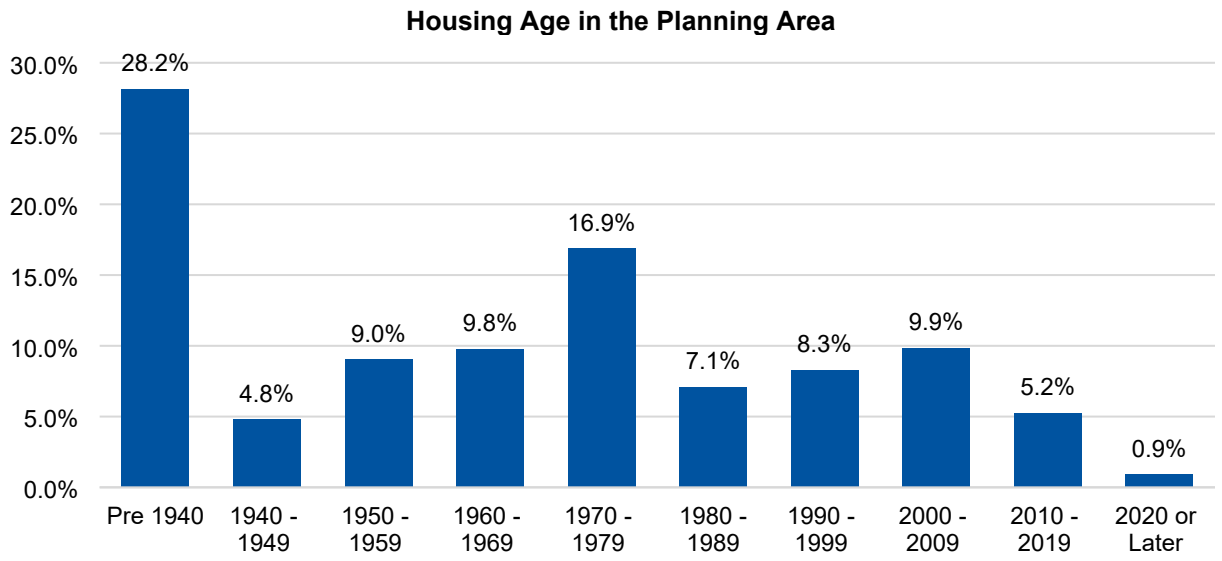
Source: U.S. Census Bureau[14]

Mobile homes have a higher risk of sustaining damage during high wind events and severe winter weather. Mobile homes that are either not anchored or are anchored incorrectly can be overturned by 60 mph winds. Households without vehicles may have difficulty evacuating during a hazardous event and a reduced ability to access resources in times of need.

Most homes within the planning area were built before 1970, with 28% of homes built before 1940. Housing age can serve as an indicator of risk, as structures built prior to the development of state building codes and prior to the identification of flood prone areas in the 1970s and 1980s may be more vulnerable. Residents living in these homes may be at higher risk of the impacts from flooding, high winds, severe winter weather.

13 United States Census Bureau. "2022 Census Bureau American Community Survey: DP04: Selected Housing Characteristics." https://data.census.gov/.

14 United States Census Bureau. "2022 Census Bureau American Community Survey: DP04: Selected Housing Characteristics." https://data.census.gov/.



Source: U.S. Census Bureau[15]

Employment and Economics

The U.S. Census Bureau provides information related to employment and economic indicators. The information below outlines vulnerabilities related to employment and economics for the planning area. Individual community employment and economics information can be found in the *Participant Profile Appendices*.

Low-income populations and those that are unemployed may lack resources to prepare for, respond to, or recover from hazard events. Residents with limited economic resources might 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. Residents below the poverty line will be more vulnerable to all hazards within the planning area.

Vulnerable Employment and Economic Characteristics

Jurisdiction	Percent of People Living Below the Poverty Line	Median Household Income	Unemployment Rate
Butler County	7.9%	$75,690	0.7%
Dodge County	9.1%	$66,793	4.1%
Saunders County	6.7%	$84,474	2.4%
Average	**8.2%**	**$75,652**	**3.2%**

Source: U.S Census Bureau[16]

Social Vulnerability

FEMA's National Risk Index is a mapping tool that analyzes a community's risk to natural hazards on a scale of 0 (lowest possible value) to 100 (highest possible value). It is broken down into two values Social Vulnerability: susceptibility to adverse impacts of natural hazards when compared

15 United States Census Bureau. "2022 Census Bureau American Community Survey: DP04: Selected Housing Characteristics". https://data.census.gov/.

16 United States Census Bureau. "2022 Census Bureau American Community Survey: DP03: Selected Economic Characteristics." https://data.census.gov/.

to the rest of the U.S. and Community Resilience: ability to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions when compared to the rest of the U.S.

National Risk Index

Jurisdiction	Social Vulnerability	Community Resilience	Overall Risk
Butler County	Very Low (8.8)	Very High (80.8)	Very Low (38.56)
Dodge County	Relatively High (64.1)	Very High (84.3)	Relatively Low (79.48)
Saunders County	Very Low (1.3)	Very High (92.6)	Relatively Low (50.11)

FEMA[17]

Rural Capacity Index

The Rural Capacity Index developed by Headwaters Economics evaluates rural communities and counties across the planning for local capacity. Capacity includes the staffing, resources, and expertise to both apply for funding and fulfill reporting requirements, as well as design, build, and maintain infrastructure products over the long term. Counties lacking local capacity often have the greatest need for infrastructure investments—particularly rural counties. The Rural Capacity Index helps identify communities and counties with limited capacity on a scale of 0 (no capacity) to 100 (high capacity). This index is based on ten variables that can function as proxies for community capacity. The following table lists out the components and scores for each of the three counties in the planning area.

Rural Capacity Index

Components of Index	Butler County	Dodge County	Saunders County
County is Metropolitan?	No	Yes	Yes
Has a Head of Planning?	Yes	Yes	Yes
Has a College or University?	No	Yes	Yes
Adults with Higher Education	25%	22%	30%
Families Below Poverty Level	4%	7%	4%
Households with Broadband	86%	88%	91%
People without Health Insurance	6%	6%	4%
Voter Turnout	74%	65%	79%
Income Stability Score (0 to 100)	54	65	54
Population Change (2010 to 2022)	31	525	2,218
Overall Rural Capacity Index Score	**57**	**78**	**83**

Source: Headwaters Economics[18]

Historical Sites

According to the National Register of Historic Places for Nebraska by the National Park Service, there are 54 historic sites located in the planning area. Thirty-one of the sites are known to be in the 100-year floodplain.

17 Federal Emergency Management Agency. January 2024. “National Risk Index”. https://hazards.fema.gov/nri/map.
18 Headwaters Economics. January 2024. “Rural Capacity Map”. https://headwaterseconomics.org/equity/rural-capacity-map/.

Historical Sites

Site Name	Date Listed	Nearest Community, County	Floodplain (Y/N)
Linwood Site	3/16/1972	Linwood, Butler	Unknown
Leshara Site	3/16/1972	Leshara, Saunders	Unknown
McClean Site	3/16/1972	Inglewood, Saunders	Unknown
Barcal Site	3/24/1972	Abie, Butler	Unknown
Yutan Site	6/26/1972	Yutan, Saunders	Unknown
Woodcliff Burials	3/7/1973	Inglewood, Saunders	Unknown
Pahuk	8/14/1973	Cedar Bluffs, Saunders	Unknown
Schuyler Site	8/14/1973	Schuyler, Colfax	Unknown
Wolfe Archeological Site	7/30/1974	Schuyler, Colfax	Unknown
Bellwood Archeological Site	8/13/1974	Bellwood, Butler	Unknown
Love-Larson Opera House	9/10/1974	Fremont, Dodge	Y
Nye House	11/23/1977	Fremont, Dodge	Y
Osterman and Tremaine Building	5/23/1978	Fremont, Dodge	Y
Fremont, Elkhorn and Missouri Valley Railroad Depot	10/11/1979	Dwight, Butler	N
McDonald, J. D., House	12/10/1980	Fremont, Dodge	Y
Colfax County Courthouse	9/3/1981	Schuyler, Colfax	Y
Schuyler City Hall	9/3/1981	Schuyler, Colfax	Y
North Bend Carnegie Library	9/3/1981	North Bend, Dodge	Y
Taylor, Chauncey S., House	6/25/1982	David City, Butler	N
Schneider, R. B., House	7/15/1982	Fremont, Dodge	Y
Janecek, John, House	7/15/1982	Schuyler, Colfax	Y
Knoell, Christopher, Farmstead	1/13/1983	Fremont, Dodge	Y
Hanson, Howard, House	1/27/1983	Wahoo, Saunders	N
Oak Ballroom	2/1/1983	Schuyler, Colfax	Y
Wahoo Burlington Depot	5/9/1985	Wahoo, Saunders	Y
Bullock, Samuel, House	9/12/1985	Fremont, Dodge	Y
Rad Plzen cis. 9 Z.C.B.J. (SD10-6)	3/20/1986	Morse Bluff, Saunders	N
Surprise Opera House	7/6/1988	Surprise, Butler	Y

Site Name	Date Listed	Nearest Community, County	Floodplain (Y/N)
Thorpe's Opera House	9/28/1988	David City, Butler	N
Dodge County Courthouse	1/10/1990	Fremont, Dodge	Y
Saunders County Courthouse	1/10/1990	Wahoo, Saunders	N
Barnard Park Historic District	7/12/1990	Fremont, Dodge	Y
St. Michael's Catholic Church	11/28/1990	Tarnov, Platte	N
O. K. Market	7/3/1991	Wahoo, Saunders	N
US Post Office – Schuyler	5/11/1992	Schuyler, Colfax	Y
Big Blue River Bridge	6/29/1992	Surprise, Butler	Y
Clear Creek Bridge	6/29/1992	Bellwood, Butler	Y
Fremont Historic Commercial District	2/17/1995	Fremont, Dodge	Y
Turner, George and Nancy, House	1/11/1996	Fremont, Dodge	Y
Fremont Post Office, Old	2/29/1996	Fremont, Dodge	Y
First Welch Calvinistic Methodist Church and Cemetery	6/25/1999	Platte County	N
David City Park and Municipal Auditorium	11/15/2000	David City, Butler	Y
Ithaca Grain Elevator, Old	2/23/2001	Ithaca, Saunders	N
Schuyler Carnegie Library	11/29/2001	Schuyler, Colfax	Y
Fremont Municipal Auditorium	7/11/2002	Fremont, Dodge	Y
Fremont Municipal Power Plant and Pumping Station	7/11/2002	Fremont, Dodge	Y
Kirchman, F.J., House	8/21/2003	Wahoo, Saunders	N
St. Mary of the Assumption Catholic Church, School and Grottoes	12/4/2008	Dwight, Butler	N
Durkee, Charles T., House	8/10/2011	Fremont, Dodge	Y
Butler County District No. 10 School	12/7/2011	Linwood, Butler	N
Kacirek-Woita General Store	7/8/2014	Weston, Saunders	N
North Broad Street Residential Historic District	3/17/2015	Fremont, Dodge	Y
Schuyler Downtown Historic District	7/22/2016	Schuyler, Colfax	Y
Merchant Park	10/28/2022	Schuyler, Colfax	Y

Source: National Park Service[19]

19 National Park Service. July 2024. “National Register of Historic Places NPGallery Database”. https://npgallery.nps.gov/NRHP.

Lower Platte North Natural Resources District
Multi-Jurisdictional Hazard Mitigation Plan 2025
RESOLUTION

WHEREAS, the Federal Disaster Mitigation Act of 2000 was signed in to 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 Multi-Jurisdictional Hazard Mitigation Plan was prepared by the Lower Platte North Natural Resources District, with assistance from JEO Consulting Group, Inc.

WHEREAS, the purpose of the mitigation plan was to lessen the effects of disasters by increasing the disaster resistance of the counties and participating jurisdictions located within the planning boundary by identifying the hazards that affect the Lower Platte North Natural Resources District 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 the Lower Platte North Natural Resources District in the form of a resolution and further requesting approval of the plan at the Federal Level; and

NOW, THEREFORE, the governing body of the Lower Platte North Natural Resources District does herewith adopt the most recent and FEMA approved version of the Lower Platte North NRD Hazard Mitigation Plan in its entirety; and

PASSED AND APPROVED this 9th day of June, 2025.

_____
Board Chairperson

ATTEST:

_____

JEO CONSULTING GROUP

Engineering | Architecture | Surveying | Planning

Invoice

April 22, 2025
Project No: R220954.00
Invoice No: 160498
Invoice Amount: 18,500.50

Eric Gottschalk
Lower Platte North NRD
Commercial Park Road
PO Box 126
Wahoo, NE 68066

Project Manager Rebecca Appleford

Project R220954.00 Lower Platte North NRD HMP 2025 Update

Professional Services through April 11, 2025

	Contract Amount	Percent Complete	Billed-to-Date	Previous Billing	Current Billing
Lump Sum Phase(s)					
Project Management	$16,500.00	98%	$16,170.00	$16,005.00	$165.00
Public Involvement and Stakeholder Participation	$34,700.00	98%	$34,006.00	$32,618.00	$1,388.00
Data Collection and GIS Mapping	$16,550.00	100%	$16,550.00	$16,550.00	0.00
Develop Hazard Mitigation Plan	$65,750.00	91%	$59,832.50	$51,285.00	$8,547.50
HMP Adoption, Submission, and Approval	$4,000.00	0%	0.00	0.00	0.00
Threat and Hazard Identification and Risk Assessment	$17,500.00	100%	$17,500.00	$17,500.00	0.00
Drought Risk Assessment and Management	$95,000.00	51%	$48,720.00	$40,320.00	$8,400.00
Total	**$250,000.00**		**$192,778.50**	**$174,278.00**	**$18,500.50**

Total Amount Due Upon Receipt : $18,500.50

Outstanding Invoices

Number	Date	Balance
159654	3/24/2025	17,040.50
Total		**17,040.50**

Email Invoice: rchapman@lpnnrd.org; jbreunig@lpnnrd.org

Progress Report

LOWER PLATTE NORTH NATURAL RESOURCES DISTRICT
HAZARD MITIGATION PLAN UPDATE

April 22, 2025

JEO Project Number: 220954.00
Project Contact: Becky Appleford, 217-741-0117
Professional Services through April 11, 2025

Below is a progress report for the above referenced project:

1. **Overall project and budget status:**

Overall Project Completion: 80%	Overall Budget Expended: 77%
HMP Completion: 92%	HMP Budget Expended: 90%
THIRA Completion: 100%	THIRA Budget Expended: 100%
Drought Plan Completion: 55%	Drought Plan Budget Expended: 51%

2. **Project activities during current period (thru April 11, 2025)**
    a. Continued to follow up with missing jurisdictions
    b. Continued incorporating Round 2 worksheets into plan
    c. Continued to draft sections of upfront HMP
    d. Completed maps for HMP
    e. Incorporated Yutan PWS drought info into matrix
    f. Continued drafting drought plan
    g. Coordinated with LRE on GWM Plan for drought related information
    h. Scheduled call with Emergency Management and NRD on HMP update

3. **Planned project activities for next period (thru May 16, 2025)**
    a. Continue to follow up with missing jurisdictions and worksheets
    b. Continue incorporating worksheets into HMP
    c. Continue drafting sections of HMP
    d. Prepare public review notifications
    e. Prepare adoption resolution template
    f. Continue drafting drought sections
    g. Facilitate meeting with EMs and NRD on HMP missing jurisdictions
        i. Meeting Thursday, April 17 at 9am

4. **Information needed from NRD or key stakeholders**
    a. Assistance with reaching out to missing worksheets from jurisdictions

5. **Project Schedule and Next Meeting(s)**

Milestone	Schedule
Last date to join HMP	May 12, 2025
Public Review Period	May 12 – June 1, 2025
Adoption Resolution Process	Begins May 12, 2025
NRD review Drought Plan	May 16 – May 30, 2025
Submit HMP to NEMA/FEMA	June 9, 2025

Public Outreach and Education Toolkit

This appendix contains a public outreach and education kit for communities to utilize for educational outreach and for notifying a community about drought stage restrictions or recommendations.

The following templates are included in this appendix:

1. Social Media Prompts
2. Press Releases
3. Website Posts
4. Outreach Flyers
5. Educational Flyers

For each templates section, there are three scenarios that can be easily edited to fit each community's needs:

Scenario Drought Stage #1: Voluntary water restrictions.

Scenario Drought Stage #2: Odd/Even calendar day outdoor watering restrictions.

Scenario Drought Stage #3: No outdoor watering.

DRAFT

Table of Contents

Social Media Prompts 3
Scenario Drought Stage #1: 3
Scenario Drought Stage #2: 4
Scenario Drought Stage #3: 5
Press Releases 6
Scenario Drought Stage #1: 6
Scenario Drought Stage #2: 7
Scenario Drought Stage #3: 8
Website Posts 9
Scenario Drought Stage #1: 9
Scenario Drought Stage #2: 10
Scenario Drought Stage #3: 11
Outreach Flyers 12
Scenario Drought Stage #1: 12
Scenario Drought Stage #2: 13
Scenario Drought Stage #3: 14
Educational Flyers 15
Let's Understand Drought 15
Drought Impacts 16
5 Easy Ways to Conserve Water During Drought 17

DRAFT

Social Media Prompts

Scenario Drought Stage #1:

ATTENTION all residents! As part of [COMMUNITY NAME] effort to conserve water in response to current drought conditions, the [COMMUNITY NAME] is requesting that residents limit outdoor watering to conserve water voluntarily.

Recommended steps include:

- Reduce outdoor irrigation and limit watering.
- Minimize overall water use.
    - Take shorter showers, turn off the faucet while brushing teeth, and wash only full loads of laundry and dishes.
- Do not use water to rinse off your driveway, sidewalks, patios, or other pavement surfaces.

To help in this conservation effort, please follow the QR code and the steps outlined or contact the [COMMUNITY DEPARTMENT] for assistance.

DRAFT

Scenario Drought Stage #2:

ATTENTION all residents! As part of [COMMUNITY NAME] effort to conserve water in response to current drought conditions, the [COMMUNITY NAME] is implementing water restrictions that require residents to conserve water on an odd/even basis. To determine if your house is an odd or even number, look at the *last* number in your address. For example, if your address is 231, you would water on the *odd* schedule.

During this time of drought conditions, residents must adhere to the following drought ordinance guidelines:

1. Odd numbered addresses may water on odd calendar days.
2. Even numbered addresses may water on even calendar days.

For further information regarding this conservation effort, please scan the QR code and follow the steps outlined or contact the [COMMUNITY DEPARTMENT] for assistance.

DRAFT

Scenario Drought Stage #3:

ATTENTION all residents! As part of [COMMUNITY NAME] effort to conserve water in response to current drought conditions, the [COMMUNITY NAME] is implementing Stage 3 water restrictions that require residents to conserve water.

During this time of drought conditions, residents must adhere to the following drought ordinance guideline:

- No outdoor watering.

For further information regarding this conservation effort, please scan the QR code and follow the steps outlined or contact the [COMMUNITY DEPARTMENT] for assistance.

DRAFT

PRESS RELEASES

Scenario Drought Stage #1:

[INSERT LOGO HERE]

For Immediate Release

REQUEST FOR WATER-USE LIMITATIONS
City/Village to Implement Water Conservation Initiatives Starting (Insert Day)

City name, State—Date— As part of [COMMUNITY NAME] effort to conserve water in response to current drought conditions, the [COMMUNITY NAME] is requesting that residents voluntarily conserve water by limiting outdoor watering.

In accordance with our municipal code, the [POSITION] has declared that the [COMMUNITY NAME] has entered Stage 1 of drought response. The reason for this is [ENTER INFORMATION ON THE TRIGGERS THAT LED TO THE DECLARATION]. Conservation efforts are critical to ensure water availability for essential uses.

Resident Actions:

- Minimize overall water use.
- Specifically, limit your outdoor water usage.
- Consider limiting outdoor watering methods to hand-held hoses or watering cans.
- Consider only watering after 5:00PM or before 9:00AM to minimize evaporation.
- Consider taking shorter showers, turning off the faucet while brushing teeth, and washing only full loads of dishes and clothes.

The goal is that citizens will adhere to the weekly watering recommendations before we reach Drought Stage 2 and must implement mandatory watering restrictions. We will continually update residents as these conditions are monitored. Residents can visit [WEBSITE] for more information on drought conditions and recommended actions. We appreciate your cooperation.

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Scenario Drought Stage #2:

[INSERT LOGO HERE]

For Immediate Release

NOTICE OF MANDATORY WATER RESTRICTIONS
City/Village to Implement Water Restrictions for Drought Relief

City, State—Date— [COMMUNITY NAME] is notifying residents of the implementation of water restrictions in response to current drought conditions.

In accordance with our municipal code, the [POSITION] has declared that the [COMMUNITY NAME] has entered Stage 2 of drought response. The reason for this is [ENTER INFORMATION ON THE TRIGGERS THAT LED TO THE DECLARATION].

Conservation efforts are critical to ensure water availability for essential uses. As part of our effort to conserve water in response to current drought conditions, we are implementing water restrictions that require residents to conserve water on an odd/even basis. To determine if your house is an odd or even number, look at the *last* number in your address. For example, if your address is 231, you would water on the *odd* schedule.

During this time, residents must adhere to the following drought ordinance guidelines:

1. Odd numbered addresses may only outdoor water on odd calendar days.

2. Even numbered addresses may only outdoor water on even calendar days.

Outdoor watering is one of the biggest sources of water use, and small changes to usual watering practices have the potential for a big impact. The goal is that citizens will adhere to these watering restrictions before we reach Drought Stage 3. Mandatory compliance with these restrictions is effective on [ENTER DATE].

We will continually update residents as these conditions are monitored. Residents can visit [WEBSITE] for more information on drought conditions and recommended actions. We appreciate your cooperation.

###

DRAFT

Scenario Drought Stage #3:

[INSERT LOGO HERE]

For Immediate Release

NOTICE OF MANDATORY WATER RESTRICTIONS
Residents Asked to Stop Outdoor Watering

City, State—Date—[COMMUNITY NAME] is notifying residents of the implementation of water restrictions in response to current drought conditions.

In accordance with our municipal code, the [POSITION] has declared that the [COMMUNITY NAME] has entered Stage 3 of drought response. The reason for this is [ENTER INFORMATION ON THE TRIGGERS THAT LED TO THE DECLARATION].

During this time of drought conditions, all residential, commercial, and municipal properties must adhere to the following drought ordinance guideline:

1. No outdoor watering. This includes watering lawns, gardens, and other outdoor landscapes.

The goal of these restrictions is to help reduce drought locally and help the city conserve water.

Mandatory compliance with these restrictions is effective on [ENTER DATE].

Additionally, please consider implementing the following recommended methods to conserve water:

- Take shorter showers, turn off the faucet while brushing teeth, and wash only full loads of dishes and clothes.

We will continually update residents as these conditions are monitored. We appreciate your cooperation.

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Website Posts

Scenario Drought Stage #1:

[COMMUNITY NAME] IS ASKING RESIDENTS TO SAVE WATER

Drought Stage 1

- Voluntary water restrictions are currently encouraged.
- Stage 1 is in effect because [ENTER INFORMATION FOR DROUGHT LEVEL].

Recommended Restrictions under Stage 1:

- Reduce outdoor irrigation and limit watering.
    - The typical home will use as much as 50% of its total water use on landscaping, so cutting back on outdoor irrigation can have a massive impact!
- Minimize overall water use.
    - Take shorter showers, turn off the faucet while brushing teeth, and wash only full loads of laundry and dishes.
- Do not use water to rinse off your driveway, sidewalks, patios, or other pavement surfaces.

We Will Keep You Informed

- As these drought conditions are monitored, we will continually update residents.
- We appreciate your consideration of these recommended restrictions to conserve our water!

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Scenario Drought Stage #2:

[COMMUNITY NAME] IS ASKING RESIDENTS TO SAVE WATER

Drought Stage 2

- Mandatory water restrictions are currently in effect.
- Stage 2 is in effect because [ENTER INFORMATION FOR DROUGHT LEVEL].
- Due to these dry conditions, the [COMMUNITY NAME] is asking all residents to help conserve and protect our water supply by cutting back on outdoor watering by implementing an odd/even watering schedule.

New Watering Schedule (Effective Immediately):

(To determine if your house is an odd or even number, look at the *last* number in your address. For example, if your address is 231, you would water on the *odd* schedule.)

- Even-numbered addresses:
  - May only run sprinkler systems on even calendar days.
- Odd-numbered addresses:
  - May only run sprinkler systems on odd calendar days.
- Water only between the hours of 5:00 PM – 9:00 AM

We Will Keep You Informed

- As these drought conditions are monitored, we will continually update residents.
- We appreciate your cooperation with these restrictions to conserve our water!

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Scenario Drought Stage #3:

[COMMUNITY NAME] IS ASKING RESIDENTS TO SAVE WATER

Drought Stage 3

- Mandatory water restrictions are currently in effect.
- Stage 3 is in effect because [ENTER INFORMATION FOR DROUGHT LEVEL].
- Due to these dry conditions, the [COMMUNITY NAME] is asking all residents to help conserve and protect our water supply by eliminating outdoor watering until drought conditions lessen. These restrictions aim to conserve water for essential uses such as drinking water, firefighting services, and more.

Watering Restrictions (Effective Immediately):

- NO OUTDOOR WATERING
    - This includes ALL outdoor watering, including lawn, garden, and landscape areas. Do not use water to rinse off your driveway or other pavement surfaces.
    - Do not fill up your pools, ponds, or other bodies of water.

We Will Keep You Informed

- As these drought conditions are monitored, we will continually update residents. Restrictions will be lifted as soon as possible.
- We appreciate your cooperation with these restrictions to conserve our water!

DRAFT

{INSERT} is Asking Residents to Conserve Water

In response to the current drought conditions, the {INSERT COMMUNITY NAME} is requesting that residents conserve water by limiting outdoor watering for the next {X} days.

Recommended Restrictions for Water Conservation Include:

1) Reduce outdoor irrigation and limit watering.

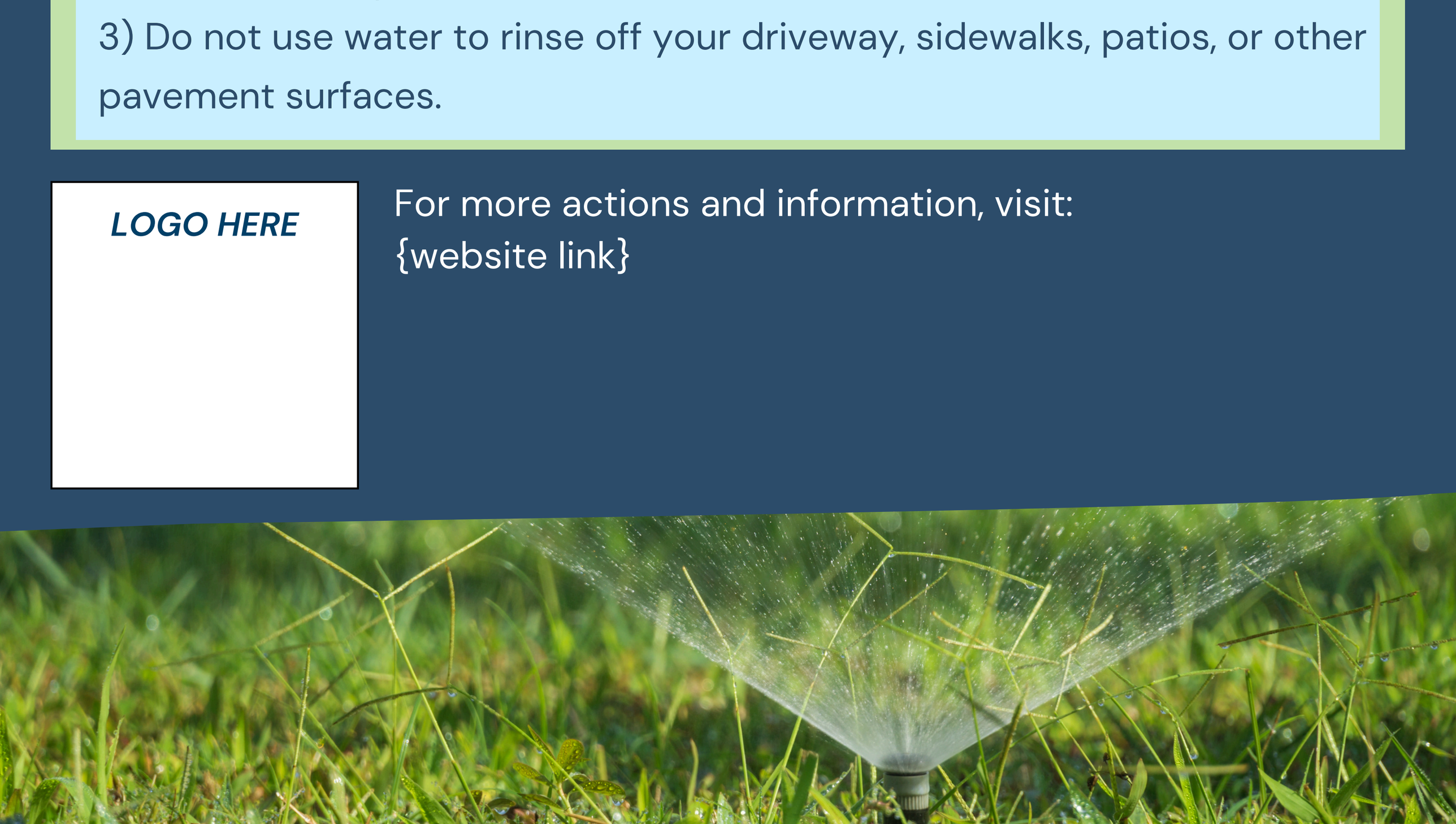
2) Minimize overall water use.

- *Take shorter showers, turn off the faucet while brushing teeth, and wash only full loads of laundry and dishes.*

3) Do not use water to rinse off your driveway, sidewalks, patios, or other pavement surfaces.

LOGO HERE

For more actions and information, visit:
{website link}

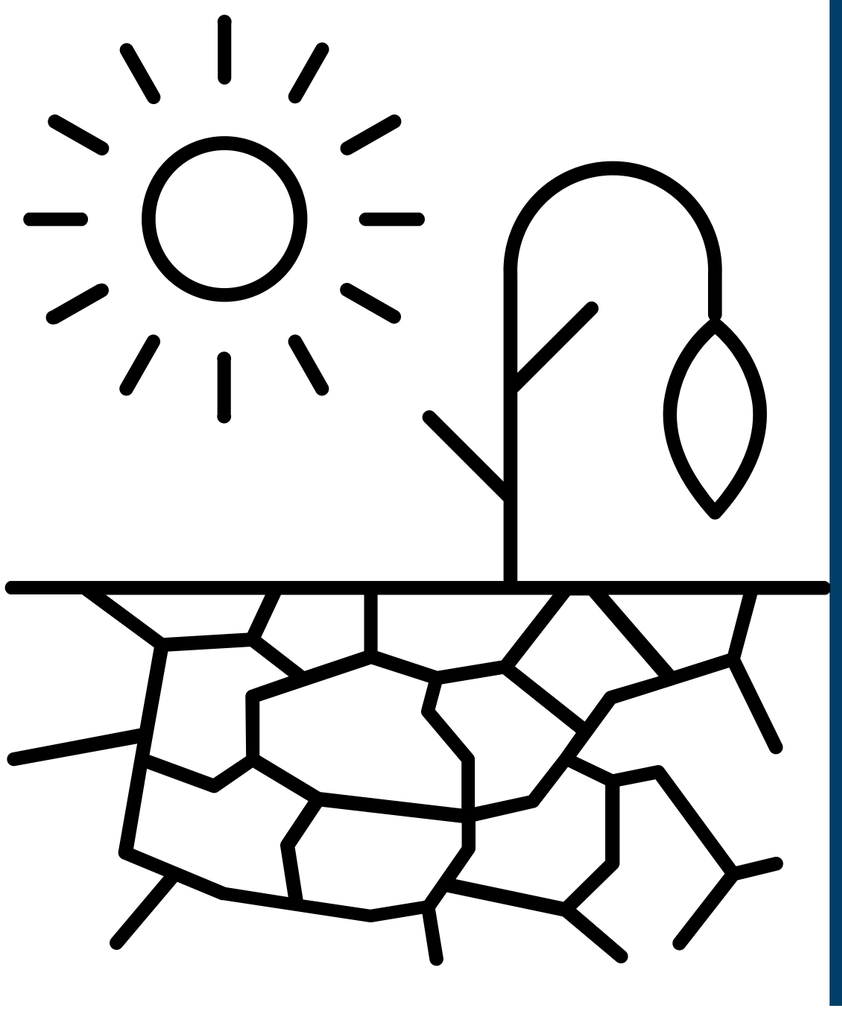


WATER CONSERVATION NOTICE

In response to the current drought conditions, {INSERT COMMUNITY NAME} is restricting non-essential watering usage.

To conserve water, the following outdoor watering restrictions will be imposed for {INSERT DURATION} per the Municipal Code {INSERT CODE NUMBER}:

WATERING DAYS



- Odd numbered addresses may only water on **odd calendar days.**

- Even numbered addresses may only water on **even calendar days.**

Mandatory Restrictions are Effective on {ENTER DATE}

LOGO HERE

For more information, visit our website:
{INSERT WEBSITE LINK}

We Appreciate Your Assistance!

WATER CONSERVATION REQUIRED

In response to the current drought conditions, the {INSERT COMMUNITY NAME} is requiring residents to conserve water by ceasing outdoor watering for {INSERT DURATION}.

Mandatory Restrictions are Effective on {ENTER DATE}

- Enforcement will be done in accordance with the Drought Ordinance guidelines.
- **Restrictions include ALL outdoor watering,** such as watering your lawn, garden, and landscape areas.
- Do not use water to rinse off your driveway or other pavement surfaces, and do not fill up pools, ponds, or other bodies of water.

LOGO HERE

For more information, visit our website:
{INSERT WEBSITE LINK}

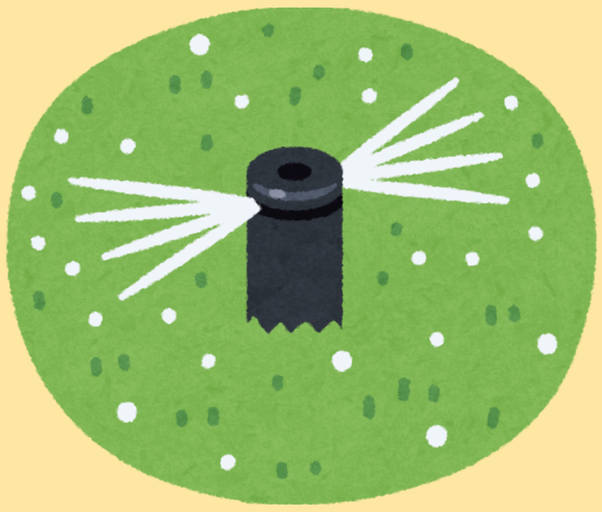
We Appreciate Your Assistance!



LET'S UNDERSTAND drought

What Is It?

Drought is a shortage of water over an extended period of time. Droughts are a normal part of a climate cycle, and they occur in all climate zones. They can vary in duration, and they bring abnormally dry weather conditions.



Why Does It Occur?

Droughts happen when an area gets much less rain or snow than usual over a long period of time. This can be caused by changes in weather patterns, such as shifts in wind or ocean currents, which can reduce the amount of moisture brought into the region. Human activities—like overusing water for farming or cutting down forests—can make droughts worse by drying out the land.

What Are The Impacts?

The following factors may be affected:

- Agriculture
- Water Quality & Quantity
- Wildfire Management & Flammability
- Public Health
- Economic Resources
- The Ecosystem

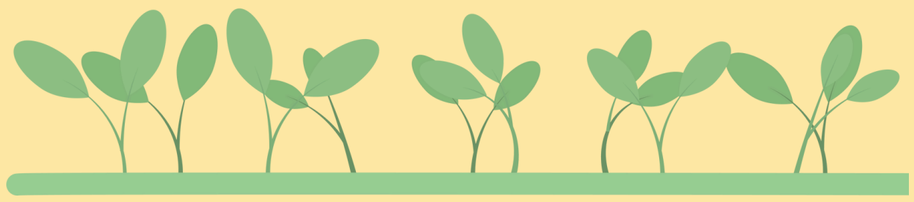
For more information, visit:

drought.gov

How Can I Help?

Conserve Water!

- Take shorter showers
- Limit outdoor watering
- Wash only full loads of laundry and dishes
- Check for and fix any leaking pipes or faucets
- Use less water at the sink



DROUGHT IMPACTS

1 Water Quality & Quantity

Water quantity is reduced during drought due to decreased rainfall and increased evaporation. This leads to lower river and stream flows, and reduces groundwater levels. This can also lead to more pollutants in the water.



2 Wildfire & Flammability

During drought conditions, vegetation becomes dried out. This makes the area more flammable and prone to ignition. Droughts also exacerbate high temperatures and winds, which further aides in the spreading of wildfires.

3 It Costs Money

According to the National Centers for Environmental Information (NCEI), the U.S. has sustained 265 weather and climate disasters since 1980 where overall damages/costs reached or exceeded $1 billion (including CPI adjustment to 2020). **The total cost of these 265 events exceeds $1.775 trillion.**



4 Mosquitoes & Other Bugs

Many bugs will migrate to areas that are not experiencing drought conditions, which can cause outbreaks in areas where water is still available. Additionally, according to the University of Cincinnati, mosquitoes will bite people and animals more frequently during droughts.

5 Increased Health Risk

According to the Centers for Disease Control (CDC), increases in infectious disease can be a direct consequence of drought. Bacteria and viruses can pollute both groundwater and surface water when rainfall decreases. Air quality can also decrease with the dry conditions and added dust.



6 Agricultural Shortages

Farmers may lose money if a drought destroys their crops. More money may need to be spent on feed and water for plants and animals, and people might have to pay more for food.



5 Easy Ways

to Conserve Water During Drought



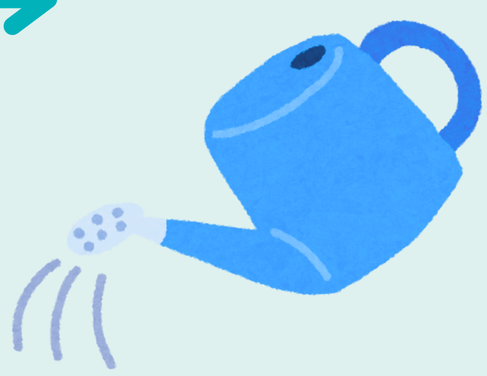
1 SAVE AT THE SINK

Save water at the sink. Turn it off while brushing teeth, shaving, and soaping your hands. Avoid filling up your entire sink when it's not necessary.

2 LAUNDRY, DISHES & SHOWERS

Wash only full loads of laundry and dishes. Take shorter showers. Cutting one minute from your shower can save around 75 gallons per month.



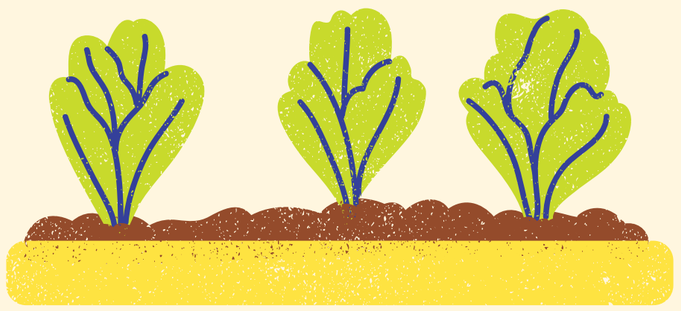


3 LIMIT OUTDOOR WATERING

Limit your outdoor water-use by watering your lawn less often, refraining from rinsing off pavement surfaces, and opting not to fill up pools, ponds, or other bodies of water.

4 GARDENING - WHEN TO WATER?

Water the garden, your plants, and the lawn only early in the morning or late in the evening to avoid evaporation.





5 IS IT LEAKING?

Check all faucets and pipes for leaks. If they're leaking, fix them ASAP! This can save about 20 gallons of water per day.

Sample Drought Ordinances

This appendix contains two sample drought ordinances that communities and water systems can utilize when updating or creating a drought ordinance. One is a detailed sample drought ordinance that can be used by larger communities, communities that have seen past drought impacts, or communities with water quantity concerns. The other is a simplified drought ordinance that can be used by smaller communities that have not seen drought impacts in the past and do not have water quantity concerns.

These sample drought ordinances are only meant to provide an initial template when creating a drought ordinance. Areas highlighted in yellow are recommended areas where local information can be added. Each community should update the sample drought ordinance to fit the individual needs of their water system. All ordinances should be reviewed and approved by legal representatives of the community.

Table of Contents

Sample Drought Ordinances 1
Detailed Drought Ordinance 2
Simple Drought Ordinance 6

DRAFT

Detailed Drought Ordinance

1. PURPOSE

1.1. The purpose of this ordinance is to conserve water during periods of drought and to protect public health, safety, and welfare by establishing restrictions on water use.

2. DEFINITIONS

Drought Stage: A classification based on water supply levels or drought conditions that trigger specific conservation measures.

Drought Stage 1 – Drought Watch (Voluntary Restrictions)

Drought Stage 2 – Drought Warning (Mandatory Restrictions)

Drought Stage 3 – Drought Emergency (Emergency Measures)

3. DROUGHT STAGE 1 - DECLARATION OF A DROUGHT WATCH.

3.1. Whenever the [COMMUNITY/PWS NAME] finds that conditions exist as described in the plan under 3.2 Triggers, it shall be empowered to declare by resolution that a Drought Stage 1 Drought Watch exists and implement the steps outlined under this section.

3.2. TRIGGERS.

3.2.1. Any of the following conditions can trigger this stage:

3.2.1.1. Groundwater levels have fallen ____feet below the normal seasonal level.

3.2.1.2. Demand for one day is in excess of _____ gallons per day.

3.2.1.3. System pressure falls below _____ pounds per square inch.

3.2.1.4. The U.S. Drought Monitor has identified a D1: Mild Drought Conditions for the region for more than 14 consecutive days.

3.3. MANAGEMENT ACTIONS.

3.3.1. The public will be made aware of the Drought Stage and encouraged to pursue voluntary conservation activities such as:

3.3.1.1. Limiting water usage for lawn watering, vehicle washing, washing only full loads of laundry/dishes, limiting length and frequency of showers, and checking for interior water leaks.

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3.4. NOTIFICATION STRATEGIES

3.4.1. The resolution shall be effective upon posting in ___#___ prominent places throughout the [COMMUNITY NAME] where notices are generally posted.

3.4.2. The public will be informed through the local media of the declaration of the existence and end of a Stage 1 Drought Watch.

4. DROUGHT STAGE 2 - DECLARATION OF A DROUGHT WARNING.

4.1. Whenever the [COMMUNITY/PWS NAME] finds that conditions exist as described in the plan under 4.2 Triggers, it shall be empowered to declare by resolution that a Drought Stage 2 Drought Warning exists and may implement the steps outlined under this section.

4.2. TRIGGERS.

4.2.1. Any of the following conditions can trigger this stage:

4.2.1.1. Groundwater Levels have fallen _____feet below the normal seasonal level.

4.2.1.2. Demand for one day is in excess of _____ gallons per day.

4.2.1.3. System pressure falls below _____ pounds per square inch.

4.2.1.4. Water Treatment Plant operations are at ___% capacity for more than 3 consecutive days.

4.2.1.5. The U.S. Drought Monitor has identified a D2: Moderate Drought Conditions for the region for more than 14 consecutive days.

4.3. MANAGEMENT ACTIONS.

4.3.1. The public will be made aware of the Drought Stage and must pursue mandatory conservation activities such as:

4.3.1.1. An odd/even lawn watering system will be imposed on residents. Residents with odd-numbered addresses may only water on odd calendar days; residents with even-numbered addresses may only water on even days.

4.3.1.2. Waste of water will be prohibited.

4.3.1.3. Refilling swimming pools will be limited to one day a week after sunset.

4.4. NOTIFICATION STRATEGIES

4.4.1. The resolution shall be effective upon posting in ___#___ prominent places throughout the [COMMUNITY NAME] where notices are generally posted.

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4.4.2. The public will be informed through the local media of the declaration of the existence and end of a Stage 2 Drought Warning.

5. DROUGHT STAGE 3 - DECLARATION OF A DROUGHT EMERGENCY

5.1. Whenever the [COMMUNITY/PWS NAME] finds that conditions exist as described in the plan under 5.2 Triggers, it shall be empowered to declare by resolution that a Drought Stage 3 Drought Emergency exists and may implement the steps outlined under this section.

5.2. TRIGGERS.

5.2.1. Any of the following conditions can trigger this stage:

5.2.1.1. Groundwater Levels have fallen _____ feet below the normal seasonal level.

5.2.1.2. Demand for one day is in excess of _____ gallons per day.

5.2.1.3. System pressure falls below _____ pounds per square inch.

5.2.1.4. Water Treatment Plant operations are at ___% capacity for more than 3 consecutive days.

5.2.1.5. The U.S. Drought Monitor has identified a D3: Severe Drought Conditions or D4: Exceptional Drought Conditions for the region for more than 14 consecutive days.

5.3. MANAGEMENT ACTIONS.

5.3.1. The public will be made aware of the Drought Stage and informed of mandatory conservation activities:

5.3.1.1. Waste of water will be prohibited.

5.3.1.2. All outdoor water use will be banned, with the exception of businesses that require outdoor water use to operate.

5.3.1.3. Restrictions include all lawn watering, car washing, refilling swimming pools, or other landscape watering on residential, commercial, or community-owned properties.

5.4. NOTIFICATION STRATEGIES

5.4.1. The resolution shall be effective upon posting in ___#___ prominent places throughout the [COMMUNITY NAME] where notices are generally posted.

5.4.2. The public will be informed through the local media of the declaration of the existence and end of a Stage 3 Drought Emergency.

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6. ENFORCEMENT

6.1. Persons or properties not adhering to the identified management actions for the drought stage may be subject to a fine or penalty.

6.1.1. [Fine or penalty Language].

7. DURATION AND TERMINATION

7.1. Drought restrictions will remain in effect until the [village board/utility superintendent] determines that conditions have improved sufficiently.

DRAFT

Simple Drought Ordinance

1. PURPOSE

1.1. The purpose of this ordinance is to conserve water during periods of drought and to protect public health, safety, and welfare by establishing restrictions on water use.

2. DEFINITIONS

Drought Stage: A classification based on water supply levels or drought conditions that trigger specific conservation measures. Drought stages will be determined by the [village board/utility superintendent].

Drought Stage 1 – Drought Watch (Voluntary Restrictions)

Drought Stage 2 – Drought Warning (Mandatory Restrictions)

3. DROUGHT STAGES, TRIGGERS AND ACTIONS

3.1. Drought Stage 1 – Drought Watch: This can be triggered by groundwater levels dropping to ____ feet, demand exceeding ____ gallons per day, or the U.S. Drought Monitor identified a D1: Mild Drought Conditions or D2: Moderate Drought Conditions.

3.1.1. Voluntary water conservation is encouraged.

3.2. Drought Stage 2 – Drought Warning: This can be triggered by groundwater levels dropping to ____ feet, demand exceeding ____ gallons per day, or the U.S. Drought Monitor identified a D3: Severe Drought Conditions or D4: Exceptional Drought Conditions.

3.2.1. Mandatory water conservation. Conservation measures will be determined by [village board/utility superintendent]. Measures may include but are not limited to even/odd outdoor watering schedule, prohibiting filling of swimming pools, prohibiting car washing, or prohibiting outdoor watering.

4. ENFORCEMENT

4.1. Persons or properties not adhering to the identified management actions for the drought stage may be subject to a fine or penalty

4.1.1. [Fine or penalty Language].

5. DURATION AND TERMINATION

5.1. Drought restrictions will remain in effect until the [village board/utility superintendent] determines that conditions have improved sufficiently.

DRAFT

JEO CONSULTING GROUP

Engineering | Architecture | Surveying | Planning

Invoice

May 16, 2025
Project No: R220954.00
Invoice No: 161146
Invoice Amount: 20,656.50

Eric Gottschalk
Lower Platte North NRD
Commercial Park Road
PO Box 126
Wahoo, NE 68066

Project Manager Rebecca Appleford

Project R220954.00 Lower Platte North NRD HMP 2025 Update

Professional Services through May 9, 2025

	Contract Amount	Percent Complete	Billed-to-Date	Previous Billing	Current Billing
Lump Sum Phase(s)					
Project Management	$16,500.00	98%	$16,170.00	$16,170.00	0.00
Public Involvement and Stakeholder Participation	$34,700.00	100%	$34,700.00	$34,006.00	$694.00
Data Collection and GIS Mapping	$16,550.00	100%	$16,550.00	$16,550.00	0.00
Develop Hazard Mitigation Plan	$65,750.00	98%	$64,435.00	$59,832.50	$4,602.50
HMP Adoption, Submission, and Approval	$4,000.00	6%	$240.00	0.00	$240.00
Threat and Hazard Identification and Risk Assessment	$17,500.00	100%	$17,500.00	$17,500.00	0.00
Drought Risk Assessment and Management	$95,000.00	67%	$63,840.00	$48,720.00	$15,120.00
Total	**$250,000.00**		**$213,435.00**	**$192,778.50**	**$20,656.50**

Total Amount Due Upon Receipt : $20,656.50

Outstanding Invoices

Number	Date	Balance
160498	4/22/2025	18,500.50
Total		**18,500.50**

Email Invoice: rchapman@lpnnrd.org; jbreunig@lpnnrd.org

Progress Report

LOWER PLATTE NORTH NATURAL RESOURCES DISTRICT
HAZARD MITIGATION PLAN UPDATE

May 15, 2025

JEO Project Number: 220954.00
Project Contact: Becky Appleford, 217-741-0117
Professional Services through May 9, 2025

Below is a progress report for the above referenced project:

1. **Overall project and budget status:**

Overall Project Completion: 85%	Overall Budget Expended: 84%
HMP Completion: 98%	HMP Budget Expended: 100%
THIRA Completion: 100%	THIRA Budget Expended: 100%
Drought Plan Completion: 76%	Drought Plan Budget Expended: 75%

2. **Project activities during current period (thru May 9, 2025)**
   a. Facilitated meeting with EMs and NRD on April 17th on missing jurisdictions
   b. Completed final attempt to follow up with missing jurisdictions and worksheets
   c. Incorporated all worksheet information into HMP profiles
   d. Finalized all sections of HMP for public review
   e. Prepared public review notifications
   f. Continued drafting drought risk and resiliency report
   g. Coordinated with LRE on GWM Plan for drought related information

3. **Planned project activities for next period (thru June 13, 2025)**
   a. Prepare HMP for public review period
   b. Prepare Google Drive for public review period documents
   c. Prepare adoption resolution template
   d. Send public review notifications
   e. Complete draft of drought report for NRD review
   f. Prepare all documents for submittal to NEMA/FEMA for review
   g. Complete Plan Review Tool for NEMA/FEMA review and approval

4. **Information needed from NRD or key stakeholders**
   a. Pass adoption resolution and send to JEO
   b. Review plans and provide comments as needed

5. **Project Schedule and Next Meeting(s)**

Milestone	Schedule
Last date to join HMP	May 12, 2025
Public Review Period	May 12 – June 1, 2025
Adoption Resolution Process	Began May 12, 2025
NRD review Drought Plan	May 16 – May 30, 2025
Submit HMP to NEMA/FEMA	June 10, 2025

LOWER PLATTE NORTH
Natural Resources District

DROUGHT RISK & RESILIENCE REPORT











2025

PLAN PREPARED BY
JEO CONSULTING GROUP

Table of Contents

Report Purpose 2
Drought Description 2
Drought Planning in the District 5
Methodology 8
Drought Resilience Matrix 10
District-Wide Trends 12
District-Wide Recommendations 13
Summary of Water System Best Management Practices/Mitigation Actions 14
Water System Specific Reports 18
- Abie Water System 19
- Bellwood Water System 22
- Cedar Bluffs Water System 25
- David City Water System 28
- Fremont Water System 32
- Ithaca Water System 36
- Lindsay Water System 39
- Malmo Water System 42
- Mead Water System 45
- Memphis Water System 48
- Morse Bluff Water System 51
- Newman Grove Water System 54
- North Bend Water System 57
- Platte Center Water System 61
- Prague Water System 64
- Rogers Water System 68
- Schuyler Water System 71
- Wahoo Water System 75
- Weston Water System 78
- Yutan Water System 81

Appendix A: Sample Drought Ordinances

Appendix B: Public Outreach and Education Toolkit

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Report Purpose

Drought is one of the most impactful hazards in the State of Nebraska, and it has widespread impacts on agriculture, energy, ecosystems, and local economies. Planning for drought is essential because it can help reduce those impacts and allow the NRD and local communities to respond more effectively to severe drought events. This Drought Risk and Resilience Report aims to better understand drought risk to local community water systems. Creating a drought risk and resilience report helps the NRD and communities identify vulnerabilities, proactively plan for future drought events, protect critical resources, identify key capabilities, and determine steps to increase drought resilience.

Community water systems were specifically chosen for analysis because the Lower Platte North NRD felt like there could be a better understanding of water system drought risk. Drought planning had already been undertaken at a regional level by the Lower Platte River Drought Consortium and at an irrigator level by the NRD's Water Quantity Management Areas and Groundwater Management Plan. However, drought planning at the community level has not been done up to this point. Community water systems also offered a unique opportunity for the NRD to partner with local cities and villages on drought mitigation projects. This Drought Risk and Resilience Report helps to fill this gap by assessing vulnerabilities, outlining preparedness strategies, and recommending system-specific best management actions. Specific profiles were created for each community water system that summarizes drought resilience, infrastructure, existing plans and capabilities, key concerns, and drought recommendations. These profiles can be found at the end of this report.

Drought Description

Drought is generally defined as a natural hazard that results from a substantial period of below-normal precipitation. Although many inaccurately consider drought a rare and random event, it is a regular, recurring feature of climate. A drought often coexists with periods of extreme heat, which can cause significant social stress, economic losses, and environmental degradation. Drought is typically a slow-onset, creeping phenomenon that can affect a wide range of people, vegetation, livestock, and industries. However, "flash droughts" can sometimes occur quickly and last for shorter periods. Drought normally affects more people than other natural hazards, and its impacts are spread over a larger geographical area. Detection and early warning signs of drought conditions have improved recently but are still more challenging to identify than quick-onset natural hazards (e.g., floods, winter storms, tornadoes). According to the National Drought Mitigation Center (NDMC), droughts are classified into four major types.[1]

- **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, frequencies (norms), and winds vary.

[1] National Drought Mitigation Center. 2017. "Drought Basics". https://drought.unl.edu/.

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- **Agricultural Drought** occurs when deficient moisture hinders planting germination, leading to a 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 evapotranspiration levels resulting from prolonged high temperatures. Hydrological drought is often 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 is not limited to, water, forage, food grains, fish, and hydroelectric power.

Drought History

Drought is a regular occurrence in the district and across Nebraska. One of the best ways to regionally monitor drought is the U.S. Drought Monitor (USDM). The USDM identifies areas in drought and the extent of drought across the United States. Jointly produced by the National Drought Mitigation Center, NOAA, and USDA, the USDM uses physical data at multiple scales, drought impacts, and feedback from local experts to determine drought classifications and create the drought map. The table below shows the different USDM drought classifications.

U.S Drought Monitor Drought Classifications

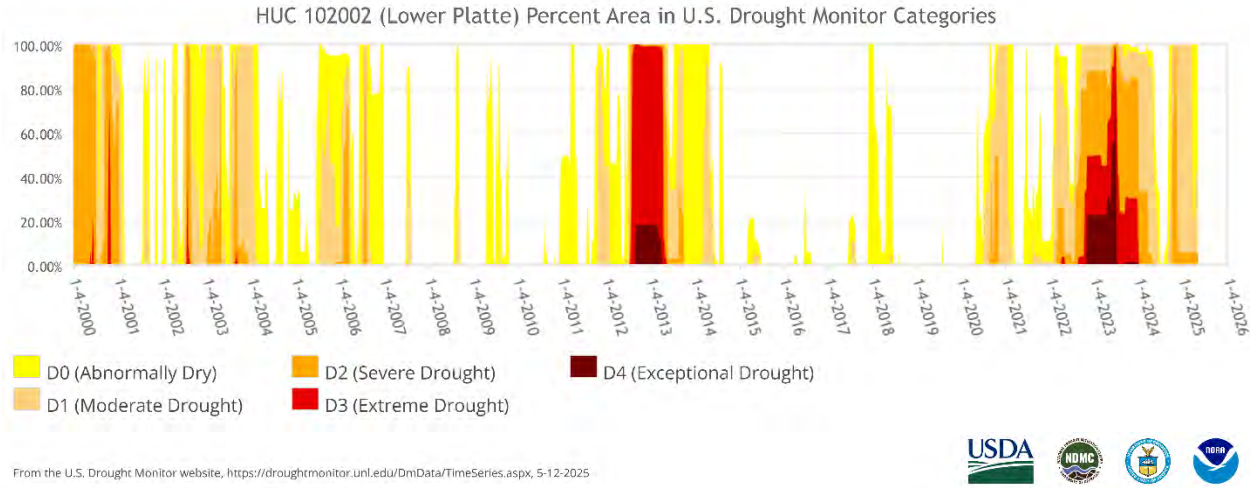
Category	Description	PDSI Ranges	Possible Impacts
None	Normal or wet conditions	-0.49 or above	
D0	Abnormally Dry	-0.5 to 0.79	Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered.
D1	Moderate Drought	-0.8 to -1.29	Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested.
D2	Severe Drought	-1.3 to -1.59	Crop or pasture losses likely, water shortages common; water restrictions imposed.
D3	Extreme Drought	-1.6 to -1.99	Major crop/pasture losses; widespread water shortages or restrictions.
D4	Exceptional Drought	-2.0 or less	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams and wells creating water emergencies.

Source: USDM, 2024[2]

[2] U.S. Drought Monitor. 2017. "Drought Classification." https://droughtmonitor.unl.edu/About/AbouttheData/DroughtClassification.aspx.

Historical data from the USDM goes from January 2000 to May 2025. The timeline below illustrates historical drought severity in the Lower Platte HUC 6 watershed, encompassing the Lower Platte North NRD and the Lower Platte South NRD. The 2012-2013 drought ranged from extreme drought (D3) to exceptional drought (D4). This drought prompted the Lower Platte North NRD to impose a 180-day moratorium on new irrigated acres within its boundaries.[3] More recently, the 2023-2024 drought ranged from moderate drought (D1) to exceptional drought (D4). This drought caused the Lower Platte River Consortium to ask that users conserve water as flows in the Platte River were below average.

Lower Platte Watershed Drought History (2000 – May 2025)



Source: U.S. Drought Monitor[4]

The table below shows drought severity as a percentage of weeks from January 2000 to May 2025. Overall, the watershed experienced 52% of weeks with at least some areas in drought. Nine percent of the weeks were in D3 (extreme drought), and three percent were in D4 (Exceptional Drought).

Lower Platte Watershed Historical Weeks in Drought

Drought Type	Total Weeks	Percentage
Not in Drought	634 out of 1,323	48%
D0 (Abnormally Dry)	135 out of 1,323	10%
D1 (Moderate Drought)	242 out of 1,323	18%
D2 (Severe Drought)	153 out of 1,323	12%
D3 (Extreme Drought)	116 out of 1,323	9%
D4 (Exceptional Drought)	43 out of 1,323	3%

Source: U.S. Drought Monitor[5]

[3] Drought Impact Reporter. May 2025. "Drought Impact Reporter." https://unldroughtcenter.maps.arcgis.com/apps/MapSeries/index.html?appid=de6fb79dcf704cb69b60b4fa268fce4d.
[4] U.S. Drought Monitor. 2000-May 2025. "Map Archive". https://droughtmonitor.unl.edu/Maps/MapArchive.aspx.
[5] U.S. Drought Monitor. 2000-May 2025. "Data Download." https://droughtmonitor.unl.edu/DmData/DataDownload.aspx.

Historical Drought Impacts on Community Water Systems

While a majority of the time was spent in drought, very few water systems reported drought-related impacts or the need to restrict water usage. Six out of the 20 water systems in the NRD reported impacts or needing to limit water usage. Nearly all of these occurred during the 2012-2013 drought. A summary of the impacts is listed below.

Bellwood – Limited lawn watering in 2012.

David City – They typically see water levels drop during drought events and have implemented water restrictions as needed.

Lindsay – Implemented voluntary restrictions in 2012.

Mead – Implemented water restrictions in 2012.

Platte Center – Implemented water restrictions in 2012.

Prague – They typically see lower water levels during drought events.

Drought Planning in the District

Groundwater Management Plan

Jon Mohr to provide a summary.

Lower Platte North NRD Water Development Areas

There are three major types of water development areas in the Lower Platte North NRD. Below is a brief overview of these areas and the rules for each one. A complete set of rules can be found in the NRD's Groundwater Management Area Rules and Regulations. A map of the NRD's groundwater development areas can be found on the page below.

- **Non-Hydrologically Connected Areas –** Up to 70 new acre-feet per year. These areas do not have interconnected groundwater and surface water.
- **Hydrologically Connected Areas –** Up to 200 new acre-feet per year. These areas have interconnected groundwater and surface water.
- **Restricted Development Area –** No new irrigated acres or water use allowed. Aquifers in these areas are thin or of limited size. Offsets are required, so if a landowner wishes to expand their water use at one location, then a similar amount of water use or acres must be retired in the same subarea.

Additionally, there are two Special Quantity Subareas in Butler/Saunders and Platte/Colfax counties. In these areas, groundwater can be highly volatile and heavily influenced by drought and groundwater pumping. No new or expanded irrigated acres are allowed in these areas,

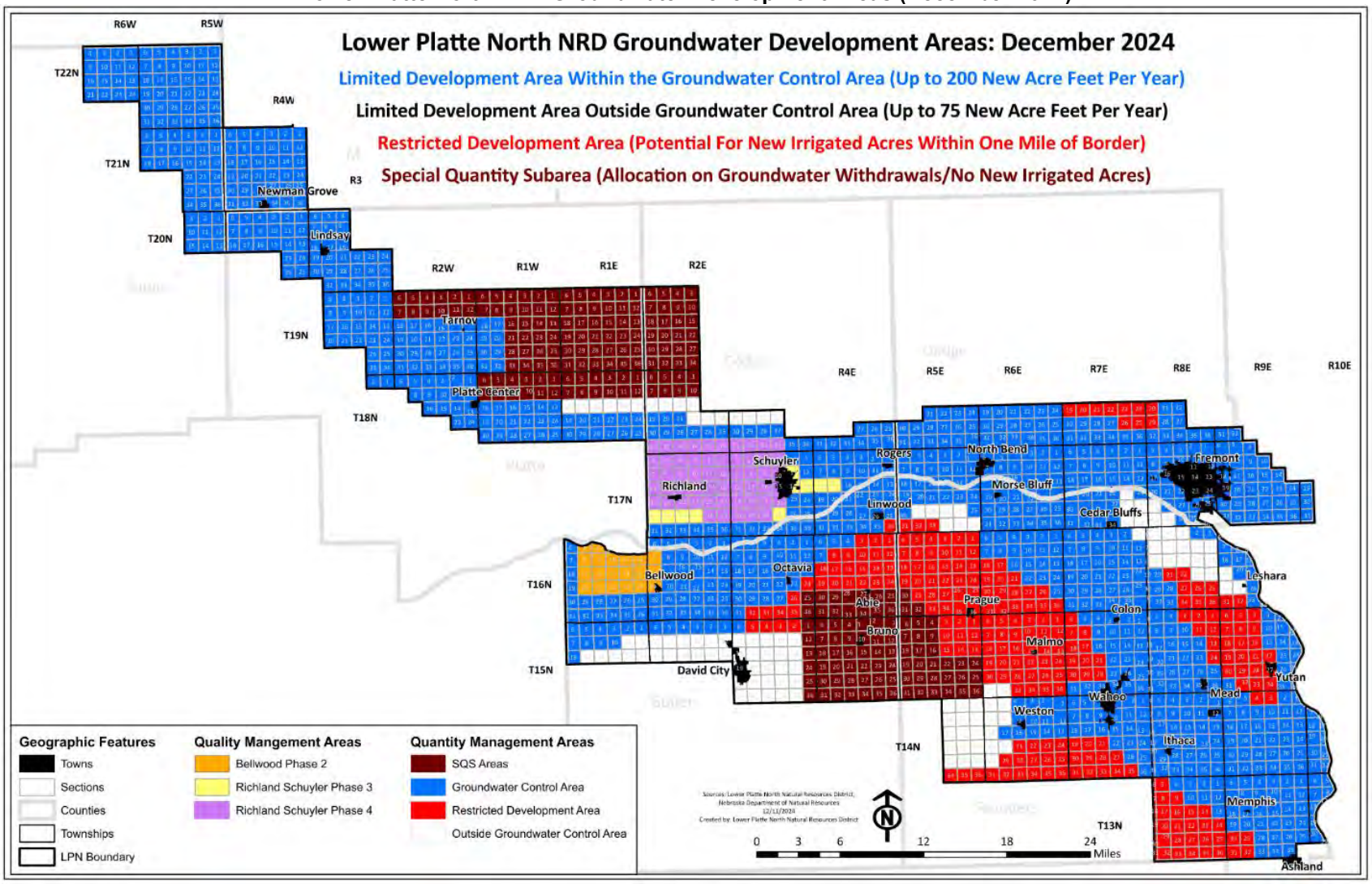
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along with other restrictions, including required flow meters and acre-inch allocation of irrigated areas.[6]

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[6] Lower Platte North NRD. 2025. “Water Development Areas.” https://lpnnrd.org/projects-and-programs/water-management/water-quantity/.

Lower Platte North NRD Groundwater Development Areas (December 2024)



Source: Lower Platte North NRD[7]

[7] Lower Platte North NRD. December 2024. "Lower Platte North NRD Groundwater Development Areas." https://lpnnrd.org/wp-content/uploads/2025/01/Groundwater-Quality-Quantity-Map-2024.pdf.

Lower Platte River Drought Consortium

The Lower Platte River Drought Consortium is a collaborative partnership formed in 2016 to address water supply challenges in Nebraska's Lower Platte River Basin. The Lower Platte North NRD is a key stakeholder in the Lower Platte River Consortium, which also includes the Lower Platte South NRD, Papio-Missouri River NRD, Omaha Metropolitan Utilities District, City of Lincoln Water System, and Nebraska Department of Natural Resources.

The primary aim of the consortium is to ensure the sustainability of public water supplies in the Lower Platte River Basin. This involves studying long-term water availability, enhancing streamflows, and improving aquifer storage to support public water systems. The consortium contracted HDR Engineering, Inc., to develop tools and alternatives, evaluations, and documentation of drought mitigation plans to enhance water supplies in the lower Platte River.

The Consortium worked together to develop a Drought Contingency Plan, approved in December 2019, with the overall goal of sustaining public water supplies in the basin. The plan lists potential drought mitigation measures and monitoring techniques for the Consortium to evaluate, adopt, and implement, which were reviewed and included here as appropriate. The Consortium also actively encourages water conservation among residents, especially during drought. Recommendations include reducing lawn watering and adopting water-saving technologies. As part of the Consortium, a Lower Platte Drought Monitor Dashboard was created to help educate residents and communities on current drought conditions.

Methodology

In order to gather the drought resilience and water system data summarized in the profiles and table below, the NRD collected information in two ways. First, all publicly available water system plans were gathered and reviewed. These included wellhead protection plans from the Nebraska Department of Natural Resources, water system engineering reports, and emergency response plans. Specific water system data was pulled from these documents to create an initial overview of each system. The NRD then met in person with representatives from each community water system to discuss the following items.

- Key Pieces of Infrastructure
- Historical Drought Impacts
- Drought Comfortability
- Drought Monitoring
- Water System Plans and Ordinances
- Anticipated Future Growth
- Needed Water System Projects
- Water Operator Coverage

Using the data collected during the water system meetings along with a review of planning documents, a Drought Resilience Matrix (section below) was created for each community. A matrix was utilized to review and analyze specific areas impacting drought resilience. This

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matrix allows the NRD and local communities to see areas where drought resilience is high and where improvements could be made.

This matrix split drought resilience into eight indicators: Water Quantity; Water Quality; Capabilities (Ordinances/Plans); Capabilities (Staff); Local Drought Monitoring; Regional Drought Monitoring; Emergency Supply; and Local Funding Ability. Each indicator received a resilience rating (High, Medium, or Low) for each community water system. Broad definitions for each indicator's high, medium, and low ratings can be found below the Drought Resilience Matrix. However, these ratings are generalized based on information obtained from each water system and are not calibrated for the system size or location. Actual vulnerability may be higher or lower due to many factors, such as hydrogeologic setting, well depth, surrounding wells, infrastructure deterioration, and future consumption changes.

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Drought Resilience Matrix

Community	Water Quantity	Water Quality	Capabilities (Ordinances/Plans)	Capabilities (Staff)	Local Drought Monitoring	Regional Drought Monitoring	Emergency Supply	Local Funding Ability
Abie	High	High	Low	Medium	High	Low	Medium	Low
Bellwood	High	Medium	Medium	Low	High	Low	Medium	Medium
Cedar Bluffs	Low	Low	Low	Medium	Medium	Low	Low	High
David City	Medium	Medium	Medium	High	High	Low	Medium	Medium
Fremont	High	Medium	Low	High	Medium	Low	Medium	Medium
Ithaca	High	Medium	Low	Medium	Medium	Low	Medium	Medium
Lindsay	High	Medium	High	High	High	Medium	Low	Medium
Malmo	High	High	Low	Medium	Medium	Low	Low	Medium
Mead	High	Medium	High	High	High	Low	Medium	Medium
Memphis	High	High	Low	Medium	Medium	Low	Low	Medium
Morse Bluff	High	High	High	Medium	Medium	Low	Medium	Medium
Newman Grove	High	High	High	Medium	Low	Low	Medium	Medium
North Bend	Medium	Medium	Medium	High	Medium	Low	Medium	Medium
Platte Center	High	High	Low	Medium	Medium	Low	Medium	Medium
Prague	Medium	Medium	Medium	High	Medium	Low	Medium	Medium
Rogers	High	High	Low	Low	Low	Low	Low	Medium
Schuyler	High	Medium	Medium	High	High	Medium	Medium	High
Wahoo	High	High	Low	High	High	Low	Medium	Medium
Weston	High	High	Low	Medium	Medium	Low	Medium	Medium
Yutan	Medium	High	Low	High	High	Low	Medium	Medium

	Water Quantity	Water Quality	Capabilities (Ordinances/ Plans)	Capabilities (Staff)	Local Drought Monitoring	Regional Drought Monitoring	Emergency Supply	Local Funding Ability
Low =	Is not able to meet the current demand. Is not able to meet future short-term growth demand or demand during drought. New wells or other sources of water will be needed soon.	Has water quality issues above required federal or state guidelines that will eventually require the community to drill a new well or construct a water treatment plant.	Does not have a drought ordinance or minimal defined parameters. Does not have many other water system plans (Engineering Report, Water Study, etc.).	Has minimal staff that are close to retirement or minimal staff that lack institutional knowledge about the water system.	Performs minimal water levels and consumption monitoring. Has minimal historical records.	Does not monitor any regional drought-related tools.	Does not have a MOU or agreement in place for emergency water. Is not connected to another water system. Would have difficulty providing adequate water if one well went down.	Would not be able to fund any large water system project (new well, water treatment plant, water storage, etc.). May have many other large projects going on.
Medium =	Can meet current demand and likely some future growth demand. Drought has caused issues in the past.	Some wells have water quality issues above required federal or state guidelines. However, it is currently being treated or will likely not require the community to drill a new well or construct a water treatment plant.	Has a basic drought ordinance but is minimal. Has some water system plans (Engineering Report, Water Study, etc.) and may be outdated.	Does not have any water operators on staff. Hires an outside company to handle the water system. Or Has minimal staff but agreements with other communities for emergency backup staff.	Performs water levels and consumption monitoring fairly regularly (>1 a month). Has historical records that may or may not go back several years.	Is aware of other drought-related tools and may check them every so often.	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.
High =	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.	Has no water quality issues above required federal or state guidelines.	Has a well-defined, in-depth drought ordinance. Has some water system plans (Engineering Report, Water Study, etc.) and are recent.	Has adequate staff and institutional knowledge to understand and operate the water system.	Regularly checks water levels and consumption (>1 a week). Has historical records that go back many years.	Regularly monitors regional drought-related tools.	Is connected to another water system.	Does not have many other large projects in the community. Would be able to easily fund a medium water system projects (new well, water storage, etc.).

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District-Wide Trends

Several district-wide trends appeared after all community water system meetings were held and the Drought Resilience Matrix was completed. Two positive trends and two of the more negative trends are discussed below.

Water Quantity

Overall, most water systems (15/20) received a high rating for Water Quantity. These water systems felt they could easily meet current and future demand, even during drought, with historical drought events causing no or only minor issues in the past. Only one water system (Cedar Bluffs) received a low rating, and they are actively looking to add new wells to their system.

Water Quality

Water Quality was also a positive indicator district-wide. Half the water systems received a high rating, with no water quality issues above required federal or state guidelines. Those that received a medium rating (9/20) have water quality issues, but they are currently being treated and would not require the community to drill a new well or construct a water treatment plant. Cedar Bluffs was the only water system with a low rating, and they are actively looking to add new wells or build a water treatment plant.

Capabilities

One of the more negative indicators district-wide was Capabilities (Ordinances/Plans). A majority of water systems (11/20) received a low rating, with only four receiving a high rating. Those systems that received a low rating either do not have a drought ordinance or have one with no defined parameters and do not have many other water system plans. This lack of detailed drought ordinances is likely due to the high drought comfortability district-wide and lack of historical impacts. However, as drought events continue to increase in length and severity, a clearly defined drought ordinance can help response and reduce public outcry.

Regional Drought Monitoring

Regional Drought Monitoring was by far the lowest indicator district-wide. No water systems received a high rating, two received a medium rating, and 18 out of 20 received a low rating. The systems that received a low rating do not monitor any regional drought-related tools (i.e., U.S. Drought Monitor, Lower Platte River Drought Consortium Dashboard, Palmer Drought Severity Index, etc.), with many not knowing what they were. This lack of regional drought monitoring is likely due to the high drought comfortability and lack of historical impacts. However, these tools can be very useful in understanding how drought impacts others nearby or downstream. While a community might not immediately feel the effects of drought, local irrigators may be experiencing those impacts.

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District-Wide Recommendations

The recommendations listed below are drought-related mitigation actions that the Lower Platte North NRD can undertake. These actions will help to increase drought resilience across the district and help community water systems better prepare for drought. The following section will discuss community-specific drought mitigation actions and best management practices.

Regional Drought Tools Education

As discussed in the section above, additional regional drought monitoring performed by the community water systems is needed across the NRD. It is recommended that the Lower Platte North NRD work with local communities and water operators to educate them on regional drought monitoring tools. These tools could include the U.S. Drought Monitor, Lower Platte Drought Monitor Dashboard, stream gauges, Palmer Drought Severity Index, and others. This educational outreach aims to increase the number of water systems that utilize and monitor regional drought tools.

Local Drought Ordinance Updates

Improved local drought ordinances were identified as a need during the drought resilience process. While the Lower Platte North NRD cannot directly control local codes and ordinances, they can assist. It is recommended that the NRD work with local community leaders and water system operators to promote updating local drought ordinances. The NRD may also be able to assist in writing local drought ordinance triggers.

As part of this Drought Risk and Resilience Report, sample drought ordinances (Appendix A) have been created for communities to utilize when updating or creating their drought ordinance. Additionally, the Public Outreach and Education Toolkit (Appendix B) contains sample press releases, social media posts, and flyers related to the sample drought ordinances that communities can easily edit to fit their local needs. The toolkit also contains flyers that communities can use to educate residents about drought.

Well Water Level Transducers

Well transducers can be very beneficial for drought management. The real-time groundwater level monitoring allows for early identification of declining water tables, helping to detect drought conditions earlier and track water levels over time. The NRD is currently working with interested community water systems to install the transducers in community wells at minimal cost to the community.

Monitoring Wells

One project identified by the NRD and Groundwater Management Plan was to continue the expansion of the dedicated monitoring well network, for both quantity and quality purposes, at critical locations in the District. Within the Groundwater Management Plan, potential areas for new monitoring wells are identified. The NRD can also work with water systems without

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monitoring wells and locate new monitoring wells nearby. These wells will help communities better understand groundwater levels and potential drought risks.

Emergency Water Supply Agreements and MOUs

During the community water system meetings, it became clear that most systems did not have a specific plan of action for obtaining water during an emergency where the system was compromised. This could be from a prolonged loss of power, a terrorist attack on infrastructure, or water supply contamination. Most water systems said they would rely on their extra wells or had contact information for outside suppliers. None had agreements or MOUs in place with these outside suppliers. It is recommended that the Lower Platte North NRD work with the communities and county emergency managers to help create agreements or MOUs with outside water suppliers. These water suppliers could be other communities, bulk water suppliers, or bottled water retailers.

Implement Actions Identified in the Lower Platte River Drought Contingency Plan

As a member of the Lower Platte River Consortium, the Lower Platte North NRD will aid in implementing identified drought mitigation actions outlined in the Lower Platte River Drought Contingency Plan 2024 Update. The NRD will also assist in developing future drought mitigation actions during subsequent plan updates.

Additional Actions to be identified by Jon Mohr.

Summary of Water System Best Management Practices/Mitigation Actions

The following table summarizes the best management practices and mitigation actions identified for each community water system based on the Drought Resilience Matrix and information provided by the community.

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Actions	Abie	Bellwood	Cedar Bluffs	David City	Fremont	Ithaca	Lindsay	Malmo	Mead	Memphis	Morse Bluff	Newman Grove	North Bend	Platte Center	Prague	Rogers	Schuyler	Wahoo	Weston	Yutan
Add a New Filter to the Water Treatment Plant and Expand the Plant													X							
Backup Generator for Well 94-1																X				
Construct New Horizontal Wells and Storage					X															
Create Agreements or MOUs for Emergency Water Supplies							X	X	X	X									X	
Create a Social Media Program for Drought Conservation																	X			
Identify Alternative Emergency Water Sources								X		X	X					X		X	X	
Create Agreements with Other Communities for Backup Water Operator Coverage																X				
Create and Pass a Drought Ordinance			X		X	X		X		X				X				X	X	
Create and Pass a More Robust Drought Ordinance	X			X									X							X
Create a Notification Plan in Case of a Water Emergency		X																		
Drill a 3rd Well to Meet Future Demand																				X

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Actions	Abie	Bellwood	Cedar Bluffs	David City	Fremont	Ithaca	Lindsay	Malmo	Mead	Memphis	Morse Bluff	Newman Grove	North Bend	Platte Center	Prague	Rogers	Schuyler	Wahoo	Weston	Yutan
Drill a New Well to Address Capacity and Water Quality Issues			X																	
Drill a New Well to Replace Well 2													X							
Drill Well for Planned AGP Plant				X																
Hire an Additional Water Operator																	X			
Identify Potential New Water Source	X																			
If Water Quality Issues Do Not Improve, Construct a Water Treatment Plant			X												X		X			
Implement Tiered Water Rates	X									X										
Increase Drought Monitoring at a Local and Regional Level	X		X		X					X	X	X	X	X	X	X			X	
Increase Drought Monitoring at a Regional Level		X		X		X		X	X									X		X
Install a Backup Generator for the Water Tower																				X
Install Transducers on Wells	X		X		X	X		X		X	X		X	X	X	X			X	
Install Water Meters on All Homes	X									X										

Actions	Abie	Bellwood	Cedar Bluffs	David City	Fremont	Ithaca	Lindsay	Malmo	Mead	Memphis	Morse Bluff	Newman Grove	North Bend	Platte Center	Prague	Rogers	Schuyler	Wahoo	Weston	Yutan
Look Into Drilling a New Well or Hooking Up to Rural Water															X					
Look Into Using Well 83-1 to Supply the Nonportable Lindsay Corporation Plant Uses.							X													
New Preliminary Engineering Report			X																	
Store Historical Consumption and Water Level Information Electronically						X				X		X			X	X				
Update and Pass a More Robust Drought Ordinance		X														X				
Update the Wellhead Protection Plan														X						
Work with the LPN NRD on Possibly Adding Groundwater Monitoring Wells Near the Community				X								X	X			X		X	X	X
Install Backup Generator on Well 2014-1											X									

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Water System-Specific Reports

The following profiles provide an overview of specific information for each community water system within the NRD. Key topics included in each profile are listed below:

- Geographic Description
- Drought Resilience Matrix
- Overall Drought Comfortability
- Drought History and Monitoring Protocols
    - Consumption Overview
    - Monitoring Schedule
- Water System Infrastructure
    - Wells
    - Storage
    - Other Concerns/Information
- Water Quality
- Existing Plans and Studies
- Recommendations
    - Key Concerns
    - Best Management Practices & Mitigation Strategies

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Abie Water System

Geographic Description

Abie is located in northeastern Butler County. The water system serves approximately 40 connections or a population of 69 in the Village.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	High	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.
Water Quality	High	Has no water quality issues above required federal or state guidelines.
Capabilities Ordinances / Plans	Low	Does not have a drought ordinance or minimal defined parameters. Does not have many other water system plans (Engineering Report, Water Study, etc.).
Capabilities Staff	Medium	Does not have any water operators on staff. Hires an outside company to handle the water system. Or Has minimal staff but agreements with other communities for emergency backup staff.
Local Drought Monitoring	High	Regularly checks water levels and consumption (>1 a week). Has historical records that go back many years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Medium	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).
Local Funding Ability	Low	Would not be able to fund any large water system project (new well, water treatment plant, water storage, etc.). May have many other large projects going on.

Overall Drought Comfortability:

Current Supply	9/10	Very comfortable with the current water supply meeting the community's needs during a drought event.
Future Supply	9/10	No major growth in the system is expected.

Drought History and Monitoring Protocols

No major past drought events required mandatory or voluntary restrictions. No past drought impacts. Only when a well has been down for an extended period or during power outages has the system encouraged limited water use.

Consumption Overview

Average consumption: 10,000 gallons per day. Historical water levels and usage are not available for analysis. Consumption and water levels are tracked on paper.

One well can sustain the water system if necessary.

Lawn watering is not allowed (no water meters in town). Instead, the water system uses a flat fee structure for water service.

Monitoring Schedule

Schedule	Description
Normal Schedule	Once A Month (static) Once A Day (drawdown)
During Drought/High Usage	Once A Month (static) Once A Day (drawdown)
Other Considerations	If the water level drops 25 ft, they would consider emergency measures. Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
Well 64-1	1964 Rate: 100 gallons/min Depth (430ft) Top of Screen (380ft) Bottom of Screen (410ft) Have Backup Portable Generator & Transfer switch No Transducer
Well 81-1	1981 Rate: 250 gallons/min Depth (460ft) Top of Screen (350ft) Bottom of Screen (413ft) Have Backup Portable Generator & Transfer Switch No Transducer
Storage	**Description**
Standpipe	1932 30,000-gallon volume

Infrastructure Additional Information

- Currently using an old airline pump to measure well drawdown – would like to install a transducer in a well through the air vent.
- Always open to an additional water source. Financial constraints to put in an extra well.
    - Have discussed hooking up with David City (14mi from Abie) with a connection to the line near Bruno (4mi). There is a lack of local support for the initiative.
- Age of the infrastructure is a concern.

Water Quality

No major water quality issues. Some levels of iron and manganese, but no treatment is needed.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	Yes	2003
Drought/Water Ordinance	Yes	Basic restricted use ordinance
Water System Emergency Response Plan	Yes	Emergency water source plan is to haul in water from the National Guard. No specific agreement or MOU.
Water Study/Water System Engineering Report	Yes	Limited – existing report only included a study to hook up with the David City pipeline.
Mutual Aid Agreements	Yes	David City

Recommendations

Key Concerns

- Existing regional drought tools are not being utilized
- Aging water system infrastructure
- No water meters
- Limited funds and flat fees prevent any large water system projects
- Does not have a well-defined drought ordinance

Best Management Practices & Mitigation Strategies

- Identify Potential New Water Source
    - Either a New Well or Connection with David City
- Install Water Meters on All Homes
    - Implement Tiered Water Rates
- Install Transducers on Wells
- Increase Drought Monitoring at a Local and Regional Level
- Create and Pass a More Robust Drought Ordinance
    - Tie in Increased Drought Monitoring

Bellwood Water System

Geographic Description

Bellwood is located in northwestern Butler County. The water system serves a population of 435 in the Village.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	High	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.
Water Quality	Medium	Some wells have water quality issues above required federal or state guidelines. However, it is currently being treated or will likely not require the community to drill a new well or construct a water treatment plant.
Capabilities Ordinances / Plans	Medium	Has a basic drought ordinance but is minimal. Has some water system plans (Engineering Report, Water Study, etc.) and may be outdated.
Capabilities Staff	Low	Has minimal staff that are close to retirement or minimal staff that lack institutional knowledge about the water system.
Local Drought Monitoring	High	Regularly checks water levels and consumption (>1 a week). Has historical records that go back many years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Medium	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

Current Supply	10/10	Very comfortable with the current water supply meeting the community's needs during a drought event.
Future Supply	10/10	A new bridge is going up, and they believe there will be an increase in population. Even if the population doubles, they still rank comfortability at a 10.

Drought History and Monitoring Protocols

Past drought events in the early 2010s led to limited lawn sprinkler use, which led to community unrest.

Consumption Overview

Historical water levels and usage are unavailable for analysis

Monitoring Schedule

Schedule	Description
Normal Schedule	Every 7 Days
During Drought/High Usage	Every 7 Days (triggered if water levels drop 10 ft)
Other Considerations	Major concerns about providing enough water for the community starts at a 15 ft drop. Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
Well 82-1	1982 Rate: 500 gallons/min Depth (128.5ft) Top of Screen (108ft) Bottom of Screen (125ft) Backup Power at Treatment Center Has a Transducer
Well 2013-1	2014 Rate: 500 gallons/min Depth (126ft) Top of Screen (103ft) Bottom of Screen (126ft) No Backup Power Source Has a Transducer
Well 76-1	*Inactive* 1976 Depth (122ft) Top of Screen (102ft) Bottom of Screen (122ft)
Storage	**Description**
Water Tower	120,000-gallon volume

Water Quality

Water Quality Issues include arsenic and iron. Arsenic is treated at the water treatment center. The system does backwash for iron. Problems with uranium which lead to Well 76-1 being inactive.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	Yes	2013
Drought/Water Ordinance	Yes	
Water System Emergency Response Plan	Yes	Emergency water source plan is to buy bottled water and use tanker trucks. No written agreements.
Water Study/Water System Engineering Report	Yes	2010
Mutual Aid Agreements	Yes	David City

Recommendations

Key Concerns

- Existing regional drought tools are not being utilized
- Only have one water operator that is very knowledgeable about the water system
- Does not have a well-defined drought ordinance

Best Management Practices & Mitigation Strategies

- Create a Notification Plan in Case of a Water Emergency
- Increase Drought Monitoring at a Regional Level
- Update and Pass a More Robust Drought Ordinance
    - Tie in Increased Drought Monitoring

Cedar Bluffs Water System

Geographic Description

Cedar Bluffs is located in northern Saunders County. The water system serves a population of 615 in the Village.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	Low	Is not able to meet the current demand. Is not able to meet future short term growth demand or demand during drought. New wells or other sources of water will be needed soon.
Water Quality	Low	Has water quality issues above required federal or state guidelines that will eventually require the community to drill a new well or construct a water treatment plant.
Capabilities Ordinances / Plans	Low	Does not have a drought ordinance or minimal defined parameters. Does not have many other water system plans (Engineering Report, Water Study, etc.).
Capabilities Staff	Medium	Does not have any water operators on staff. Hires an outside company to handle the water system. Or Has minimal staff but agreements with other communities for emergency backup staff.
Local Drought Monitoring	Medium	Performs water levels and consumption monitoring fairly regularly (>1 a month). Has historical records that may or may not go back several years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Low	Does not have a MOU or agreement in place for emergency water. Is not connected to another water system. Would have difficulty providing adequate water if one well went down.
Local Funding Ability	High	Does not have many other large projects in the community. Would be able to easily fund a medium water system projects (new well, water storage, etc.).

Overall Drought Comfortability:

Current Supply	1/10	Subdivision expansion in 2025 (200 people) and they are a growing community. They can't do the new subdivision without a new well. There are already some people in town with water pressure issues.
Future Supply	1/10	Without a new well, future growth is not possible.

Drought History and Monitoring Protocols

Past drought impacts are largely unknown due to staff turnover. Other planning documents, such as the Hazard Mitigation Plan, noted that water supply was insufficient during past drought events. High irrigation demand in the summer has threatened the water supply.

Consumption Overview

Historical water levels and usage are unavailable for analysis due to staff turnover.

Monitoring Schedule

Schedule	Description
Normal Schedule	Once A Month (Summer) Every Other Month (Winter)
During Drought/High Usage	None currently, but there will be. Policy is that if levels drop below 10 ft of gap, they will monitor more. Usually, around 50% of typical water level, they start having concerns.
Other Considerations	People Service was hired as an advisor. They took over operating the system in March 2025. Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
57-1 (Well 3)	G-028649 1957 Rate: 50 gallons/min Depth (130ft) Top of Screen (100ft) Bottom of Screen (130ft) Portable Backup Generator No Transducer
91-1 (Well 5)	G-077077 1991 Rate: 60 gallons/min Depth (144ft) Top of Screen (114ft)

	Bottom of Screen (144ft) Stationary Backup Generator No Transducer
Storage	**Description**
Water Tower	15,000-gallon volume

Infrastructure Additional Information

Age of wells, especially Well 3 (Drilled in 1957).

Water Quality

Water Quality Issues include arsenic. Both wells are blended to reduce arsenic levels but have received violations in prior years.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	Yes	1999
Drought/Water Ordinance	No	
Water System Emergency Response Plan	Yes	In an emergency, they would truck in water. Unsure from where and no current agreements.
Water Study/Water System Engineering Report	2017	An updated and comprehensive Preliminary Engineering Report should be done.
Mutual Aid Agreements	No	

Recommendations

Key Concerns

- Do not have enough water to meet future demands
- Arsenic issues in both wells
- Existing local and regional drought tools are not being utilized
- Does not have a well-defined drought ordinance

Best Management Practices & Mitigation Strategies

- New Preliminary Engineering Report
- Install Transducers on Wells
- Drill a New Well to Address Capacity and Water Quality Issues
    - If Water Quality Do Not Improve, Construct a Water Treatment Plant
- Increase Drought Monitoring at a Local and Regional Level
- Create and Pass a Drought Ordinance
    - Tie in Increased Drought Monitoring

David City Water System

Geographic Description

David City is located in central Butler County. The water system serves a population of 8,369 in the City.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	Medium	Can meet current demand and likely some future growth demand. Drought has caused issues in the past.
Water Quality	Medium	Some wells have water quality issues above required federal or state guidelines. However, it is currently being treated or will likely not require the community to drill a new well or construct a water treatment plant.
Capabilities Ordinances / Plans	Medium	Has a basic drought ordinance but is minimal. Has some water system plans (Engineering Report, Water Study, etc.) and may be outdated.
Capabilities Staff	High	Has adequate staff and institutional knowledge to understand and operate the water system.
Local Drought Monitoring	High	Regularly checks water levels and consumption (>1 a week). Has historical records that go back many years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Medium	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

Current Supply	8/10	Most concerned with heavy industry use on the water supply.
Future Supply	8/10	In the coming years, the only major growth is AGP coming in. If another large industry moves in, that would increase concern.

Drought History and Monitoring Protocols

The water system is most commonly impacted by irrigation in the late summer. The system will see water levels drop a bit during the late summer. The system has implemented restrictions in the past.

Consumption Overview

Average annual consumption – 186.2 million gallons

Monitoring Schedule

Schedule	Description
Normal Schedule	Daily
During Drought/High Usage	Daily
Other Considerations	Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
Well 10	Built: 1979 Rate: 747 gallons/min Top of Screen (397ft) Depth (425ft) Bottom of Screen (425ft) No Backup Generator Has a Transducer
Well 11	Built: 2002 Rate: 850 gallons/min Top of Screen (330ft) Depth (427ft) Bottom of Screen (420ft) No Backup Generator Has a Transducer
Well 12	Built: 2009 Rate: 1,100 gallons/min Depth (408ft) Top of Screen (354ft) Bottom of Screen (405ft) Has Backup Generator (spring 2025) Has a Transducer
Well 14	Built: 2009 Rate: 950 gallons/min Depth (427ft) Top of Screen (305ft) Bottom of Screen (424ft) No Backup Generator No Transducer

Well 8	Built: 1966 *Inactive*
Well 9	Built: 1972 *Inactive – Currently Going Through Decommissioning*
Storage	**Description**
Elevated Storage Tank	750,000-gallon volume
Underground Clearwell Storage Tank	500,000-gallon volume
New Storage Tank	50,000-gallon volume

Infrastructure Additional Information

- David City provides water to the Village of Bruno. Bruno's original water system often could not meet demand during summer. This led to a project to run a 9-mile water line from David City to Bruno. The NRD operates the water line, purchasing and delivering water from David City to Bruno. Bruno is in charge of distributing the water and operating the system.
- Another well is planned in the next 5+ years (300 gal/min). It will be used for the planned AGP plant.

Water Quality

Water Quality Issues include arsenic and iron manganese. Water is treated at the water treatment plant.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	No	
Drought/Water Ordinance	Yes	Basic restricted use ordinance
Water System Emergency Response Plan	Yes	Bruno ERP – 2023 David City ERP – 2023 Emergency water source plan is a bulk water truck. No written agreements.
Water Study/Water System Engineering Report	Yes	2022
Mutual Aid Agreements	Yes	Rising City and Bellwood provide staff assistance. David City will also help out smaller communities when they need it.

Recommendations

Key Concerns

- Does not have a well-defined drought ordinance
- Existing regional drought tools are not being utilized
- Adding additional large industrial users in the future

Best Management Practices & Mitigation Strategies

- Work with the LPN NRD on Possibly Adding Groundwater Monitoring Wells Near the Community
- Drill Well for Planned AGP Plant
- Increase Drought Monitoring at a Regional Level
- Create and Pass a More Robust Drought Ordinance
    - Tie in Increased Drought Monitoring

Fremont Water System

Geographic Description

Fremont is located in southeastern Dodge County. The city's water system serves a population of 27,141 (2020).

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	High	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.
Water Quality	Medium	Some wells have water quality issues above required federal or state guidelines. However, it is currently being treated or will likely not require the community to drill a new well or construct a water treatment plant.
Capabilities Ordinances / Plans	Low	Does not have a drought ordinance or minimal defined parameters. Does not have many other water system plans (Engineering Report, Water Study, etc.).
Capabilities Staff	High	Has adequate staff and institutional knowledge to understand and operate the water system.
Local Drought Monitoring	Medium	Performs water levels and consumption monitoring fairly regularly (>1 a month). Has historical records that may or may not go back several years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Medium	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

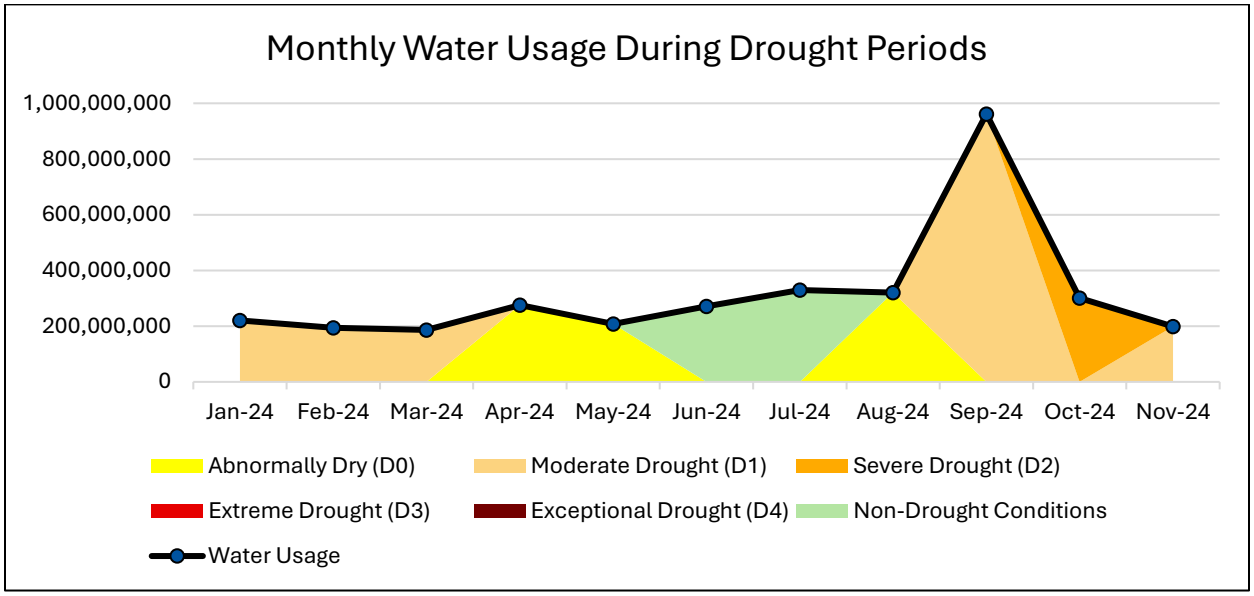
Current Supply	10/10	Very comfortable with the current water supply meeting the community's needs during a drought event.
Future Supply	10/10	Some significant population growth is anticipated over the next 5-10 years. The city is getting requests from large companies every year. However, the planned new wells and storage will cover the additional consumption.

Drought History and Monitoring Protocols

No major past drought events requiring mandatory or voluntary restrictions. No past drought impacts.

Consumption Overview

Average consumption: 304 million gallons annually.



Monitoring Schedule

Schedule	Description
Normal Schedule	Once A Month
During Drought/High Usage	Once A Month
Other Considerations	Major concerns would begin at a drop of 6-8 feet. Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
2000-1	2000 Rate: 1,500 gallons/min Depth (86ft) Top of Screen (44ft) Bottom of Screen (86ft) No Backup Generator No Transducer
2001-1	2001 Rate: 1,300 gallons/min

	Depth (74ft) Top of Screen (44ft) Bottom of Screen (74ft) Has a Backup Generator No Transducer
2005-1	2005 Rate: (?) Depth (76ft) Top of Screen (45ft) Bottom of Screen (76ft) No Backup Generator No Transducer
2005-2 Well #9	2005 Rate: 2,425 gallons/min Depth (70ft) Top of Screen (35ft) Bottom of Screen (70ft) Has a Backup Generator No Transducer
9 additional older wells	
Storage	**Description**
Reservoir	5,000,000-gallon volume

Infrastructure Additional Information

- Fremont helps to provide backup operators for several smaller communities.
- Fremont plans to add horizontal wells and storage within 1-3 years. A reservoir is anticipated to be west of the city, with a study under development as of 2025.

Water Quality

Water quality issues include manganese, which is treated with tripolyphosphates.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	Yes	2010
Drought/Water Ordinance	No	
Water System Emergency Response Plan	Yes	Emergency water source plan is to use other wells.
Water Study/Water System Engineering Report	Yes	Currently under development
Mutual Aid Agreements	Yes	NeWARN

Recommendations

Key Concerns

- Funding for future expansion and other large water system projects
- Existing regional drought tools are not being utilized
- Does not have a drought ordinance

Best Management Practices & Mitigation Strategies

- Install Transducers on Wells
    - Christianson Park West wells
- Increase Drought Monitoring at a Local and Regional Level
- Create and Pass a Drought Ordinance
    - Tie in Increased Drought Monitoring
- Construct New Horizontal Wells and Storage

Ithaca Water System

Geographic Description

Ithaca is located in central Saunders County. The water system serves a population of 160 in the Village.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	High	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.
Water Quality	Medium	Some wells have water quality issues above required federal or state guidelines. However, it is currently being treated or will likely not require the community to drill a new well or construct a water treatment plant.
Capabilities Ordinances / Plans	Low	Does not have a drought ordinance or minimal defined parameters. Does not have many other water system plans (Engineering Report, Water Study, etc.).
Capabilities Staff	Medium	Does not have any water operators on staff. Hires an outside company to handle the water system. Or Has minimal staff but agreements with other communities for emergency backup staff.
Local Drought Monitoring	Medium	Performs water levels and consumption monitoring fairly regularly (>1 a month). Has historical records that may or may not go back several years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Medium	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

Current Supply	9/10	Very comfortable with the current water supply meeting the community's needs during a drought event. Water level stays consistent and doesn't drop much.
Future Supply	9/10	No major population growth or change is anticipated in the next 10 years.

Drought History and Monitoring Protocols

No major past drought events requiring mandatory or voluntary restrictions. No impacts from past drought events.

Consumption Overview

Average consumption: 4,000,000 gallons per year. Consumption and water levels are tracked on paper.

Historical water levels and usage are not available for analysis.

Monitoring Schedule

Schedule	Description
Normal Schedule	Once A Month
During Drought/High Usage	Monthly. Additional checks are triggered if levels drop 5ft.
Other Considerations	Levels have always been consistent. Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
87-1	1987 Rate: 225 gallons/min Depth (127ft) Top of Screen (92ft) Bottom of Screen (122ft) Have Backup Portable Generator No Transducer
87-2	1987 Rate: 135 gallons/min Depth (116ft) Top of Screen (86ft) Bottom of Screen (300ft) Have Backup Portable Generator No Transducer
Storage	**Description**
Hydro Pneumatic Tank	10,000-gallon volume

Water Quality

Water quality issues include minor issues with copper. Copper levels come and go and do not require mitigation. The last violation was in 2024, and the system achieved compliance.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	Yes	2000
Drought/Water Ordinance	No	
Water System Emergency Response Plan	Yes	Emergency water source plan is to truck in water. They have a contact list for this.
Water Study/Water System Engineering Report	No	
Mutual Aid Agreements	No	

Recommendations

Key Concerns

- Existing regional drought tools are not being utilized.
- Does not have a drought ordinance and has a limited number of other water system planning documents.

Best Management Practices & Mitigation Strategies

- Increase Drought Monitoring at a Regional Level
- Create and Pass a Drought Ordinance
    - Tie in Increased Drought Monitoring
- Store Historical Consumption and Water Level Information Electronically
- Install Transducers on Wells

Lindsay Water System

Geographic Description

Lindsay is located in northern Platte County. The water system serves a population of 255 in the Village.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	High	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.
Water Quality	Medium	Some wells have water quality issues above required federal or state guidelines. However, it is currently being treated or will likely not require the community to drill a new well or construct a water treatment plant.
Capabilities Ordinances / Plans	High	Has a well-defined, in-depth drought ordinance. Has some water system plans (Engineering Report, Water Study, etc.) and are recent.
Capabilities Staff	High	Has adequate staff and institutional knowledge to understand and operate the water system.
Local Drought Monitoring	High	Regularly checks water levels and consumption (>1 a week). Has historical records that go back many years.
Regional Drought Monitoring	Medium	Is aware of other drought-related tools and may check them every so often.
Emergency Supply	Low	Does not have a MOU or agreement in place for emergency water. Is not connected to another water system. Would have difficulty providing adequate water if one well went down.
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

Current Supply	9/10	Very comfortable with the current water supply meeting the community's needs during a drought event. Any concern would relate to water quality.
Future Supply	9/10	Quantity can meet future needs. The only concern is water quality. New growth includes new apartment complex (14 units), housing development (10 homes), and housing development (12 homes). Upgrades to the plant, new fire hall, and a new school (with limited demand increase). The community is growing in population. Several businesses have reduced water usage.

Drought History and Monitoring Protocols

The system has seen large swings in water levels but has not had direct negative impacts from drought. The system has not instituted mandatory restrictions in the past. During the 2012 drought, voluntary restrictions were implemented instead.

Consumption Overview

Average Daily Water Pumped – 123,258 Gal

Average Daily Used – 54,009 Gal

Pumped the most in 2022, followed by 2012.

Lindsay Corporation is the largest water user (2/3 of total use). There is a good working relationship between the community and business.

Monitoring Schedule

Schedule	Description
Normal Schedule	Daily reports
During Drought/High Usage	Daily reports
Other Considerations	Lindsay Corporation has several monitoring wells because it is a superfund site. Water levels can drop 12-25ft in the summer. They also monitor the weather and regional drought levels on the U.S. Drought Monitor.

Water System Infrastructure

Wells	Description
83-1	1983 Rate: 650 gallons/min Depth (85ft) Top of Screen (65ft) Bottom of Scree (?) No Backup Power. Has a Transducer *Not used for consumption. Currently only use it for testing and fire supply backup.*
89-1	1989 Rate: 500 gallons/min Depth (105ft) Top of Screen (80ft) Bottom of Screen (?) No Backup Power (Has a Right-Angle Drive) Has a Transducer
2013-1	2013 Rate: 650 gallons/min Depth (211ft) Top of Screen (188ft)

	Bottom of Screen (?) No Backup Power (Has a Right-Angle Drive) Has a Transducer
Storage	**Description**
Elevated Water Storage Tank	2019 100,000-gallon volume

Infrastructure Additional Information

Aging water mains lead to additional leaks and breaks.

Water Quality

Minor water quality concerns regarding nitrates. Two wells are blended to lower overall nitrate levels. One well is not used for consumption but solely for fire protection and testing.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	Yes	2015
Drought/Water Ordinance	2006	Very detailed. Has three stages with triggers, goals, education actions, management actions, regulation actions, and declaration.
Water System Emergency Response Plan	Yes	Emergency water source plan is to fill from another hydrant source. No agreements or MOUs in place.
Water Study/Water System Engineering Report	Yes	2017
Mutual Aid Agreements	Yes	Nebraska Rural Water

Recommendations

Key Concerns

- Nitrate levels in one well require blending.
- Need for updating/upgrading water mains.
- No agreements or MOUs in place for emergency water.

Best Management Practices & Mitigation Strategies

- Look Into Using Well 83-1 to Supply the Nonportable Lindsay Corporation Plant Uses.
- Create Agreements or MOUs for Emergency Water Supplies.

Malmo Water System

Geographic Description

Malmo is located in central Saunders County. The water system serves a population of 94 in the Village.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	High	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.
Water Quality	Medium	Some wells have water quality issues above required federal or state guidelines. However, it is currently being treated or will likely not require the community to drill a new well or construct a water treatment plant.
Capabilities Ordinances / Plans	High	Has a well-defined, in-depth drought ordinance. Has some water system plans (Engineering Report, Water Study, etc.) and are recent.
Capabilities Staff	Medium	Does not have any water operators on staff. Hires an outside company to handle the water system. Or Has minimal staff but agreements with other communities for emergency backup staff.
Local Drought Monitoring	Medium	Performs water levels and consumption monitoring fairly regularly (>1 a month). Has historical records that may or may not go back several years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Low	Does not have a MOU or agreement in place for emergency water. Is not connected to another water system. Would have difficulty providing adequate water if one well went down.
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

Current Supply	10/10	Very comfortable with the current water supply meeting the community's needs during a drought event.
Future Supply	10/10	No major population growth is expected in the coming years.

Drought History and Monitoring Protocols

No major past drought events requiring mandatory or voluntary restrictions. No past impacts from drought events.

Consumption Overview

Historical water levels and usage are not available for analysis.

Monitoring Schedule

Schedule	Description
Normal Schedule	Monthly
During Drought/High Usage	Monthly.
Other Considerations	Unsure what water level would cause major concerns about providing enough water for the community. Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
75-1	1976 Rate: 120 gallons/min Depth (58ft) Top of screen (46ft) Bottom of Screen (58ft) No Backup Generator No Transducer
41	1942 Rate: 100 gallons/min Depth (50ft) Top of Screen (?) Bottom of Screen (50ft) No Backup generator No Transducer
Storage	**Description**
Water Tower	2000 50,000-gallon volume

Infrastructure Additional Information

Operators from Wahoo run Malmo's water system, and Wahoo handles water system billing.

Water Quality

No water quality issues to report.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	Yes	2002
Drought/Water Ordinance	No	
Water System Emergency Response Plan	Yes	Unsure of an emergency water source.
Water Study/Water System Engineering Report	No	
Mutual Aid Agreements	Yes	

Recommendations

Key Concerns

- Aging water system infrastructure, especially the Well 41, which was drilled in 1942
- Existing regional drought tools are not being utilized.
- Does not have a drought ordinance or many other water system plans.

Best Management Practices & Mitigation Strategies

- Increase Drought Monitoring at a Regional Level
- Create and Pass a Drought Ordinance
- Identify Alternative Emergency Water Sources
- Create Agreements or MOUs for Emergency Water Supplies
- Install Transducers on Wells

Mead Water System

Geographic Description

Mead is located in central Saunders County. The water system serves a population of 617 in the village.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	High	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.
Water Quality	Medium	Some wells have water quality issues above required federal or state guidelines. However, it is currently being treated or will likely not require the community to drill a new well or construct a water treatment plant.
Capabilities Ordinances / Plans	High	Has a well-defined, in-depth drought ordinance. Has some water system plans (Engineering Report, Water Study, etc.) and are recent.
Capabilities Staff	High	Has adequate staff and institutional knowledge to understand and operate the water system.
Local Drought Monitoring	High	Regularly checks water levels and consumption (>1 a week). Has historical records that go back many years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Medium	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

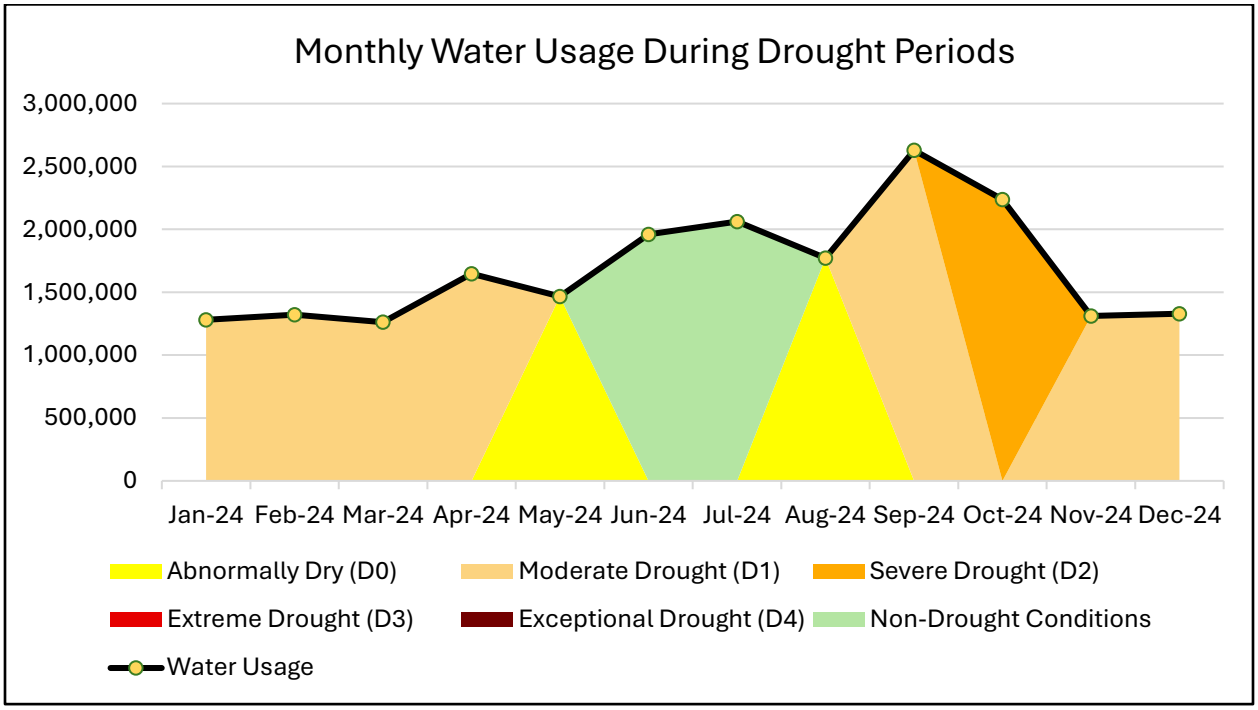
Current Supply	10/10	Very comfortable with the current water supply meeting the community's needs during a drought event.
Future Supply	10/10	No significant population growth or changes are anticipated for the next 5 - 10 years.

Drought History and Monitoring Protocols

During the drought in 2012, the village implemented water restrictions. The public had no issues with the restrictions. No other drought impacts were reported.

Consumption Overview

Average annual consumption: 20,280,316 gallons (2024)



Monitoring Schedule

Schedule	Description
Normal Schedule	Daily
During Drought/High Usage	Daily
Other Considerations	Uses the SCADA system to monitor the wells. Normal fluctuations about 2 ft. A drop of 10 ft would be concerning. Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
2017-2A	2017 Rate: 400 gallons/min Depth (133ft) Top of Screen (98ft)

	Bottom of Screen (?) Has Portable Generator Has a Transducer
2017-2B	2017 Rate: 235 gallons/min Depth (131ft) Top of Screen (94ft) Bottom of Screen (?) Has a Portable Generator Has a Transducer

Storage	Description
Water Tower	150,000-gallon volume

Infrastructure Additional Information

David City is contracted to be the village's water operator.

Water Quality

Water quality issues include Arsenic, Iron, and Manganese, which are treated through the water treatment plant.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	Yes	2001
Drought/Water Ordinance	Yes	2006. Very detailed. Has three stages with triggers, goals, education actions, management actions, and regulation actions.
Water System Emergency Response Plan	Yes	2024. Emergency water source plan is to truck in water and use the National Guard. No written agreements, just contacts.
Water Study/Water System Engineering Report	Yes	
Mutual Aid Agreements	Yes	David City

Recommendations

Key Concerns

- Existing regional drought tools are not being utilized
- Does not have contracts or agreements for emergency sources of water

Best Management Practices & Mitigation Strategies

- Increase Drought Monitoring at the Regional Level
- Create Agreements or MOUs for Emergency Water Supplies

Memphis Water System

Geographic Description

Memphis is located in southeastern Saunders County. The water system serves a population of 109 in the Village.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	High	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.
Water Quality	High	Has no water quality issues above required federal or state guidelines.
Capabilities Ordinances / Plans	Low	Does not have a drought ordinance or minimal defined parameters. Does not have many other water system plans (Engineering Report, Water Study, etc.).
Capabilities Staff	Medium	Does not have any water operators on staff. Hires an outside company to handle the water system. Or Has minimal staff but agreements with other communities for emergency backup staff.
Local Drought Monitoring	Medium	Performs water levels and consumption monitoring fairly regularly (>1 a month). Has historical records that may or may not go back several years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Low	Does not have a MOU or agreement in place for emergency water. Is not connected to another water system. Would have difficulty providing adequate water if one well went down.
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

Current Supply	10/10	Very comfortable with the current water supply meeting the community's needs during a drought event.
Future Supply	10/10	Not anticipating significant population growth or changes in the next 5-10 years.

Drought History and Monitoring Protocols

No major past drought events requiring mandatory or voluntary restrictions. No reported impacts from past drought events.

Consumption Overview

Historical water levels and usage are not available for analysis. Consumption and water levels are tracked on paper.

Monitoring Schedule

Schedule	Description
Normal Schedule	Monthly
During Drought/High Usage	Monthly
Other Considerations	Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
Well 1	1973 Rate: 200 gallons/min Depth (100ft) Top of Screen (?) Bottom of Screen (?) PTO Backup Power No Transducer
Well 2	1994 Rate: (?) Depth (184ft) Top of Screen (?) Bottom of Screen (?) No Backup Generator No Transducer
Storage	**Description**
Tank	5,000-gallon volume

Infrastructure Additional Information

Water system operation is contracted out to People's Service.

Water Quality

No water quality issues.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	Yes	1999
Drought/Water Ordinance	No	
Water System Emergency Response Plan	Yes	Unsure of their source of emergency water.
Water Study/Water System Engineering Report	No	
Mutual Aid Agreements	No	

Recommendations

Key Concerns

- No water meters
- Limited funds and flat fees prevent any large water system projects
- Does not have a drought ordinance or many other water system planning documents
- Existing regional drought tools are not being utilized
- Historical data is not stored electronically
- Does not have an identified source of emergency water

Best Management Practices & Mitigation Strategies

- Install Water Meters on All Homes
    - Implement Tiered Water Rates
- Increase Drought Monitoring at a Local and Regional Level
- Install Transducers on Wells
- Create and Pass a Drought Ordinance
    - Tie in Increased Drought Monitoring
- Store Historical Consumption and Water Level Information Electronically
- Create Agreements or MOUs for Emergency Water Supplies
- Identify Alternative Emergency Water Sources

Morse Bluff Water System

Geographic Description

Morse Bluff is located in northern Saunders County. The water system serves a population of 117 in the village.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	High	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.
Water Quality	High	Has no water quality issues above required federal or state guidelines.
Capabilities Ordinances / Plans	High	Has a well-defined, in-depth drought ordinance. Has some water system plans (Engineering Report, Water Study, etc.) and are recent.
Capabilities Staff	Medium	Does not have any water operators on staff. Hires an outside company to handle the water system. Or Has minimal staff but agreements with other communities for emergency backup staff.
Local Drought Monitoring	Medium	Performs water levels and consumption monitoring fairly regularly (>1 a month). Has historical records that may or may not go back several years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Medium	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

Current Supply	8 to 10/10	Very comfortable with the current water supply meeting the community's needs during a drought event.
Future Supply	8 to 10/10	No significant population growth or development is anticipated within the next 1-10 years.

Drought History and Monitoring Protocols

No major past drought events requiring mandatory or voluntary restrictions. No reported impacts from past drought events.

Consumption Overview

Average consumption – 8,000 gal/day in the summer; 5,000 gal/day in the winter.

Monitoring Schedule

Schedule	Description
Normal Schedule	Monthly
During Drought/High Usage	Monthly
Other Considerations	Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
79-1	1979 Rate: 285 gallons/min Depth (196ft) Top of Screen (188ft) Bottom of Screen (Unknown) Has a Backup Power Source No Transducer
2014-1	2014 Rate: 350 gallons/min Depth (206ft) Top of Screen (158ft) Bottom of Screen (206ft) No Backup Generator Has a Transducer
Storage	**Description**
Standpipe	75,000-gallon volume

Infrastructure Additional Information

Have a verbal agreement with a certified operator in Cedar Bluffs to serve as a backup operator.

Water Quality

No water quality issues.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	Yes	2003
Drought/Water Ordinance	Yes	2013. Very detailed. Has three stages with triggers, goals, education actions, management actions, and regulation actions.
Water System Emergency Response Plan	Yes	2024. Emergency water source plan is to truck in water and use bottled water. No written agreements, just contacts.
Water Study/Water System Engineering Report	Yes	2016
Mutual Aid Agreements	No	

Recommendations

Key Concerns

- Existing regional drought tools are not being utilized

Best Management Practices & Mitigation Strategies

- Increase Drought Monitoring at a Local and Regional Level
- Install Transducers on Wells
- Install Backup Generator on Well 2014-1

Newman Grove Water System

Geographic Description

Newman Grove is located on the border between southern Madison County and northern Platte County. The water system serves a population of 667 in the Village.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	High	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.
Water Quality	High	Has no water quality issues above required federal or state guidelines.
Capabilities Ordinances / Plans	High	Has a well-defined, in-depth drought ordinance. Has some water system plans (Engineering Report, Water Study, etc.) and are recent.
Capabilities Staff	Medium	Does not have any water operators on staff. Hires an outside company to handle the water system. Or Has minimal staff but agreements with other communities for emergency backup staff.
Local Drought Monitoring	Low	Performs minimal water levels and consumption monitoring. Has minimal historical records.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Medium	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

Current Supply	10/10	Very comfortable with the current water supply meeting the community's needs during a drought event. Unsure of what water level would cause major concerns about providing enough water for the community.
Future Supply	8/10	No significant population growth is expected in the coming years. Comfortability with the current system meeting needs in the next 5-10 years is an 8/10 because the system is getting older and may need repairs.

Drought History and Monitoring Protocols

No major past drought events requiring mandatory or voluntary restrictions, but they were close once. No reported impacts from past drought events.

Consumption Overview

Historical water levels and usage are not available for analysis. Consumption records are kept but not organized. Water levels are not tracked.

Monitoring Schedule

Schedule	Description
Normal Schedule	Monthly
During Drought/High Usage	Monthly
Other Considerations	Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
92-1	1992 Rate: 450 gallons/min Depth (135ft) Top of Screen (15ft 5in) Bottom of Screen (133ft 5in) PTO Backup Power Has a Transducer
63-1	1963 Rate: 330 gallons/mi Depth (112ft) Top of screen (97ft) Bottom of screen (112ft) No Backup Power Has a Transducer
Storage	**Description**
Standpipe	223,374-gallon volume

Infrastructure Additional Information

The system is getting older and may need repairs.

Water Quality

No water quality issues were reported.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	No	
Drought/Water Ordinance	Yes	Very detailed. Has three stages with triggers, goals, education actions, management actions, regulation actions, and declaration.
Water System Emergency Response Plan	Yes	2024. Emergency water source plan is to truck in water and use bottled water. No written agreements, just contacts.
Water Study/Water System Engineering Report	No	
Mutual Aid Agreements	Yes	Verbal agreement with Lindsay to help if repairs are needed.

Recommendations

Key Concerns

- Aging infrastructure
- Existing regional drought tools are not being utilized
- Local consumption and water level information is either not organized or not kept

Best Management Practices & Mitigation Strategies

- Increase Drought Monitoring at a Local and Regional Level
- Store Historical Consumption and Water Level Information Electronically
- Work with LPNNRD to Potentially Identify Locations Near the Village to Install Groundwater Monitoring Wells

North Bend Water System

Geographic Description

North Bend is located in southwestern Dodge County. The water system serves a population of 1,177 in the City.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	Medium	Can meet current demand and likely some future growth demand. Drought has caused issues in the past.
Water Quality	Medium	Some wells have water quality issues above required federal or state guidelines. However, it is currently being treated or will likely not require the community to drill a new well or construct a water treatment plant.
Capabilities Ordinances / Plans	Medium	Has a basic drought ordinance but is minimal. Has some water system plans (Engineering Report, Water Study, etc.) and may be outdated.
Capabilities Staff	High	Has adequate staff and institutional knowledge to understand and operate the water system.
Local Drought Monitoring	Medium	Performs water levels and consumption monitoring fairly regularly (>1 a month). Has historical records that may or may not go back several years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Medium	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

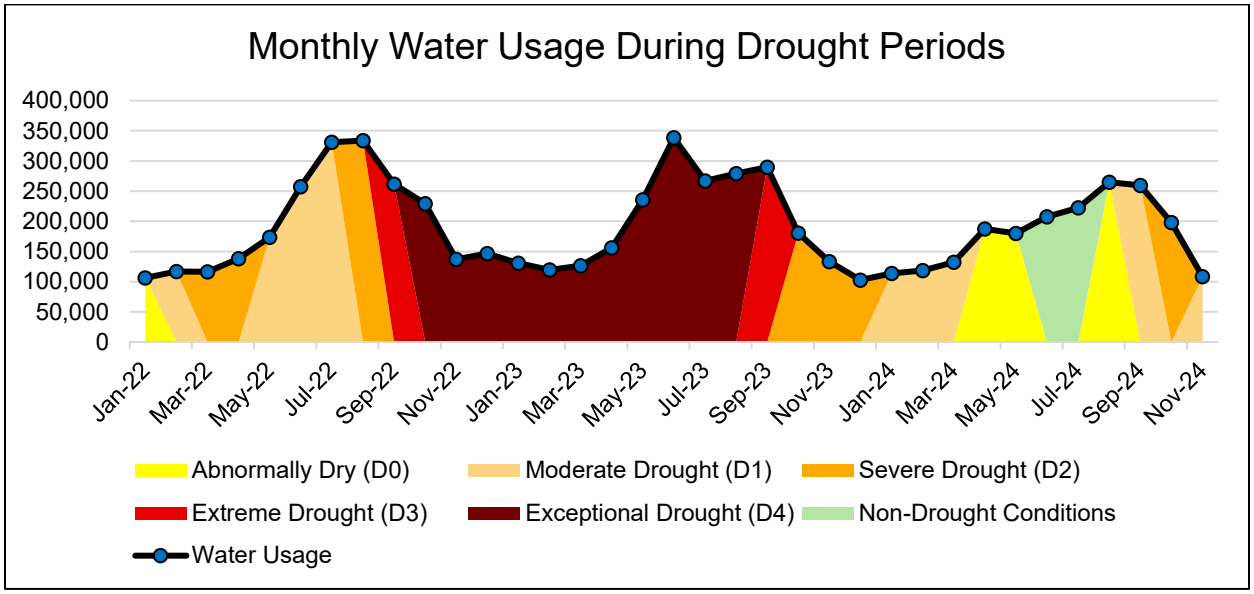
Current Supply	5/10	The more water they run, the lower the quality of the water. There are concerns about the treatment plant keeping up without issues. Water quantity is less of a concern.
Future Supply	5/10	Concerns for water quality. New development includes new housing (20 new houses, 12 new mobile homes). Water quantity is less of a concern.

Drought History and Monitoring Protocols

Higher pumping has happened in the past as a result of drought. This has resulted in more manganese in the water. The community has not instituted water restrictions in the past.

Consumption Overview

Average consumption: 191,000 gallons per day.



Monitoring Schedule

Schedule	Description
Normal Schedule	Monthly
During Drought/High Usage	Monthly (not much fluctuation)
Other Considerations	A drop of 50% in the water level would be cause for concern. Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
Well 1 (North) 811	1968 Rate: 500 gallons/min Depth (77ft) Has a Backup Power Generator No Transducer
Well 2 (West) 671	1981 Rate: 500 gallons/min Depth (55ft) Top of Screen (38ft) Bottom of Screen (55ft)

	Has a Backup Power Generator No Transducer
2018-1	2018 Rate: 500 gallons/min Depth (169ft) Has a Portable Generator Has a Transducer

Storage	Description
Water Tower	300,000-gallon volume
Clearwell	70,000-gallon volume

Infrastructure Additional Information

- Well 2 has water quality issues that worsen as pumping increases and must be replaced.
- Water treatment plant needs a new filter and expansion.

Water Quality

Water quality issues include manganese, which is treated at the water treatment plant.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	Yes	2011
Drought/Water Ordinance	Yes	2008. Basic restricted use ordinance.
Water System Emergency Response Plan	Yes	2024. Emergency water source plan is to truck in water and use bottled water. No written agreements, just contacts.
Water Study/Water System Engineering Report	Yes	Under Development
Mutual Aid Agreements	Yes	Contract with People's Service.

Recommendations

Key Concerns

- Water treatment plant needs a new filter/expansion
- Well 2 has manganese issues that get worse when pumping increases
- Additional groundwater monitoring wells are needed
- Has a very basic drought ordinance
- Existing regional drought tools are not being utilized

Best Management Practices & Mitigation Strategies

- Drill a New Well to Replace Well 2
- Add a New Filter to the Water Treatment Plant and Expand the Plant
- Work with the LPN NRD to Possibly Add Groundwater Monitoring Wells Near the City

- Increase Drought Monitoring at a Local and Regional Level
- Create and Pass a More Robust Drought Ordinance
    - Tie in Increased Drought Monitoring
- Install Transducers on Wells

Platte Center Water System

Geographic Description

Platte Center is located in northern Platte County. The water system serves a population of 336 in the village.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	High	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.
Water Quality	High	Has no water quality issues above required federal or state guidelines.
Capabilities Ordinances / Plans	Low	Does not have a drought ordinance or minimal defined parameters. Does not have many other water system plans (Engineering Report, Water Study, etc.).
Capabilities Staff	Medium	Does not have any water operators on staff. Hires an outside company to handle the water system. Or Has minimal staff but agreements with other communities for emergency backup staff.
Local Drought Monitoring	Medium	Performs water levels and consumption monitoring fairly regularly (>1 a month). Has historical records that may or may not go back several years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Medium	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

Current Supply	10/10	Very comfortable with the current water supply meeting the community's needs during a drought event.
Future Supply	10/10	Anticipating the addition of 25-100 homes in the next 5-10 years. Even with the additional homes, there are no concerns with water quantity.

Drought History and Monitoring Protocols

Instituted restrictions during 2012 drought conditions. The public responded well during those restrictions. No other impacts were reported during past drought events.

Consumption Overview

Historical water levels and usage are unavailable for analysis.

Monitoring Schedule

Schedule	Description
Normal Schedule	Monthly
During Drought/High Usage	Monthly
Other Considerations	Normal drawdown is ~2 ft. Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
2011-1	2011 Rate: 275 gallons/min Depth (211ft) Top of Screen (180ft) Bottom of Screen (208ft) Has a Backup Generator No Transducer
2021-1	2021 Rate: 275 gallons/min Depth (185ft) Top of Screen (162ft) Bottom of Screen (178ft) Has a Backup Generator Has a Transducer
78-1	Inactive, for emergency use 1978
Storage	**Description**
Water Tower	50,000-gallon volume

Water Quality

No current water quality issues.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	Yes	2014
Drought/Water Ordinance	No	
Water System Emergency Response Plan	Yes	Emergency water source plan is to truck in water. No written agreements, just contacts.
Water Study/Water System Engineering Report	Yes	Under development
Mutual Aid Agreements	Yes	Monroe NeWARN

Recommendations

Key Concerns

- Existing regional drought tools are not being utilized
- Does not have a drought ordinance
- Does not have agreements for emergency sources of water

Best Management Practices & Mitigation Strategies

- Update the Wellhead Protection Plan
- Increase Drought Monitoring at a Local and Regional Level
- Create and Pass a Drought Ordinance
    - Tie in Increased Drought Monitoring
- Create Agreements or MOUs for Emergency Water Supplies
- Install Transducers on Wells

Prague Water System

Geographic Description

Prague is located in western Saunders County. The water system serves a population of 291 in the Village.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	Medium	Can meet current demand and likely some future growth demand. Drought has caused issues in the past.
Water Quality	Medium	Some wells have water quality issues above required federal or state guidelines. However, it is currently being treated or will likely not require the community to drill a new well or construct a water treatment plant.
Capabilities Ordinances / Plans	Medium	Has a basic drought ordinance but is minimal. Has some water system plans (Engineering Report, Water Study, etc.) and may be outdated.
Capabilities Staff	High	Has adequate staff and institutional knowledge to understand and operate the water system.
Local Drought Monitoring	Medium	Performs water levels and consumption monitoring fairly regularly (>1 a month). Has historical records that may or may not go back several years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Medium	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

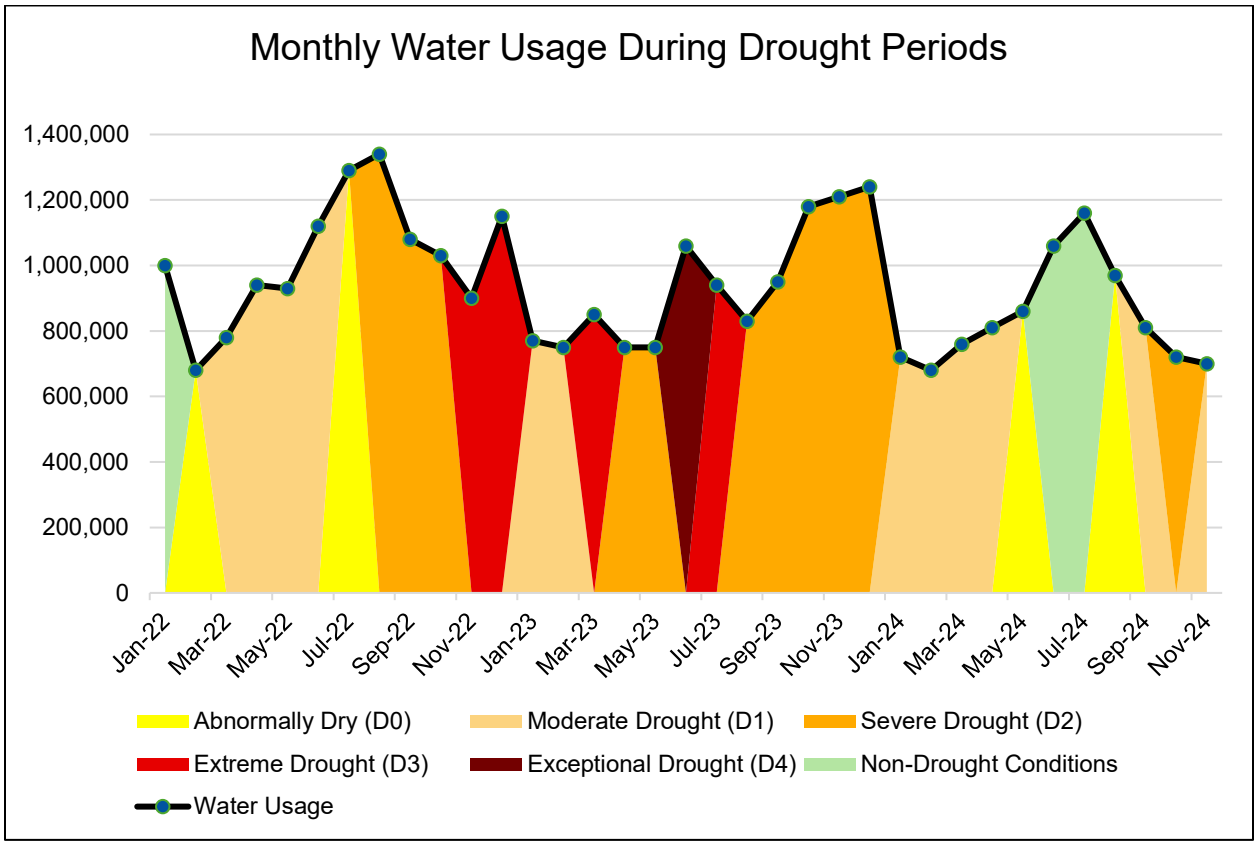
Current Supply	5/10	Comfort with the current water supply is due to water quality issues and the age of the wells.
Future Supply	7/10	Population is stable, and they are not expecting major population growth or change within the next 10 years.

Drought History and Monitoring Protocols

The community has encountered lower water levels and higher pumping during past drought events. Water restrictions have not been implemented in the past.

Consumption Overview

Average consumption: 929,444 gallons/month. Consumption and water levels are tracked on paper.



Monitoring Schedule

Schedule	Description
Normal Schedule	Monthly check from May to September, otherwise quarterly
During Drought/High Usage	Monthly
Other Considerations	Start having major concerns at the 50 ft level. Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
61-1	1961 Rate: 160 gallons/min Depth (110ft) Top of screen (87ft) Bottom of screen (137ft) Has a 3 Phase Generator (Portable) No Transducer
70-1	1966 Rate: 180 gallons/min Depth (137ft) Top of screen (117ft) Bottom of screen (137ft) Has a 3 Phase Generator (Portable) No Transducer
Storage	**Description**
Stand Pipe	110,000-gallon volume

Water Quality

Water quality issues include iron, manganese, and arsenic. These are all treated at the water treatment plant.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	Yes	2001
Drought/Water Ordinance	Yes	2006. Very detailed. Has three stages with triggers, declarations, response actions, and violations.
Water System Emergency Response Plan	Yes	2024. Emergency water source plan is to truck in water and use bottled water. No written agreements, just contacts.
Water Study/Water System Engineering Report	Yes	2023
Mutual Aid Agreements	Yes	NeWARN

Recommendations

Key Concerns

- Aging wells and treatment plant
- Historical consumption and water levels are not stored electronically
- Existing regional drought tools are not being utilized
- Limited local drought monitoring

Best Management Practices & Mitigation Strategies

- Look Into Drilling a New Well or Hooking Up to Rural Water
- If Water Quality Do Not Improve, Construct a Water Treatment Plant
- Install Transducers on Wells
- Increase Drought Monitoring at a Local and Regional Level
- Store Historical Consumption and Water Level Information Electronically

Rogers Water System

Geographic Description

Rogers is located in southeastern Colfax County. The water system serves a population of 95 in the village with 42 water hookups.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	High	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.
Water Quality	High	Has no water quality issues above required federal or state guidelines.
Capabilities Ordinances / Plans	Low	Does not have a drought ordinance or minimal defined parameters. Does not have many other water system plans (Engineering Report, Water Study, etc.).
Capabilities Staff	Low	Has minimal staff that are close to retirement or minimal staff that lack institutional knowledge about the water system.
Local Drought Monitoring	Low	Performs minimal water levels and consumption monitoring. Has minimal historical records.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Low	Does not have a MOU or agreement in place for emergency water. Is not connected to another water system. Would have difficulty providing adequate water if one well went down.
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

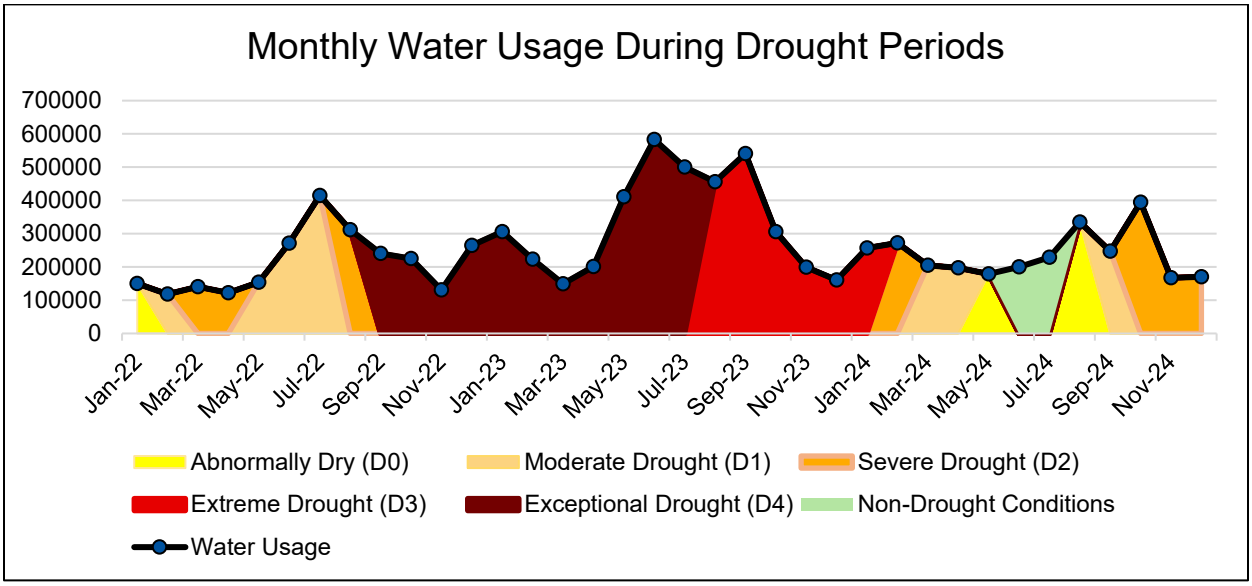
Current Supply	10/10	Very comfortable with the current water supply meeting the community's needs during a drought event.
Future Supply	10/10	No major changes are planned for the next 5-10 years.

Drought History and Monitoring Protocols

No major past drought events requiring mandatory or voluntary restrictions. No reported impacts from past drought events.

Consumption Overview

Average consumption: 328,102 gallons/monthly. Consumption and water levels are tracked on paper.



Monitoring Schedule

Schedule	Description
Normal Schedule	Gallons Pumped: Monthly Static Water Level: Rarely
During Drought/High Usage	Gallons Pumped: Monthly Static Water Level: Rarely
Other Considerations	Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
43-1	1943 Depth (36ft) *Not being used due to State requirements*
94-1	1994 Rate: 350 gallons/min Depth (106ft) Top of Screen (86ft) Bottom of Screen (106ft) No Backup Power (Has a Right-Angle Drive) No Transducer
Storage	**Description**
Water Tower	30,000-gallon volume

Infrastructure Additional Information

- Well 43-1 cannot currently be used due to State requirements.
- One water operator and no agreements with other communities.

Water Quality

No current water quality issues. Sometimes, water quality will show coliform during warm conditions.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	No	Wellhead protection map was completed in 2014.
Drought/Water Ordinance	Yes	Basic restricted use ordinance.
Water System Emergency Response Plan	Yes	2024. Emergency water source plan is to truck in water and use bottled water. No written agreements, just contacts.
Water Study/Water System Engineering Report	No	
Mutual Aid Agreements	Yes	Schuyler North Bend

Recommendations

Key Concerns

- Only one well that can be used for drinking water
- Existing regional drought tools are not being utilized
- Minimal water level monitoring
- Historical consumption and water levels are not stored electronically
- Does not have a well-defined drought ordinance
- Only one water operator
- Identified emergency supply is the well that is not allowed to be used

Best Management Practices & Mitigation Strategies

- Backup Generator for Well 94-1
- Work with LPN NRD to possibly Install Groundwater Monitoring Wells Near the Community
- Increase Drought Monitoring at a Local and Regional Level
- Update and Pass a More Robust Drought Ordinance
    - Tie in Increased Drought Monitoring
- Store Historical Consumption and Water Level Information Electronically
- Create Agreements with Other Communities for Backup Water Operator Coverage
- Install Transducers on Well(s)
- Identify Alternative Emergency Water Sources

Schuyler Water System

Geographic Description

Schuyler is located in eastern Colfax County. The water system serves a population of 6,211 in the City.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	High	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.
Water Quality	Medium	Some wells have water quality issues above required federal or state guidelines. However, it is currently being treated or will likely not require the community to drill a new well or construct a water treatment plant.
Capabilities Ordinances / Plans	Medium	Has a basic drought ordinance but is minimal. Has some water system plans (Engineering Report, Water Study, etc.) and may be outdated.
Capabilities Staff	High	Has adequate staff and institutional knowledge to understand and operate the water system.
Local Drought Monitoring	High	Regularly checks water levels and consumption (>1 a week). Has historical records that go back many years.
Regional Drought Monitoring	Medium	Is aware of other drought-related tools and may check them every so often.
Emergency Supply	Medium	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).
Local Funding Ability	High	Would not be able to fund any large water system project (new well, water treatment plant, water storage, etc.). May have many other large projects going on.

Overall Drought Comfortability:

Current Supply	9/10	Once the last two wells are online, there will be no water quantity concerns during drought.
Future Supply	9/10	Anticipated growth within the next 1-10 years includes another packing plant, a larger business potentially expanding and hooking onto the system, a lake development south of town that might have to hook onto Schuyler's system because of water quality, and the possibility of supplying water to the Village of Rogers.

Drought History and Monitoring Protocols

Past drought events have not required voluntary or mandatory restrictions. The system addresses consumers one-on-one when they see them not conserving water in peak months. The system would like to put together a social media program. No impacts were reported from past drought events.

Consumption Overview

Year	Annual Gallons Pumped
2018	354,538,000
2019	317,320,000
2020	394,394,000

Monitoring Schedule

Schedule	Description
Normal Schedule	Daily
During Drought/High Usage	Daily
Other Considerations	Major concerns if pumping level gets below pump depth. Keep track of the water table by monitoring wells in different locations in town.

Water System Infrastructure

Wells	Description
Well #14	1960 Rate: 540 gallons/min Depth (84ft) Top of Screen (29ft) Bottom of Screen (84ft) No Backup Generator Has a Transducer
Well #22	2007 Rate: 782 gallons/min Depth (78ft) Top of Screen (51ft) Bottom of Screen (78ft) Has a Backup Generator Has a Transducer
Well #23	2008 Rate: 602 gallons/min Depth (86ft) Top of Screen (56ft) Bottom of Screen (86ft) Has a Backup Generator No Transducer
Well #24	2009

	Rate: 560 gallons/min Depth (89ft) Top of Screen (54ft) Bottom of Screen (89ft) Has a Backup Generator Has a Transducer
Well #25	2023 Rate: 595 gallons/min Depth (70ft) Top of Screen (52ft) Bottom of Screen (70ft) Has a Backup Generator Has a Transducer
Well #26	*Under construction 2025* Rate: 800 gallons/min Depth (72ft) Top of Screen (51ft) Bottom of Screen (71ft) Has a Backup Generator Has a Transducer
Well #27	*Under construction 2025* Rate: 600 gallons/min Depth (80ft) Top of Screen (52ft) Bottom of Screen (77ft) Has a Backup Generator Has a Transducer

Storage	Description
Downtown Water Tower	500,000-gallon volume
Northern Water Tower	500,000-gallon volume

Water Quality

Water quality issues include uranium in Well #24 and historically high nitrates. Currently, blend all the wells so any uranium or nitrate issues are reduced.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	Yes	2014
Drought/Water Ordinance	Yes	Drought ordinance has two stages with triggers and management actions.
Water System Emergency Response Plan	Yes	Risk and Resilience Assessment Report Water System Emergency Response Plan - Emergency water source plan is to use bottled water. No written agreements, just contacts.
Water Study/Water System Engineering Report	Yes	2021 - PER

Plan / Study	Present	Description
Mutual Aid Agreements	No	

Recommendations

Key Concerns

- No mutual aid agreements in place
- Would like to have social media outreach materials for drought conservation
- If water quality continues to be an issue, a water treatment plant may be necessary
- Currently have four water operators, but five would be ideal

Best Management Practices & Mitigation Strategies

- Create a Social Media Program for Drought Conservation
- If Water Quality Do Not Improve, Construct a Water Treatment Plant
- Hire an Additional Water Operator

Wahoo Water System

Geographic Description

Wahoo is located in central Saunders County. The water system serves a population of 4,818 in the City.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	High	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.
Water Quality	High	Has no water quality issues above required federal or state guidelines.
Capabilities Ordinances / Plans	Low	Does not have a drought ordinance or minimal defined parameters. Does not have many other water system plans (Engineering Report, Water Study, etc.).
Capabilities Staff	High	Has adequate staff and institutional knowledge to understand and operate the water system.
Local Drought Monitoring	High	Regularly checks water levels and consumption (>1 a week). Has historical records that go back many years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Medium	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

Current Supply	8/10	Very comfortable with the current water supply meeting the community's needs during a drought event. The city feels like they have good well diversity.
Future Supply	8/10	A couple of new housing subdivisions are planned, but no major population growth is expected.

Drought History and Monitoring Protocols

No major past drought events requiring mandatory or voluntary restrictions. No reported drought impacts from past drought events.

Consumption Overview

Year	Annual Gallons Pumped
2017	221,400,000
2018	205,100,000

Average Daily Demand – 590,000 gallons
Maximum Daily Demand – 1,900,000 gallons

Monitoring Schedule

Schedule	Description
Normal Schedule	Daily
During Drought/High Usage	Daily.
Other Considerations	Concern is triggered when the drawdown is around 20 ft. Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
63-1 #4	1963 Depth (103ft) Rate: 1,200 gallons/min Top of Screen (73ft) Bottom of Screen (103ft) Has Backup Generator Has a Transducer
95-1 #5	1995 Rate: 1,000 gallons/min Depth (132ft) Top of Screen (89ft) Bottom of Screen (132ft) Has Backup Generator Has a Transducer
2009-1	2009 Rate: 760 gallons/min Depth (133.9ft) Top of Screen (102.5ft) Bottom of Screen (133ft) Has Backup Generator Has a Transducer
33-1 #1	*Emergency use only, not hooked up to the system.* Rate: 500 gallons/min

	Depth (85ft)
Storage	**Description**
Water Storage Tank Tower	750,000-gallon volume

Infrastructure Additional Information

- Wahoo provides water to the Village of Colon. The original Colon water system often had trouble meeting standards for nitrate and arsenic. This led to a cooperative project to run a 5-mile water line from Wahoo to Colon. The NRD operates both the rural water line and the Colon water utility, purchasing water from Wahoo for delivery to Colon residents.
- Wahoo provides backup water operators to other communities.

Water Quality

No water quality issues were identified.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	No	Wellhead Protection Map 2016
Drought/Water Ordinance	No	
Water System Emergency Response Plan	Yes	Risk and Resilience Assessment 2021 Water System Emergency Response Plan 2021 – No emergency water supply identified. Colon ERP 2021
Water Study/Water System Engineering Report	Yes	2020
Mutual Aid Agreements	Yes	NeWARN

Recommendations

Key Concerns

- Does not have a drought ordinance
- Existing regional drought tools are not being utilized
- Does not have an identified emergency water supply outside of the wells

Best Management Practices & Mitigation Strategies

- Work with the LPN NRD on Possibly Adding Groundwater Monitoring Wells Near the Community
- Increase Drought Monitoring at the Regional Level
- Create and Pass a Drought Ordinance
    - Tie in Increased Drought Monitoring
- Identify Alternative Emergency Water Sources

Weston Water System

Geographic Description

Weston is located in southern Saunders County. The water system serves a population of 250 in the Village.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	High	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.
Water Quality	High	Has no water quality issues above required federal or state guidelines.
Capabilities Ordinances / Plans	Low	Does not have a drought ordinance or minimal defined parameters. Does not have many other water system plans (Engineering Report, Water Study, etc.).
Capabilities Staff	Medium	Does not have any water operators on staff. Hires an outside company to handle the water system. Or Has minimal staff but agreements with other communities for emergency backup staff.
Local Drought Monitoring	Medium	Performs water levels and consumption monitoring fairly regularly (>1 a month). Has historical records that may or may not go back several years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Medium	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

Current Supply	10/10	Very comfortable with the current water supply meeting the community's needs during a drought event.
Future Supply	10/10	Not expecting major population growth or change within the next 10 years.

Drought History and Monitoring Protocols

No major past drought events requiring mandatory or voluntary restrictions. No reported impacts from past drought events.

Consumption Overview

Sell approximately 8 to 10 million gallons a year.

Monitoring Schedule

Schedule	Description
Normal Schedule	Monthly.
During Drought/High Usage	Monthly.
Other Considerations	Unsure at what water levels they would start having concerns. Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
2002-1	2002 Rate: 100 gallons/min Depth (177.3ft) Top of Screen (140ft) Bottom of Screen (175ft) Has a Backup Generator No Transducer
82-1	1982 Rate: 200 gallons/min Depth (124ft) Top of Screen (99ft) Bottom of Screen (124ft) No Backup Generator No Transducer
Storage	**Description**
Water Tower	80,000-gallon volume

Water Quality

Water quality issues. They have had to treat for coliform in the past.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	No	Wellhead Protection Map - 2005
Drought/Water Ordinance	No	

Plan / Study	Present	Description
Water System Emergency Response Plan	Yes	Unsure of emergency water supply.
Water Study/Water System Engineering Report	No	
Mutual Aid Agreements	Yes	Wahoo

Recommendations

Key Concerns

- Does not have a drought ordinance
- Existing regional drought tools are not being utilized
- Unsure of the community's emergency water source
- No transducers on wells

Best Management Practices & Mitigation Strategies

- Work with the LPN NRD on Possibly Adding Groundwater Monitoring Wells Near the Community
- Increase Drought Monitoring at a Local and Regional Level
- Create and Pass a Drought Ordinance
    - Tie in Increased Drought Monitoring
- Create Agreements or MOUs for Emergency Water Supplies
- Identify Alternative Emergency Water Sources
- Install Transducers on Wells

Yutan Water System

Geographic Description

Yutan is located in eastern Saunders County. The water system serves a population of 1,352 in the City.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	Medium	Can meet current demand and likely some future growth demand. Drought has caused issues in the past.
Water Quality	High	Has no water quality issues above required federal or state guidelines.
Capabilities Ordinances / Plans	Low	Does not have a drought ordinance or minimal defined parameters. Does not have many other water system plans (Engineering Report, Water Study, etc.).
Capabilities Staff	High	Has adequate staff and institutional knowledge to understand and operate the water system.
Local Drought Monitoring	High	Regularly checks water levels and consumption (>1 a week). Has historical records that go back many years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Medium	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

Current Supply	10/10	Very comfortable with the current water supply meeting the community's needs during a drought event.
Future Supply	7/10	Significant anticipated growth within the next 1-10 years includes apartments and the possibility of a new subdivision. The option of adding a 3rd well is currently being discussed to meet the community's demands in the future.

Drought History and Monitoring Protocols

No major past drought events requiring mandatory or voluntary restrictions. No reported impacts from past drought events.

Consumption Overview

Year	Annual Water Produced
2016	8,745,000 gallons
2017	45,174,000 gallons
2018	45,800,000 gallons
2019	29,500,000 gallons

Consumption and water levels are tracked on paper.

Monitoring Schedule

Schedule	Description
Normal Schedule	Daily
During Drought/High Usage	Daily
Other Considerations	Unsure at what water levels they would start having concerns. Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
Well 69-1	*Inactive, possibly decommissioning* 1969 Rate: 250 gallons/minute Depth (232ft)
Well 2014-1	2014 Rate: 525 gallons/minute Depth (232ft) Top of Screen (182ft) Bottom of Screen (232ft) No Backup Generator Has a Transducer
Well 90-1	1990 Rate: 400gpm Depth (245ft) Top of Screen (?) Bottom of Screen (?) Has a Backup Generator Has a Transducer
Storage	**Description**
Water Tower	300,000-gallon volume

Infrastructure Additional Information

The community has discussed the addition of a third well within the next 5+ years to help meet future demand.

Water Quality

Iron and manganese are present in the system but do not exceed thresholds. The system chlorinates and flushes hydrants and water tower twice a year.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	Yes	2002
Drought/Water Ordinance	Yes	Basic restricted use ordinance
Water System Emergency Response Plan	Yes	No MOUs or agreements for emergency water supply.
Water Study/Water System Engineering Report	Yes	2020
Mutual Aid Agreements	No	

Recommendations

Key Concerns

- Historical consumption and water levels are not stored electronically
- Does not have a well-defined drought ordinance
- Existing regional drought tools are not being utilized
- May need a 3rd well to meet future demand

Best Management Practices & Mitigation Strategies

- Install a Backup Generator for the Water Tower
- Drill a 3rd Well to Meet Future Demand
- Increase Drought Monitoring at a Regional Level
- Create and Pass a More Robust Drought Ordinance
    - Tie in Increased Drought Monitoring
- Work with the LPN NRD on Possibly Adding Groundwater Monitoring Wells Near the Community

Sample Drought Ordinances

This appendix contains two sample drought ordinances that communities and water systems can utilize when updating or creating a drought ordinance. One is a detailed sample drought ordinance that can be used by larger communities, communities that have seen past drought impacts, or communities with water quantity concerns. The other is a simplified drought ordinance that can be used by smaller communities that have not seen drought impacts in the past and do not have water quantity concerns.

These sample drought ordinances are only meant to provide an initial template when creating a drought ordinance. Areas highlighted in yellow are recommended areas where local information can be added. Each community should update the sample drought ordinance to fit the individual needs of their water system. All ordinances should be reviewed and approved by legal representatives of the community.

Table of Contents

Sample Drought Ordinances 1
Detailed Drought Ordinance 2
Simple Drought Ordinance 6

DRAFT

Detailed Drought Ordinance

1. PURPOSE

1.1. The purpose of this ordinance is to conserve water during periods of drought and to protect public health, safety, and welfare by establishing restrictions on water use.

2. DEFINITIONS

Drought Stage: A classification based on water supply levels or drought conditions that trigger specific conservation measures.

Drought Stage 1 – Drought Watch (Voluntary Restrictions)

Drought Stage 2 – Drought Warning (Mandatory Restrictions)

Drought Stage 3 – Drought Emergency (Emergency Measures)

3. DROUGHT STAGE 1 - DECLARATION OF A DROUGHT WATCH.

3.1. Whenever the [COMMUNITY/PWS NAME] finds that conditions exist as described in the plan under 3.2 Triggers, it shall be empowered to declare by resolution that a Drought Stage 1 Drought Watch exists and implement the steps outlined under this section.

3.2. TRIGGERS.

3.2.1. Any of the following conditions can trigger this stage:

3.2.1.1. Groundwater levels have fallen ____feet below the normal seasonal level.

3.2.1.2. Demand for one day is in excess of _____ gallons per day.

3.2.1.3. System pressure falls below _____ pounds per square inch.

3.2.1.4. The U.S. Drought Monitor has identified a D1: Mild Drought Conditions for the region for more than 14 consecutive days.

3.3. MANAGEMENT ACTIONS.

3.3.1. The public will be made aware of the Drought Stage and encouraged to pursue voluntary conservation activities such as:

3.3.1.1. Limiting water usage for lawn watering, vehicle washing, washing only full loads of laundry/dishes, limiting length and frequency of showers, and checking for interior water leaks.

DRAFT

3.4. NOTIFICATION STRATEGIES

3.4.1. The resolution shall be effective upon posting in ___#___ prominent places throughout the [COMMUNITY NAME] where notices are generally posted.

3.4.2. The public will be informed through the local media of the declaration of the existence and end of a Stage 1 Drought Watch.

4. DROUGHT STAGE 2 - DECLARATION OF A DROUGHT WARNING.

4.1. Whenever the [COMMUNITY/PWS NAME] finds that conditions exist as described in the plan under 4.2 Triggers, it shall be empowered to declare by resolution that a Drought Stage 2 Drought Warning exists and may implement the steps outlined under this section.

4.2. TRIGGERS.

4.2.1. Any of the following conditions can trigger this stage:

4.2.1.1. Groundwater Levels have fallen _____feet below the normal seasonal level.

4.2.1.2. Demand for one day is in excess of _____ gallons per day.

4.2.1.3. System pressure falls below _____ pounds per square inch.

4.2.1.4. Water Treatment Plant operations are at ___% capacity for more than 3 consecutive days.

4.2.1.5. The U.S. Drought Monitor has identified a D2: Moderate Drought Conditions for the region for more than 14 consecutive days.

4.3. MANAGEMENT ACTIONS.

4.3.1. The public will be made aware of the Drought Stage and must pursue mandatory conservation activities such as:

4.3.1.1. An odd/even lawn watering system will be imposed on residents. Residents with odd-numbered addresses may only water on odd calendar days; residents with even-numbered addresses may only water on even days.

4.3.1.2. Waste of water will be prohibited.

4.3.1.3. Refilling swimming pools will be limited to one day a week after sunset.

4.4. NOTIFICATION STRATEGIES

4.4.1. The resolution shall be effective upon posting in ___#___ prominent places throughout the [COMMUNITY NAME] where notices are generally posted.

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4.4.2. The public will be informed through the local media of the declaration of the existence and end of a Stage 2 Drought Warning.

5. DROUGHT STAGE 3 - DECLARATION OF A DROUGHT EMERGENCY

5.1. Whenever the [COMMUNITY/PWS NAME] finds that conditions exist as described in the plan under 5.2 Triggers, it shall be empowered to declare by resolution that a Drought Stage 3 Drought Emergency exists and may implement the steps outlined under this section.

5.2. TRIGGERS.

5.2.1. Any of the following conditions can trigger this stage:

5.2.1.1. Groundwater Levels have fallen _____ feet below the normal seasonal level.

5.2.1.2. Demand for one day is in excess of _____ gallons per day.

5.2.1.3. System pressure falls below _____ pounds per square inch.

5.2.1.4. Water Treatment Plant operations are at ___% capacity for more than 3 consecutive days.

5.2.1.5. The U.S. Drought Monitor has identified a D3: Severe Drought Conditions or D4: Exceptional Drought Conditions for the region for more than 14 consecutive days.

5.3. MANAGEMENT ACTIONS.

5.3.1. The public will be made aware of the Drought Stage and informed of mandatory conservation activities:

5.3.1.1. Waste of water will be prohibited.

5.3.1.2. All outdoor water use will be banned, with the exception of businesses that require outdoor water use to operate.

5.3.1.3. Restrictions include all lawn watering, car washing, refilling swimming pools, or other landscape watering on residential, commercial, or community-owned properties.

5.4. NOTIFICATION STRATEGIES

5.4.1. The resolution shall be effective upon posting in ___#___ prominent places throughout the [COMMUNITY NAME] where notices are generally posted.

5.4.2. The public will be informed through the local media of the declaration of the existence and end of a Stage 3 Drought Emergency.

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6. ENFORCEMENT

6.1. Persons or properties not adhering to the identified management actions for the drought stage may be subject to a fine or penalty.

6.1.1. [Fine or penalty Language].

7. DURATION AND TERMINATION

7.1. Drought restrictions will remain in effect until the [village board/utility superintendent] determines that conditions have improved sufficiently.

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Simple Drought Ordinance

1. PURPOSE

1.1. The purpose of this ordinance is to conserve water during periods of drought and to protect public health, safety, and welfare by establishing restrictions on water use.

2. DEFINITIONS

Drought Stage: A classification based on water supply levels or drought conditions that trigger specific conservation measures. Drought stages will be determined by the [village board/utility superintendent].

Drought Stage 1 – Drought Watch (Voluntary Restrictions)

Drought Stage 2 – Drought Warning (Mandatory Restrictions)

3. DROUGHT STAGES, TRIGGERS AND ACTIONS

3.1. Drought Stage 1 – Drought Watch: This can be triggered by groundwater levels dropping to ____ feet, demand exceeding ____ gallons per day, or the U.S. Drought Monitor identified a D1: Mild Drought Conditions or D2: Moderate Drought Conditions.

3.1.1. Voluntary water conservation is encouraged.

3.2. Drought Stage 2 – Drought Warning: This can be triggered by groundwater levels dropping to ____ feet, demand exceeding ____ gallons per day, or the U.S. Drought Monitor identified a D3: Severe Drought Conditions or D4: Exceptional Drought Conditions.

3.2.1. Mandatory water conservation. Conservation measures will be determined by [village board/utility superintendent]. Measures may include but are not limited to even/odd outdoor watering schedule, prohibiting filling of swimming pools, prohibiting car washing, or prohibiting outdoor watering.

4. ENFORCEMENT

4.1. Persons or properties not adhering to the identified management actions for the drought stage may be subject to a fine or penalty

4.1.1. [Fine or penalty Language].

5. DURATION AND TERMINATION

5.1. Drought restrictions will remain in effect until the [village board/utility superintendent] determines that conditions have improved sufficiently.

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Public Outreach and Education Toolkit

This appendix contains a public outreach and education kit for communities to utilize for educational outreach and for notifying a community about drought stage restrictions or recommendations.

The following templates are included in this appendix:

1. Social Media Prompts
2. Press Releases
3. Website Posts
4. Outreach Flyers
5. Educational Flyers

For each templates section, there are three scenarios that can be easily edited to fit each community's needs:

Scenario Drought Stage #1: Voluntary water restrictions.

Scenario Drought Stage #2: Odd/Even calendar day outdoor watering restrictions.

Scenario Drought Stage #3: No outdoor watering.

DRAFT

Table of Contents

Social Media Prompts 3
Scenario Drought Stage #1: 3
Scenario Drought Stage #2: 4
Scenario Drought Stage #3: 5
Press Releases 6
Scenario Drought Stage #1: 6
Scenario Drought Stage #2: 7
Scenario Drought Stage #3: 8
Website Posts 9
Scenario Drought Stage #1: 9
Scenario Drought Stage #2: 10
Scenario Drought Stage #3: 11
Outreach Flyers 12
Scenario Drought Stage #1: 12
Scenario Drought Stage #2: 13
Scenario Drought Stage #3: 14
Educational Flyers 15
Let's Understand Drought 15
Drought Impacts 16
5 Easy Ways to Conserve Water During Drought 17

DRAFT

Social Media Prompts

Scenario Drought Stage #1:

ATTENTION all residents! As part of [COMMUNITY NAME] effort to conserve water in response to current drought conditions, the [COMMUNITY NAME] is requesting that residents limit outdoor watering to conserve water voluntarily.

Recommended steps include:

- Reduce outdoor irrigation and limit watering.
- Minimize overall water use.
    - Take shorter showers, turn off the faucet while brushing teeth, and wash only full loads of laundry and dishes.
- Do not use water to rinse off your driveway, sidewalks, patios, or other pavement surfaces.

To help in this conservation effort, please follow the QR code and the steps outlined or contact the [COMMUNITY DEPARTMENT] for assistance.

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Scenario Drought Stage #2:

ATTENTION all residents! As part of [COMMUNITY NAME] effort to conserve water in response to current drought conditions, the [COMMUNITY NAME] is implementing water restrictions that require residents to conserve water on an odd/even basis. To determine if your house is an odd or even number, look at the *last* number in your address. For example, if your address is 231, you would water on the *odd* schedule.

During this time of drought conditions, residents must adhere to the following drought ordinance guidelines:

1. Odd numbered addresses may water on odd calendar days.
2. Even numbered addresses may water on even calendar days.

For further information regarding this conservation effort, please scan the QR code and follow the steps outlined or contact the [COMMUNITY DEPARTMENT] for assistance.

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Scenario Drought Stage #3:

ATTENTION all residents! As part of [COMMUNITY NAME] effort to conserve water in response to current drought conditions, the [COMMUNITY NAME] is implementing Stage 3 water restrictions that require residents to conserve water.

During this time of drought conditions, residents must adhere to the following drought ordinance guideline:

- No outdoor watering.

For further information regarding this conservation effort, please scan the QR code and follow the steps outlined or contact the [COMMUNITY DEPARTMENT] for assistance.

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PRESS RELEASES

Scenario Drought Stage #1:

[INSERT LOGO HERE]

For Immediate Release

REQUEST FOR WATER-USE LIMITATIONS
City/Village to Implement Water Conservation Initiatives Starting (Insert Day)

City name, State—Date— As part of [COMMUNITY NAME] effort to conserve water in response to current drought conditions, the [COMMUNITY NAME] is requesting that residents voluntarily conserve water by limiting outdoor watering.

In accordance with our municipal code, the [POSITION] has declared that the [COMMUNITY NAME] has entered Stage 1 of drought response. The reason for this is [ENTER INFORMATION ON THE TRIGGERS THAT LED TO THE DECLARATION]. Conservation efforts are critical to ensure water availability for essential uses.

Resident Actions:

- Minimize overall water use.
- Specifically, limit your outdoor water usage.
- Consider limiting outdoor watering methods to hand-held hoses or watering cans.
- Consider only watering after 5:00PM or before 9:00AM to minimize evaporation.
- Consider taking shorter showers, turning off the faucet while brushing teeth, and washing only full loads of dishes and clothes.

The goal is that citizens will adhere to the weekly watering recommendations before we reach Drought Stage 2 and must implement mandatory watering restrictions. We will continually update residents as these conditions are monitored. Residents can visit [WEBSITE] for more information on drought conditions and recommended actions. We appreciate your cooperation.

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Scenario Drought Stage #2:

[INSERT LOGO HERE]

For Immediate Release

NOTICE OF MANDATORY WATER RESTRICTIONS
City/Village to Implement Water Restrictions for Drought Relief

City, State—Date— [COMMUNITY NAME] is notifying residents of the implementation of water restrictions in response to current drought conditions.

In accordance with our municipal code, the [POSITION] has declared that the [COMMUNITY NAME] has entered Stage 2 of drought response. The reason for this is [ENTER INFORMATION ON THE TRIGGERS THAT LED TO THE DECLARATION].

Conservation efforts are critical to ensure water availability for essential uses. As part of our effort to conserve water in response to current drought conditions, we are implementing water restrictions that require residents to conserve water on an odd/even basis. To determine if your house is an odd or even number, look at the *last* number in your address. For example, if your address is 231, you would water on the *odd* schedule.

During this time, residents must adhere to the following drought ordinance guidelines:

1. Odd numbered addresses may only outdoor water on odd calendar days.

2. Even numbered addresses may only outdoor water on even calendar days.

Outdoor watering is one of the biggest sources of water use, and small changes to usual watering practices have the potential for a big impact. The goal is that citizens will adhere to these watering restrictions before we reach Drought Stage 3. Mandatory compliance with these restrictions is effective on [ENTER DATE].

We will continually update residents as these conditions are monitored. Residents can visit [WEBSITE] for more information on drought conditions and recommended actions. We appreciate your cooperation.

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Scenario Drought Stage #3:

[INSERT LOGO HERE]

For Immediate Release

NOTICE OF MANDATORY WATER RESTRICTIONS
Residents Asked to Stop Outdoor Watering

City, State—Date—[COMMUNITY NAME] is notifying residents of the implementation of water restrictions in response to current drought conditions.

In accordance with our municipal code, the [POSITION] has declared that the [COMMUNITY NAME] has entered Stage 3 of drought response. The reason for this is [ENTER INFORMATION ON THE TRIGGERS THAT LED TO THE DECLARATION].

During this time of drought conditions, all residential, commercial, and municipal properties must adhere to the following drought ordinance guideline:

1. No outdoor watering. This includes watering lawns, gardens, and other outdoor landscapes.

The goal of these restrictions is to help reduce drought locally and help the city conserve water.

Mandatory compliance with these restrictions is effective on [ENTER DATE].

Additionally, please consider implementing the following recommended methods to conserve water:

- Take shorter showers, turn off the faucet while brushing teeth, and wash only full loads of dishes and clothes.

We will continually update residents as these conditions are monitored. We appreciate your cooperation.

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Website Posts

Scenario Drought Stage #1:

[COMMUNITY NAME] IS ASKING RESIDENTS TO SAVE WATER

Drought Stage 1

- Voluntary water restrictions are currently encouraged.
- Stage 1 is in effect because [ENTER INFORMATION FOR DROUGHT LEVEL].

Recommended Restrictions under Stage 1:

- Reduce outdoor irrigation and limit watering.
    - The typical home will use as much as 50% of its total water use on landscaping, so cutting back on outdoor irrigation can have a massive impact!
- Minimize overall water use.
    - Take shorter showers, turn off the faucet while brushing teeth, and wash only full loads of laundry and dishes.
- Do not use water to rinse off your driveway, sidewalks, patios, or other pavement surfaces.

We Will Keep You Informed

- As these drought conditions are monitored, we will continually update residents.
- We appreciate your consideration of these recommended restrictions to conserve our water!

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Scenario Drought Stage #2:

[COMMUNITY NAME] IS ASKING RESIDENTS TO SAVE WATER

Drought Stage 2

- Mandatory water restrictions are currently in effect.
- Stage 2 is in effect because [ENTER INFORMATION FOR DROUGHT LEVEL].
- Due to these dry conditions, the [COMMUNITY NAME] is asking all residents to help conserve and protect our water supply by cutting back on outdoor watering by implementing an odd/even watering schedule.

New Watering Schedule (Effective Immediately):

(To determine if your house is an odd or even number, look at the *last* number in your address. For example, if your address is 231, you would water on the *odd* schedule.)

- Even-numbered addresses:
  - May only run sprinkler systems on even calendar days.
- Odd-numbered addresses:
  - May only run sprinkler systems on odd calendar days.
- Water only between the hours of 5:00 PM – 9:00 AM

We Will Keep You Informed

- As these drought conditions are monitored, we will continually update residents.
- We appreciate your cooperation with these restrictions to conserve our water!

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Scenario Drought Stage #3:

[COMMUNITY NAME] IS ASKING RESIDENTS TO SAVE WATER

Drought Stage 3

- Mandatory water restrictions are currently in effect.
- Stage 3 is in effect because [ENTER INFORMATION FOR DROUGHT LEVEL].
- Due to these dry conditions, the [COMMUNITY NAME] is asking all residents to help conserve and protect our water supply by eliminating outdoor watering until drought conditions lessen. These restrictions aim to conserve water for essential uses such as drinking water, firefighting services, and more.

Watering Restrictions (Effective Immediately):

- NO OUTDOOR WATERING
    - This includes ALL outdoor watering, including lawn, garden, and landscape areas. Do not use water to rinse off your driveway or other pavement surfaces.
    - Do not fill up your pools, ponds, or other bodies of water.

We Will Keep You Informed

- As these drought conditions are monitored, we will continually update residents. Restrictions will be lifted as soon as possible.
- We appreciate your cooperation with these restrictions to conserve our water!

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{INSERT} is Asking Residents to Conserve Water

In response to the current drought conditions, the {INSERT COMMUNITY NAME} is requesting that residents conserve water by limiting outdoor watering for the next {X} days.

Recommended Restrictions for Water Conservation Include:

1) Reduce outdoor irrigation and limit watering.

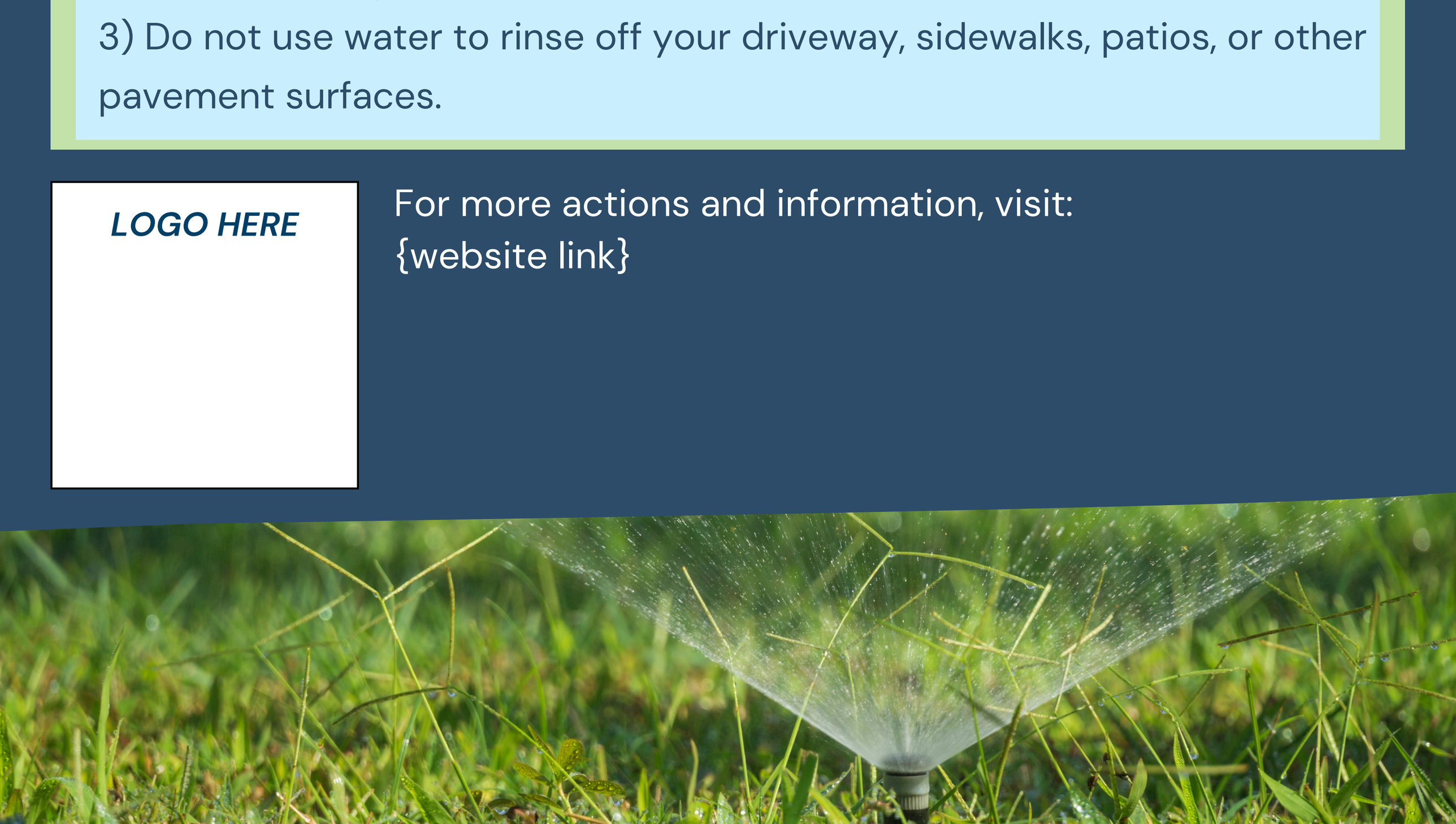
2) Minimize overall water use.

- *Take shorter showers, turn off the faucet while brushing teeth, and wash only full loads of laundry and dishes.*

3) Do not use water to rinse off your driveway, sidewalks, patios, or other pavement surfaces.

LOGO HERE

For more actions and information, visit:
{website link}

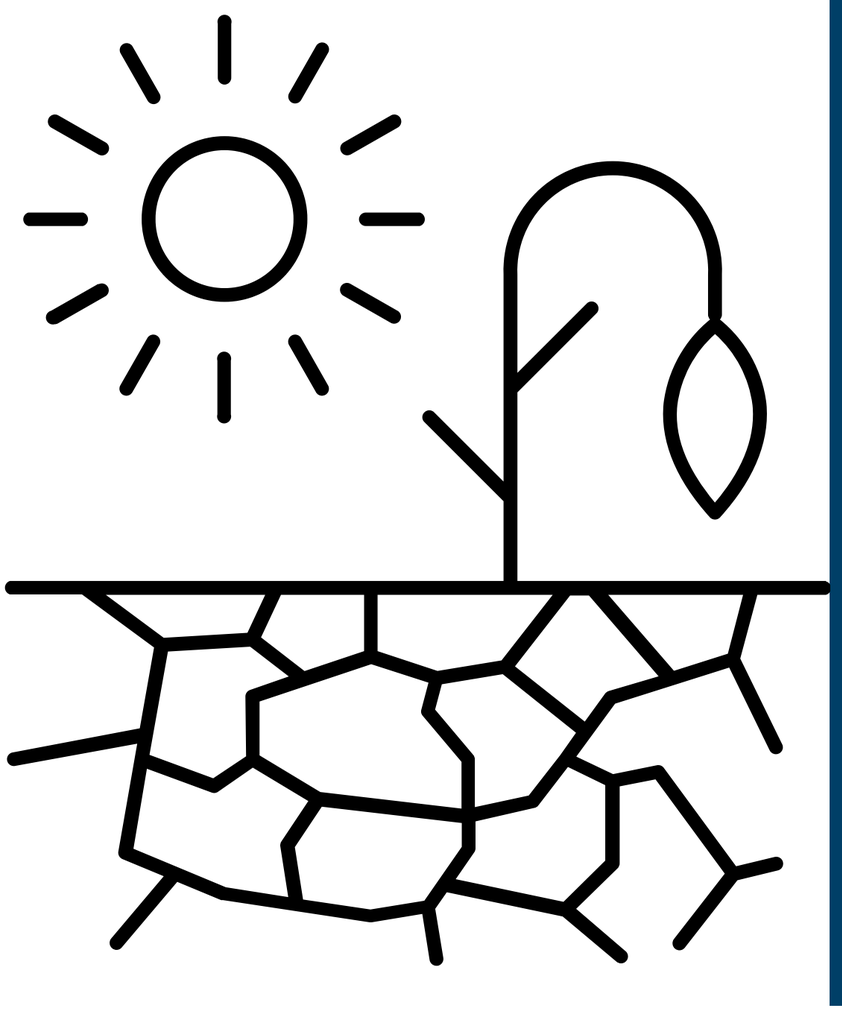


WATER CONSERVATION NOTICE

In response to the current drought conditions, {INSERT COMMUNITY NAME} is restricting non-essential watering usage.

To conserve water, the following outdoor watering restrictions will be imposed for {INSERT DURATION} per the Municipal Code {INSERT CODE NUMBER}:

WATERING DAYS



- Odd numbered addresses may only water on **odd calendar days.**

- Even numbered addresses may only water on **even calendar days.**

Mandatory Restrictions are Effective on {ENTER DATE}

LOGO HERE

For more information, visit our website:
{INSERT WEBSITE LINK}

We Appreciate Your Assistance!

WATER CONSERVATION REQUIRED

In response to the current drought conditions, the {INSERT COMMUNITY NAME} is requiring residents to conserve water by ceasing outdoor watering for {INSERT DURATION}.

Mandatory Restrictions are Effective on {ENTER DATE}

- Enforcement will be done in accordance with the Drought Ordinance guidelines.
- **Restrictions include ALL outdoor watering,** such as watering your lawn, garden, and landscape areas.
- Do not use water to rinse off your driveway or other pavement surfaces, and do not fill up pools, ponds, or other bodies of water.

LOGO HERE

For more information, visit our website:
{INSERT WEBSITE LINK}

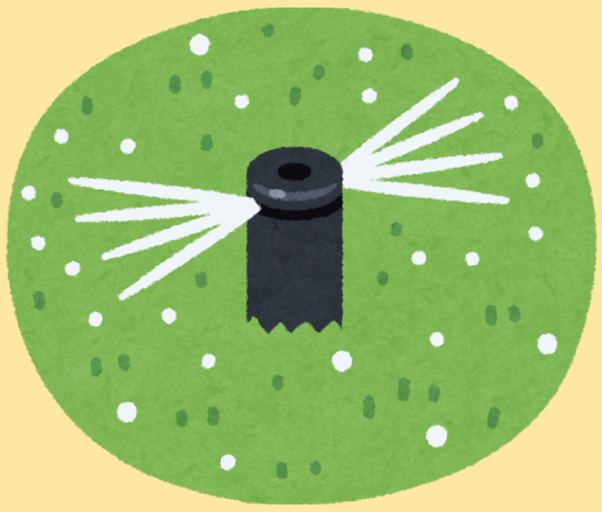
We Appreciate Your Assistance!



LET'S UNDERSTAND drought

What Is It?

Drought is a shortage of water over an extended period of time. Droughts are a normal part of a climate cycle, and they occur in all climate zones. They can vary in duration, and they bring abnormally dry weather conditions.



Why Does It Occur?

Droughts happen when an area gets much less rain or snow than usual over a long period of time. This can be caused by changes in weather patterns, such as shifts in wind or ocean currents, which can reduce the amount of moisture brought into the region. Human activities—like overusing water for farming or cutting down forests—can make droughts worse by drying out the land.

What Are The Impacts?

The following factors may be affected:

- Agriculture
- Water Quality & Quantity
- Wildfire Management & Flammability
- Public Health
- Economic Resources
- The Ecosystem

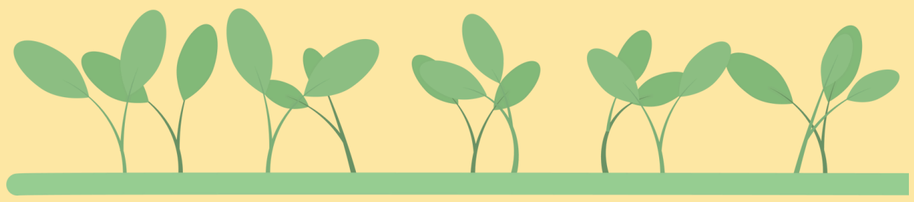
For more information, visit:

drought.gov

How Can I Help?

Conserve Water!

- Take shorter showers
- Limit outdoor watering
- Wash only full loads of laundry and dishes
- Check for and fix any leaking pipes or faucets
- Use less water at the sink



DROUGHT IMPACTS

1 Water Quality & Quantity

Water quantity is reduced during drought due to decreased rainfall and increased evaporation. This leads to lower river and stream flows, and reduces groundwater levels. This can also lead to more pollutants in the water.



2 Wildfire & Flammability

During drought conditions, vegetation becomes dried out. This makes the area more flammable and prone to ignition. Droughts also exacerbate high temperatures and winds, which further aides in the spreading of wildfires.

3 It Costs Money

According to the National Centers for Environmental Information (NCEI), the U.S. has sustained 265 weather and climate disasters since 1980 where overall damages/costs reached or exceeded $1 billion (including CPI adjustment to 2020). **The total cost of these 265 events exceeds $1.775 trillion.**



4 Mosquitoes & Other Bugs

Many bugs will migrate to areas that are not experiencing drought conditions, which can cause outbreaks in areas where water is still available. Additionally, according to the University of Cincinnati, mosquitoes will bite people and animals more frequently during droughts.

5 Increased Health Risk

According to the Centers for Disease Control (CDC), increases in infectious disease can be a direct consequence of drought. Bacteria and viruses can pollute both groundwater and surface water when rainfall decreases. Air quality can also decrease with the dry conditions and added dust.



6 Agricultural Shortages

Farmers may lose money if a drought destroys their crops. More money may need to be spent on feed and water for plants and animals, and people might have to pay more for food.



5 Easy Ways

to Conserve Water During Drought



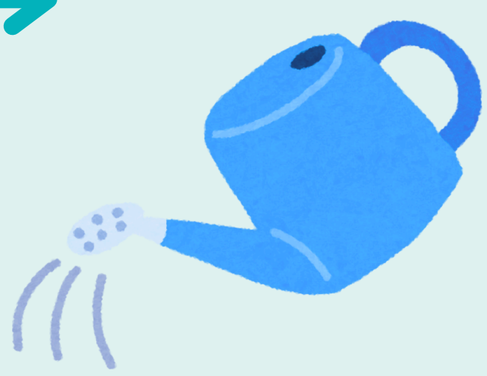
1 SAVE AT THE SINK

Save water at the sink. Turn it off while brushing teeth, shaving, and soaping your hands. Avoid filling up your entire sink when it's not necessary.

2 LAUNDRY, DISHES & SHOWERS

Wash only full loads of laundry and dishes. Take shorter showers. Cutting one minute from your shower can save around 75 gallons per month.



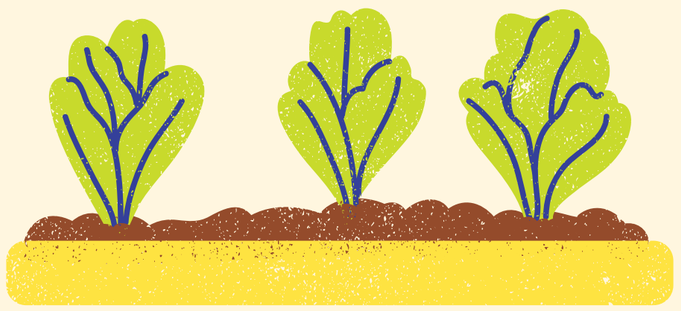


3 LIMIT OUTDOOR WATERING

Limit your outdoor water-use by watering your lawn less often, refraining from rinsing off pavement surfaces, and opting not to fill up pools, ponds, or other bodies of water.

4 GARDENING - WHEN TO WATER?

Water the garden, your plants, and the lawn only early in the morning or late in the evening to avoid evaporation.





5 IS IT LEAKING?

Check all faucets and pipes for leaks. If they're leaking, fix them ASAP! This can save about 20 gallons of water per day.

LOWER PLATTE NORTH
Natural Resources District

DROUGHT RISK & RESILIENCE REPORT











2025

PLAN PREPARED BY
JEO CONSULTING GROUP

Table of Contents

Report Purpose 2
Drought Description 2
Drought Planning in the District 5
Methodology 8
Drought Resilience Matrix 10
District-Wide Trends 12
District-Wide Recommendations 13
Summary of Water System Best Management Practices/Mitigation Actions 14
Water System Specific Reports 18
- Abie Water System 19
- Bellwood Water System 22
- Cedar Bluffs Water System 25
- David City Water System 28
- Fremont Water System 32
- Ithaca Water System 36
- Lindsay Water System 39
- Malmo Water System 42
- Mead Water System 45
- Memphis Water System 48
- Morse Bluff Water System 51
- Newman Grove Water System 54
- North Bend Water System 57
- Platte Center Water System 61
- Prague Water System 64
- Rogers Water System 68
- Schuyler Water System 71
- Wahoo Water System 75
- Weston Water System 78
- Yutan Water System 81

Appendix A: Sample Drought Ordinances

Appendix B: Public Outreach and Education Toolkit

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Report Purpose

Drought is one of the most impactful hazards in the State of Nebraska, and it has widespread impacts on agriculture, energy, ecosystems, and local economies. Planning for drought is essential because it can help reduce those impacts and allow the NRD and local communities to respond more effectively to severe drought events. This Drought Risk and Resilience Report aims to better understand drought risk to local community water systems. Creating a drought risk and resilience report helps the NRD and communities identify vulnerabilities, proactively plan for future drought events, protect critical resources, identify key capabilities, and determine steps to increase drought resilience.

Community water systems were specifically chosen for analysis because the Lower Platte North NRD felt like there could be a better understanding of water system drought risk. Drought planning had already been undertaken at a regional level by the Lower Platte River Drought Consortium and at an irrigator level by the NRD's Water Quantity Management Areas and Groundwater Management Plan. However, drought planning at the community level has not been done up to this point. Community water systems also offered a unique opportunity for the NRD to partner with local cities and villages on drought mitigation projects. This Drought Risk and Resilience Report helps to fill this gap by assessing vulnerabilities, outlining preparedness strategies, and recommending system-specific best management actions. Specific profiles were created for each community water system that summarizes drought resilience, infrastructure, existing plans and capabilities, key concerns, and drought recommendations. These profiles can be found at the end of this report.

Drought Description

Drought is generally defined as a natural hazard that results from a substantial period of below-normal precipitation. Although many inaccurately consider drought a rare and random event, it is a regular, recurring feature of climate. A drought often coexists with periods of extreme heat, which can cause significant social stress, economic losses, and environmental degradation. Drought is typically a slow-onset, creeping phenomenon that can affect a wide range of people, vegetation, livestock, and industries. However, "flash droughts" can sometimes occur quickly and last for shorter periods. Drought normally affects more people than other natural hazards, and its impacts are spread over a larger geographical area. Detection and early warning signs of drought conditions have improved recently but are still more challenging to identify than quick-onset natural hazards (e.g., floods, winter storms, tornadoes). According to the National Drought Mitigation Center (NDMC), droughts are classified into four major types.[1]

- **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, frequencies (norms), and winds vary.

[1] National Drought Mitigation Center. 2017. "Drought Basics". https://drought.unl.edu/.

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- **Agricultural Drought** occurs when deficient moisture hinders planting germination, leading to a 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 evapotranspiration levels resulting from prolonged high temperatures. Hydrological drought is often 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 is not limited to, water, forage, food grains, fish, and hydroelectric power.

Drought History

Drought is a regular occurrence in the district and across Nebraska. One of the best ways to regionally monitor drought is the U.S. Drought Monitor (USDM). The USDM identifies areas in drought and the extent of drought across the United States. Jointly produced by the National Drought Mitigation Center, NOAA, and USDA, the USDM uses physical data at multiple scales, drought impacts, and feedback from local experts to determine drought classifications and create the drought map. The table below shows the different USDM drought classifications.

U.S Drought Monitor Drought Classifications

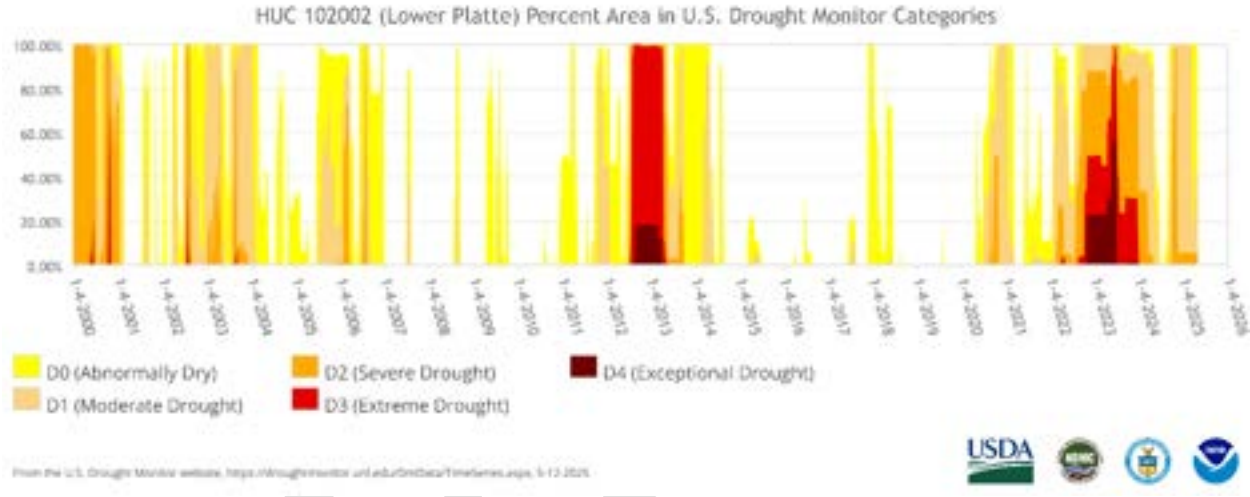
Category	Description	PDSI Ranges	Possible Impacts
None	Normal or wet conditions	-0.49 or above	
D0	Abnormally Dry	-0.5 to 0.79	Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered.
D1	Moderate Drought	-0.8 to -1.29	Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested.
D2	Severe Drought	-1.3 to -1.59	Crop or pasture losses likely, water shortages common; water restrictions imposed.
D3	Extreme Drought	-1.6 to -1.99	Major crop/pasture losses; widespread water shortages or restrictions.
D4	Exceptional Drought	-2.0 or less	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams and wells creating water emergencies.

Source: USDM, 2024[2]

[2] U.S. Drought Monitor. 2017. "Drought Classification." https://droughtmonitor.unl.edu/About/AbouttheData/DroughtClassification.aspx.

Historical data from the USDM goes from January 2000 to May 2025. The timeline below illustrates historical drought severity in the Lower Platte HUC 6 watershed, encompassing the Lower Platte North NRD and the Lower Platte South NRD. The 2012-2013 drought ranged from extreme drought (D3) to exceptional drought (D4). This drought prompted the Lower Platte North NRD to impose a 180-day moratorium on new irrigated acres within its boundaries.[3] More recently, the 2023-2024 drought ranged from moderate drought (D1) to exceptional drought (D4). This drought caused the Lower Platte River Consortium to ask that users conserve water as flows in the Platte River were below average.

Lower Platte Watershed Drought History (2000 – May 2025)



Source: U.S. Drought Monitor[4]

The table below shows drought severity as a percentage of weeks from January 2000 to May 2025. Overall, the watershed experienced 52% of weeks with at least some areas in drought. Nine percent of the weeks were in D3 (extreme drought), and three percent were in D4 (Exceptional Drought).

Lower Platte Watershed Historical Weeks in Drought

Drought Type	Total Weeks	Percentage
Not in Drought	634 out of 1,323	48%
D0 (Abnormally Dry)	135 out of 1,323	10%
D1 (Moderate Drought)	242 out of 1,323	18%
D2 (Severe Drought)	153 out of 1,323	12%
D3 (Extreme Drought)	116 out of 1,323	9%
D4 (Exceptional Drought)	43 out of 1,323	3%

Source: U.S. Drought Monitor[5]

[3] Drought Impact Reporter. May 2025. "Drought Impact Reporter." https://unldroughtcenter.maps.arcgis.com/apps/MapSeries/index.html?appid=de6fb79dcf704cb69b60b4fa268fce4d.
[4] U.S. Drought Monitor. 2000-May 2025. "Map Archive". https://droughtmonitor.unl.edu/Maps/MapArchive.aspx.
[5] U.S. Drought Monitor. 2000-May 2025. "Data Download." https://droughtmonitor.unl.edu/DmData/DataDownload.aspx.

Historical Drought Impacts on Community Water Systems

While a majority of the time was spent in drought, very few water systems reported drought-related impacts or the need to restrict water usage. Six out of the 20 water systems in the NRD reported impacts or needing to limit water usage. Nearly all of these occurred during the 2012-2013 drought. A summary of the impacts is listed below.

Bellwood – Limited lawn watering in 2012.

David City – They typically see water levels drop during drought events and have implemented water restrictions as needed.

Lindsay – Implemented voluntary restrictions in 2012.

Mead – Implemented water restrictions in 2012.

Platte Center – Implemented water restrictions in 2012.

Prague – They typically see lower water levels during drought events.

Drought Planning in the District

Groundwater Management Plan

Jon Mohr to provide a summary.

Lower Platte North NRD Water Development Areas

There are three major types of water development areas in the Lower Platte North NRD. Below is a brief overview of these areas and the rules for each one. A complete set of rules can be found in the NRD's Groundwater Management Area Rules and Regulations. A map of the NRD's groundwater development areas can be found on the page below.

- **Non-Hydrologically Connected Areas –** Up to 70 new acre-feet per year. These areas do not have interconnected groundwater and surface water.
- **Hydrologically Connected Areas –** Up to 200 new acre-feet per year. These areas have interconnected groundwater and surface water.
- **Restricted Development Area –** No new irrigated acres or water use allowed. Aquifers in these areas are thin or of limited size. Offsets are required, so if a landowner wishes to expand their water use at one location, then a similar amount of water use or acres must be retired in the same subarea.

Additionally, there are two Special Quantity Subareas in Butler/Saunders and Platte/Colfax counties. In these areas, groundwater can be highly volatile and heavily influenced by drought and groundwater pumping. No new or expanded irrigated acres are allowed in these areas,

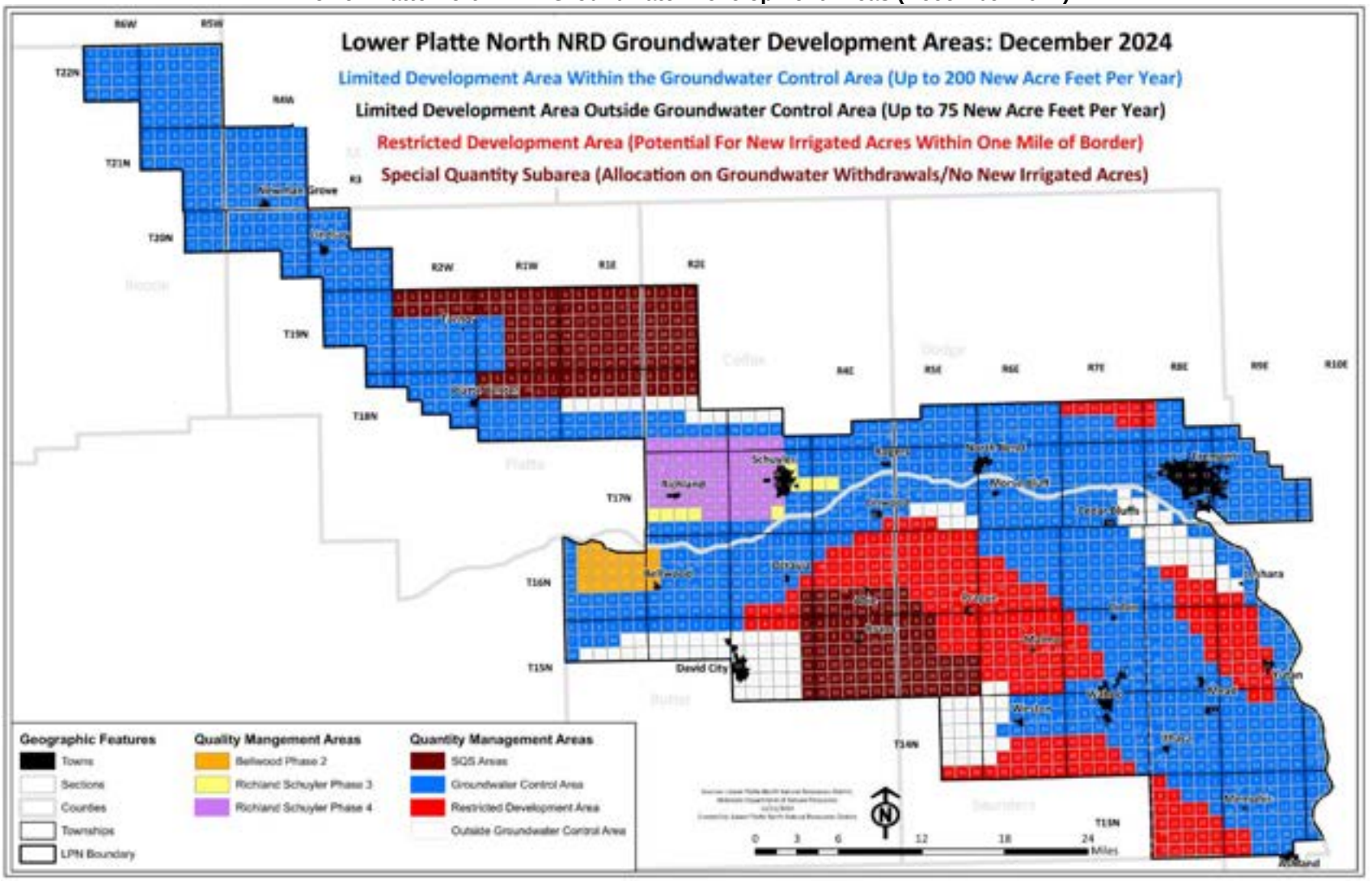
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along with other restrictions, including required flow meters and acre-inch allocation of irrigated areas.[6]

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[6] Lower Platte North NRD. 2025. “Water Development Areas.” https://lpnnrd.org/projects-and-programs/water-management/water-quantity/.

Lower Platte North NRD Groundwater Development Areas (December 2024)



Source: Lower Platte North NRD[7]

[7] Lower Platte North NRD. December 2024. "Lower Platte North NRD Groundwater Development Areas." https://lpnnrd.org/wp-content/uploads/2025/01/Groundwater-Quality-Quantity-Map-2024.pdf.

Lower Platte River Drought Consortium

The Lower Platte River Drought Consortium is a collaborative partnership formed in 2016 to address water supply challenges in Nebraska's Lower Platte River Basin. The Lower Platte North NRD is a key stakeholder in the Lower Platte River Consortium, which also includes the Lower Platte South NRD, Papio-Missouri River NRD, Omaha Metropolitan Utilities District, City of Lincoln Water System, and Nebraska Department of Natural Resources.

The primary aim of the consortium is to ensure the sustainability of public water supplies in the Lower Platte River Basin. This involves studying long-term water availability, enhancing streamflows, and improving aquifer storage to support public water systems. The consortium contracted HDR Engineering, Inc., to develop tools and alternatives, evaluations, and documentation of drought mitigation plans to enhance water supplies in the lower Platte River.

The Consortium worked together to develop a Drought Contingency Plan, approved in December 2019, with the overall goal of sustaining public water supplies in the basin. The plan lists potential drought mitigation measures and monitoring techniques for the Consortium to evaluate, adopt, and implement, which were reviewed and included here as appropriate. The Consortium also actively encourages water conservation among residents, especially during drought. Recommendations include reducing lawn watering and adopting water-saving technologies. As part of the Consortium, a Lower Platte Drought Monitor Dashboard was created to help educate residents and communities on current drought conditions.

Methodology

In order to gather the drought resilience and water system data summarized in the profiles and table below, the NRD collected information in two ways. First, all publicly available water system plans were gathered and reviewed. These included wellhead protection plans from the Nebraska Department of Natural Resources, water system engineering reports, and emergency response plans. Specific water system data was pulled from these documents to create an initial overview of each system. The NRD then met in person with representatives from each community water system to discuss the following items.

- Key Pieces of Infrastructure
- Historical Drought Impacts
- Drought Comfortability
- Drought Monitoring
- Water System Plans and Ordinances
- Anticipated Future Growth
- Needed Water System Projects
- Water Operator Coverage

Using the data collected during the water system meetings along with a review of planning documents, a Drought Resilience Matrix (section below) was created for each community. A matrix was utilized to review and analyze specific areas impacting drought resilience. This

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matrix allows the NRD and local communities to see areas where drought resilience is high and where improvements could be made.

This matrix split drought resilience into eight indicators: Water Quantity; Water Quality; Capabilities (Ordinances/Plans); Capabilities (Staff); Local Drought Monitoring; Regional Drought Monitoring; Emergency Supply; and Local Funding Ability. Each indicator received a resilience rating (High, Medium, or Low) for each community water system. Broad definitions for each indicator's high, medium, and low ratings can be found below the Drought Resilience Matrix. However, these ratings are generalized based on information obtained from each water system and are not calibrated for the system size or location. Actual vulnerability may be higher or lower due to many factors, such as hydrogeologic setting, well depth, surrounding wells, infrastructure deterioration, and future consumption changes.

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Drought Resilience Matrix

Community	Water Quantity	Water Quality	Capabilities (Ordinances/Plans)	Capabilities (Staff)	Local Drought Monitoring	Regional Drought Monitoring	Emergency Supply	Local Funding Ability
Abie	High	High	Low	Medium	High	Low	Medium	Low
Bellwood	High	Medium	Medium	Low	High	Low	Medium	Medium
Cedar Bluffs	Low	Low	Low	Medium	Medium	Low	Low	High
David City	Medium	Medium	Medium	High	High	Low	Medium	Medium
Fremont	High	Medium	Low	High	Medium	Low	Medium	Medium
Ithaca	High	Medium	Low	Medium	Medium	Low	Medium	Medium
Lindsay	High	Medium	High	High	High	Medium	Low	Medium
Malmo	High	High	Low	Medium	Medium	Low	Low	Medium
Mead	High	Medium	High	High	High	Low	Medium	Medium
Memphis	High	High	Low	Medium	Medium	Low	Low	Medium
Morse Bluff	High	High	High	Medium	Medium	Low	Medium	Medium
Newman Grove	High	High	High	Medium	Low	Low	Medium	Medium
North Bend	Medium	Medium	Medium	High	Medium	Low	Medium	Medium
Platte Center	High	High	Low	Medium	Medium	Low	Medium	Medium
Prague	Medium	Medium	Medium	High	Medium	Low	Medium	Medium
Rogers	High	High	Low	Low	Low	Low	Low	Medium
Schuyler	High	Medium	Medium	High	High	Medium	Medium	High
Wahoo	High	High	Low	High	High	Low	Medium	Medium
Weston	High	High	Low	Medium	Medium	Low	Medium	Medium
Yutan	Medium	High	Low	High	High	Low	Medium	Medium

	Water Quantity	Water Quality	**Capabilities** (Ordinances/ Plans)	**Capabilities** (Staff)	Local Drought Monitoring	Regional Drought Monitoring	Emergency Supply	Local Funding Ability
Low =	Is not able to meet the current demand. Is not able to meet future short-term growth demand or demand during drought. New wells or other sources of water will be needed soon.	Has water quality issues above required federal or state guidelines that will eventually require the community to drill a new well or construct a water treatment plant.	Does not have a drought ordinance or minimal defined parameters. Does not have many other water system plans (Engineering Report, Water Study, etc.).	Has minimal staff that are close to retirement or minimal staff that lack institutional knowledge about the water system.	Performs minimal water levels and consumption monitoring. Has minimal historical records.	Does not monitor any regional drought-related tools.	Does not have a MOU or agreement in place for emergency water. Is not connected to another water system. Would have difficulty providing adequate water if one well went down.	Would not be able to fund any large water system project (new well, water treatment plant, water storage, etc.). May have many other large projects going on.
Medium =	Can meet current demand and likely some future growth demand. Drought has caused issues in the past.	Some wells have water quality issues above required federal or state guidelines. However, it is currently being treated or will likely not require the community to drill a new well or construct a water treatment plant.	Has a basic drought ordinance but is minimal. Has some water system plans (Engineering Report, Water Study, etc.) and may be outdated.	Does not have any water operators on staff. Hires an outside company to handle the water system. Or Has minimal staff but agreements with other communities for emergency backup staff.	Performs water levels and consumption monitoring fairly regularly (>1 a month). Has historical records that may or may not go back several years.	Is aware of other drought-related tools and may check them every so often.	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.
High =	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.	Has no water quality issues above required federal or state guidelines.	Has a well-defined, in-depth drought ordinance. Has some water system plans (Engineering Report, Water Study, etc.) and are recent.	Has adequate staff and institutional knowledge to understand and operate the water system.	Regularly checks water levels and consumption (>1 a week). Has historical records that go back many years.	Regularly monitors regional drought-related tools.	Is connected to another water system.	Does not have many other large projects in the community. Would be able to easily fund a medium water system projects (new well, water storage, etc.).

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District-Wide Trends

Several district-wide trends appeared after all community water system meetings were held and the Drought Resilience Matrix was completed. Two positive trends and two of the more negative trends are discussed below.

Water Quantity

Overall, most water systems (15/20) received a high rating for Water Quantity. These water systems felt they could easily meet current and future demand, even during drought, with historical drought events causing no or only minor issues in the past. Only one water system (Cedar Bluffs) received a low rating, and they are actively looking to add new wells to their system.

Water Quality

Water Quality was also a positive indicator district-wide. Half the water systems received a high rating, with no water quality issues above required federal or state guidelines. Those that received a medium rating (9/20) have water quality issues, but they are currently being treated and would not require the community to drill a new well or construct a water treatment plant. Cedar Bluffs was the only water system with a low rating, and they are actively looking to add new wells or build a water treatment plant.

Capabilities

One of the more negative indicators district-wide was Capabilities (Ordinances/Plans). A majority of water systems (11/20) received a low rating, with only four receiving a high rating. Those systems that received a low rating either do not have a drought ordinance or have one with no defined parameters and do not have many other water system plans. This lack of detailed drought ordinances is likely due to the high drought comfortability district-wide and lack of historical impacts. However, as drought events continue to increase in length and severity, a clearly defined drought ordinance can help response and reduce public outcry.

Regional Drought Monitoring

Regional Drought Monitoring was by far the lowest indicator district-wide. No water systems received a high rating, two received a medium rating, and 18 out of 20 received a low rating. The systems that received a low rating do not monitor any regional drought-related tools (i.e., U.S. Drought Monitor, Lower Platte River Drought Consortium Dashboard, Palmer Drought Severity Index, etc.), with many not knowing what they were. This lack of regional drought monitoring is likely due to the high drought comfortability and lack of historical impacts. However, these tools can be very useful in understanding how drought impacts others nearby or downstream. While a community might not immediately feel the effects of drought, local irrigators may be experiencing those impacts.

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District-Wide Recommendations

The recommendations listed below are drought-related mitigation actions that the Lower Platte North NRD can undertake. These actions will help to increase drought resilience across the district and help community water systems better prepare for drought. The following section will discuss community-specific drought mitigation actions and best management practices.

Regional Drought Tools Education

As discussed in the section above, additional regional drought monitoring performed by the community water systems is needed across the NRD. It is recommended that the Lower Platte North NRD work with local communities and water operators to educate them on regional drought monitoring tools. These tools could include the U.S. Drought Monitor, Lower Platte Drought Monitor Dashboard, stream gauges, Palmer Drought Severity Index, and others. This educational outreach aims to increase the number of water systems that utilize and monitor regional drought tools.

Local Drought Ordinance Updates

Improved local drought ordinances were identified as a need during the drought resilience process. While the Lower Platte North NRD cannot directly control local codes and ordinances, they can assist. It is recommended that the NRD work with local community leaders and water system operators to promote updating local drought ordinances. The NRD may also be able to assist in writing local drought ordinance triggers.

As part of this Drought Risk and Resilience Report, sample drought ordinances (Appendix A) have been created for communities to utilize when updating or creating their drought ordinance. Additionally, the Public Outreach and Education Toolkit (Appendix B) contains sample press releases, social media posts, and flyers related to the sample drought ordinances that communities can easily edit to fit their local needs. The toolkit also contains flyers that communities can use to educate residents about drought.

Well Water Level Transducers

Well transducers can be very beneficial for drought management. The real-time groundwater level monitoring allows for early identification of declining water tables, helping to detect drought conditions earlier and track water levels over time. The NRD is currently working with interested community water systems to install the transducers in community wells at minimal cost to the community.

Monitoring Wells

One project identified by the NRD and Groundwater Management Plan was to continue the expansion of the dedicated monitoring well network, for both quantity and quality purposes, at critical locations in the District. Within the Groundwater Management Plan, potential areas for new monitoring wells are identified. The NRD can also work with water systems without

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monitoring wells and locate new monitoring wells nearby. These wells will help communities better understand groundwater levels and potential drought risks.

Emergency Water Supply Agreements and MOUs

During the community water system meetings, it became clear that most systems did not have a specific plan of action for obtaining water during an emergency where the system was compromised. This could be from a prolonged loss of power, a terrorist attack on infrastructure, or water supply contamination. Most water systems said they would rely on their extra wells or had contact information for outside suppliers. None had agreements or MOUs in place with these outside suppliers. It is recommended that the Lower Platte North NRD work with the communities and county emergency managers to help create agreements or MOUs with outside water suppliers. These water suppliers could be other communities, bulk water suppliers, or bottled water retailers.

Implement Actions Identified in the Lower Platte River Drought Contingency Plan

As a member of the Lower Platte River Consortium, the Lower Platte North NRD will aid in implementing identified drought mitigation actions outlined in the Lower Platte River Drought Contingency Plan 2024 Update. The NRD will also assist in developing future drought mitigation actions during subsequent plan updates.

Additional Actions to be identified by Jon Mohr.

Summary of Water System Best Management Practices/Mitigation Actions

The following table summarizes the best management practices and mitigation actions identified for each community water system based on the Drought Resilience Matrix and information provided by the community.

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Actions	Abie	Bellwood	Cedar Bluffs	David City	Fremont	Ithaca	Lindsay	Malmo	Mead	Memphis	Morse Bluff	Newman Grove	North Bend	Platte Center	Prague	Rogers	Schuyler	Wahoo	Weston	Yutan
Add a New Filter to the Water Treatment Plant and Expand the Plant													X							
Backup Generator for Well 94-1																X				
Construct New Horizontal Wells and Storage					X															
Create Agreements or MOUs for Emergency Water Supplies							X	X	X	X									X	
Create a Social Media Program for Drought Conservation																	X			
Identify Alternative Emergency Water Sources								X		X	X					X		X	X	
Create Agreements with Other Communities for Backup Water Operator Coverage																X				
Create and Pass a Drought Ordinance			X		X	X		X		X				X				X	X	
Create and Pass a More Robust Drought Ordinance	X			X									X							X
Create a Notification Plan in Case of a Water Emergency		X																		
Drill a 3rd Well to Meet Future Demand																				X

DRAFT

Actions	Abie	Bellwood	Cedar Bluffs	David City	Fremont	Ithaca	Lindsay	Malmo	Mead	Memphis	Morse Bluff	Newman Grove	North Bend	Platte Center	Prague	Rogers	Schuyler	Wahoo	Weston	Yutan
Drill a New Well to Address Capacity and Water Quality Issues			X																	
Drill a New Well to Replace Well 2													X							
Drill Well for Planned AGP Plant				X																
Hire an Additional Water Operator																	X			
Identify Potential New Water Source	X																			
If Water Quality Issues Do Not Improve, Construct a Water Treatment Plant			X												X		X			
Implement Tiered Water Rates	X									X										
Increase Drought Monitoring at a Local and Regional Level	X		X		X					X	X	X	X	X	X	X			X	
Increase Drought Monitoring at a Regional Level		X		X		X		X	X									X		X
Install a Backup Generator for the Water Tower																				X
Install Transducers on Wells	X		X		X	X		X		X	X		X	X	X	X			X	
Install Water Meters on All Homes	X									X										

Actions	Abie	Bellwood	Cedar Bluffs	David City	Fremont	Ithaca	Lindsay	Malmo	Mead	Memphis	Morse Bluff	Newman Grove	North Bend	Platte Center	Prague	Rogers	Schuyler	Wahoo	Weston	Yutan
Look Into Drilling a New Well or Hooking Up to Rural Water															X					
Look Into Using Well 83-1 to Supply the Nonportable Lindsay Corporation Plant Uses.							X													
New Preliminary Engineering Report			X																	
Store Historical Consumption and Water Level Information Electronically						X				X		X			X	X				
Update and Pass a More Robust Drought Ordinance		X														X				
Update the Wellhead Protection Plan														X						
Work with the LPN NRD on Possibly Adding Groundwater Monitoring Wells Near the Community				X								X	X			X		X	X	X
Install Backup Generator on Well 2014-1											X									

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Water System-Specific Reports

The following profiles provide an overview of specific information for each community water system within the NRD. Key topics included in each profile are listed below:

- Geographic Description
- Drought Resilience Matrix
- Overall Drought Comfortability
- Drought History and Monitoring Protocols
    - Consumption Overview
    - Monitoring Schedule
- Water System Infrastructure
    - Wells
    - Storage
    - Other Concerns/Information
- Water Quality
- Existing Plans and Studies
- Recommendations
    - Key Concerns
    - Best Management Practices & Mitigation Strategies

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Abie Water System

Geographic Description

Abie is located in northeastern Butler County. The water system serves approximately 40 connections or a population of 69 in the Village.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	High	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.
Water Quality	High	Has no water quality issues above required federal or state guidelines.
Capabilities Ordinances / Plans	Low	Does not have a drought ordinance or minimal defined parameters. Does not have many other water system plans (Engineering Report, Water Study, etc.).
Capabilities Staff	Medium	Does not have any water operators on staff. Hires an outside company to handle the water system. Or Has minimal staff but agreements with other communities for emergency backup staff.
Local Drought Monitoring	High	Regularly checks water levels and consumption (>1 a week). Has historical records that go back many years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Medium	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).
Local Funding Ability	Low	Would not be able to fund any large water system project (new well, water treatment plant, water storage, etc.). May have many other large projects going on.

Overall Drought Comfortability:

Current Supply	9/10	Very comfortable with the current water supply meeting the community's needs during a drought event.
Future Supply	9/10	No major growth in the system is expected.

Drought History and Monitoring Protocols

No major past drought events required mandatory or voluntary restrictions. No past drought impacts. Only when a well has been down for an extended period or during power outages has the system encouraged limited water use.

Consumption Overview

Average consumption: 10,000 gallons per day. Historical water levels and usage are not available for analysis. Consumption and water levels are tracked on paper.

One well can sustain the water system if necessary.

Lawn watering is not allowed (no water meters in town). Instead, the water system uses a flat fee structure for water service.

Monitoring Schedule

Schedule	Description
Normal Schedule	Once A Month (static) Once A Day (drawdown)
During Drought/High Usage	Once A Month (static) Once A Day (drawdown)
Other Considerations	If the water level drops 25 ft, they would consider emergency measures. Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
Well 64-1	1964 Rate: 100 gallons/min Depth (430ft) Top of Screen (380ft) Bottom of Screen (410ft) Have Backup Portable Generator & Transfer switch No Transducer
Well 81-1	1981 Rate: 250 gallons/min Depth (460ft) Top of Screen (350ft) Bottom of Screen (413ft) Have Backup Portable Generator & Transfer Switch No Transducer
Storage	**Description**
Standpipe	1932 30,000-gallon volume

Infrastructure Additional Information

- Currently using an old airline pump to measure well drawdown – would like to install a transducer in a well through the air vent.
- Always open to an additional water source. Financial constraints to put in an extra well.
    - Have discussed hooking up with David City (14mi from Abie) with a connection to the line near Bruno (4mi). There is a lack of local support for the initiative.
- Age of the infrastructure is a concern.

Water Quality

No major water quality issues. Some levels of iron and manganese, but no treatment is needed.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	Yes	2003
Drought/Water Ordinance	Yes	Basic restricted use ordinance
Water System Emergency Response Plan	Yes	Emergency water source plan is to haul in water from the National Guard. No specific agreement or MOU.
Water Study/Water System Engineering Report	Yes	Limited – existing report only included a study to hook up with the David City pipeline.
Mutual Aid Agreements	Yes	David City

Recommendations

Key Concerns

- Existing regional drought tools are not being utilized
- Aging water system infrastructure
- No water meters
- Limited funds and flat fees prevent any large water system projects
- Does not have a well-defined drought ordinance

Best Management Practices & Mitigation Strategies

- Identify Potential New Water Source
    - Either a New Well or Connection with David City
- Install Water Meters on All Homes
    - Implement Tiered Water Rates
- Install Transducers on Wells
- Increase Drought Monitoring at a Local and Regional Level
- Create and Pass a More Robust Drought Ordinance
    - Tie in Increased Drought Monitoring

Bellwood Water System

Geographic Description

Bellwood is located in northwestern Butler County. The water system serves a population of 435 in the Village.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	High	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.
Water Quality	Medium	Some wells have water quality issues above required federal or state guidelines. However, it is currently being treated or will likely not require the community to drill a new well or construct a water treatment plant.
Capabilities Ordinances / Plans	Medium	Has a basic drought ordinance but is minimal. Has some water system plans (Engineering Report, Water Study, etc.) and may be outdated.
Capabilities Staff	Low	Has minimal staff that are close to retirement or minimal staff that lack institutional knowledge about the water system.
Local Drought Monitoring	High	Regularly checks water levels and consumption (>1 a week). Has historical records that go back many years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Medium	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

Current Supply	10/10	Very comfortable with the current water supply meeting the community's needs during a drought event.
Future Supply	10/10	A new bridge is going up, and they believe there will be an increase in population. Even if the population doubles, they still rank comfortability at a 10.

Drought History and Monitoring Protocols

Past drought events in the early 2010s led to limited lawn sprinkler use, which led to community unrest.

Consumption Overview

Historical water levels and usage are unavailable for analysis

Monitoring Schedule

Schedule	Description
Normal Schedule	Every 7 Days
During Drought/High Usage	Every 7 Days (triggered if water levels drop 10 ft)
Other Considerations	Major concerns about providing enough water for the community starts at a 15 ft drop. Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
Well 82-1	1982 Rate: 500 gallons/min Depth (128.5ft) Top of Screen (108ft) Bottom of Screen (125ft) Backup Power at Treatment Center Has a Transducer
Well 2013-1	2014 Rate: 500 gallons/min Depth (126ft) Top of Screen (103ft) Bottom of Screen (126ft) No Backup Power Source Has a Transducer
Well 76-1	*Inactive* 1976 Depth (122ft) Top of Screen (102ft) Bottom of Screen (122ft)
Storage	**Description**
Water Tower	120,000-gallon volume

Water Quality

Water Quality Issues include arsenic and iron. Arsenic is treated at the water treatment center. The system does backwash for iron. Problems with uranium which lead to Well 76-1 being inactive.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	Yes	2013
Drought/Water Ordinance	Yes	
Water System Emergency Response Plan	Yes	Emergency water source plan is to buy bottled water and use tanker trucks. No written agreements.
Water Study/Water System Engineering Report	Yes	2010
Mutual Aid Agreements	Yes	David City

Recommendations

Key Concerns

- Existing regional drought tools are not being utilized
- Only have one water operator that is very knowledgeable about the water system
- Does not have a well-defined drought ordinance

Best Management Practices & Mitigation Strategies

- Create a Notification Plan in Case of a Water Emergency
- Increase Drought Monitoring at a Regional Level
- Update and Pass a More Robust Drought Ordinance
    - Tie in Increased Drought Monitoring

Cedar Bluffs Water System

Geographic Description

Cedar Bluffs is located in northern Saunders County. The water system serves a population of 615 in the Village.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	Low	Is not able to meet the current demand. Is not able to meet future short term growth demand or demand during drought. New wells or other sources of water will be needed soon.
Water Quality	Low	Has water quality issues above required federal or state guidelines that will eventually require the community to drill a new well or construct a water treatment plant.
Capabilities Ordinances / Plans	Low	Does not have a drought ordinance or minimal defined parameters. Does not have many other water system plans (Engineering Report, Water Study, etc.).
Capabilities Staff	Medium	Does not have any water operators on staff. Hires an outside company to handle the water system. Or Has minimal staff but agreements with other communities for emergency backup staff.
Local Drought Monitoring	Medium	Performs water levels and consumption monitoring fairly regularly (>1 a month). Has historical records that may or may not go back several years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Low	Does not have a MOU or agreement in place for emergency water. Is not connected to another water system. Would have difficulty providing adequate water if one well went down.
Local Funding Ability	High	Does not have many other large projects in the community. Would be able to easily fund a medium water system projects (new well, water storage, etc.).

Overall Drought Comfortability:

Current Supply	1/10	Subdivision expansion in 2025 (200 people) and they are a growing community. They can't do the new subdivision without a new well. There are already some people in town with water pressure issues.
Future Supply	1/10	Without a new well, future growth is not possible.

Drought History and Monitoring Protocols

Past drought impacts are largely unknown due to staff turnover. Other planning documents, such as the Hazard Mitigation Plan, noted that water supply was insufficient during past drought events. High irrigation demand in the summer has threatened the water supply.

Consumption Overview

Historical water levels and usage are unavailable for analysis due to staff turnover.

Monitoring Schedule

Schedule	Description
Normal Schedule	Once A Month (Summer) Every Other Month (Winter)
During Drought/High Usage	None currently, but there will be. Policy is that if levels drop below 10 ft of gap, they will monitor more. Usually, around 50% of typical water level, they start having concerns.
Other Considerations	People Service was hired as an advisor. They took over operating the system in March 2025. Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
57-1 (Well 3)	G-028649 1957 Rate: 50 gallons/min Depth (130ft) Top of Screen (100ft) Bottom of Screen (130ft) Portable Backup Generator No Transducer
91-1 (Well 5)	G-077077 1991 Rate: 60 gallons/min Depth (144ft) Top of Screen (114ft)

	Bottom of Screen (144ft) Stationary Backup Generator No Transducer
Storage	**Description**
Water Tower	15,000-gallon volume

Infrastructure Additional Information

Age of wells, especially Well 3 (Drilled in 1957).

Water Quality

Water Quality Issues include arsenic. Both wells are blended to reduce arsenic levels but have received violations in prior years.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	Yes	1999
Drought/Water Ordinance	No	
Water System Emergency Response Plan	Yes	In an emergency, they would truck in water. Unsure from where and no current agreements.
Water Study/Water System Engineering Report	2017	An updated and comprehensive Preliminary Engineering Report should be done.
Mutual Aid Agreements	No	

Recommendations

Key Concerns

- Do not have enough water to meet future demands
- Arsenic issues in both wells
- Existing local and regional drought tools are not being utilized
- Does not have a well-defined drought ordinance

Best Management Practices & Mitigation Strategies

- New Preliminary Engineering Report
- Install Transducers on Wells
- Drill a New Well to Address Capacity and Water Quality Issues
    - If Water Quality Do Not Improve, Construct a Water Treatment Plant
- Increase Drought Monitoring at a Local and Regional Level
- Create and Pass a Drought Ordinance
    - Tie in Increased Drought Monitoring

David City Water System

Geographic Description

David City is located in central Butler County. The water system serves a population of 8,369 in the City.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	Medium	Can meet current demand and likely some future growth demand. Drought has caused issues in the past.
Water Quality	Medium	Some wells have water quality issues above required federal or state guidelines. However, it is currently being treated or will likely not require the community to drill a new well or construct a water treatment plant.
Capabilities Ordinances / Plans	Medium	Has a basic drought ordinance but is minimal. Has some water system plans (Engineering Report, Water Study, etc.) and may be outdated.
Capabilities Staff	High	Has adequate staff and institutional knowledge to understand and operate the water system.
Local Drought Monitoring	High	Regularly checks water levels and consumption (>1 a week). Has historical records that go back many years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Medium	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

Current Supply	8/10	Most concerned with heavy industry use on the water supply.
Future Supply	8/10	In the coming years, the only major growth is AGP coming in. If another large industry moves in, that would increase concern.

Drought History and Monitoring Protocols

The water system is most commonly impacted by irrigation in the late summer. The system will see water levels drop a bit during the late summer. The system has implemented restrictions in the past.

Consumption Overview

Average annual consumption – 186.2 million gallons

Monitoring Schedule

Schedule	Description
Normal Schedule	Daily
During Drought/High Usage	Daily
Other Considerations	Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
Well 10	Built: 1979 Rate: 747 gallons/min Top of Screen (397ft) Depth (425ft) Bottom of Screen (425ft) No Backup Generator Has a Transducer
Well 11	Built: 2002 Rate: 850 gallons/min Top of Screen (330ft) Depth (427ft) Bottom of Screen (420ft) No Backup Generator Has a Transducer
Well 12	Built: 2009 Rate: 1,100 gallons/min Depth (408ft) Top of Screen (354ft) Bottom of Screen (405ft) Has Backup Generator (spring 2025) Has a Transducer
Well 14	Built: 2009 Rate: 950 gallons/min Depth (427ft) Top of Screen (305ft) Bottom of Screen (424ft) No Backup Generator No Transducer

Well 8	Built: 1966 *Inactive*
Well 9	Built: 1972 *Inactive – Currently Going Through Decommissioning*
Storage	**Description**
Elevated Storage Tank	750,000-gallon volume
Underground Clearwell Storage Tank	500,000-gallon volume
New Storage Tank	50,000-gallon volume

Infrastructure Additional Information

- David City provides water to the Village of Bruno. Bruno's original water system often could not meet demand during summer. This led to a project to run a 9-mile water line from David City to Bruno. The NRD operates the water line, purchasing and delivering water from David City to Bruno. Bruno is in charge of distributing the water and operating the system.
- Another well is planned in the next 5+ years (300 gal/min). It will be used for the planned AGP plant.

Water Quality

Water Quality Issues include arsenic and iron manganese. Water is treated at the water treatment plant.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	No	
Drought/Water Ordinance	Yes	Basic restricted use ordinance
Water System Emergency Response Plan	Yes	Bruno ERP – 2023 David City ERP – 2023 Emergency water source plan is a bulk water truck. No written agreements.
Water Study/Water System Engineering Report	Yes	2022
Mutual Aid Agreements	Yes	Rising City and Bellwood provide staff assistance. David City will also help out smaller communities when they need it.

Recommendations

Key Concerns

- Does not have a well-defined drought ordinance
- Existing regional drought tools are not being utilized
- Adding additional large industrial users in the future

Best Management Practices & Mitigation Strategies

- Work with the LPN NRD on Possibly Adding Groundwater Monitoring Wells Near the Community
- Drill Well for Planned AGP Plant
- Increase Drought Monitoring at a Regional Level
- Create and Pass a More Robust Drought Ordinance
    - Tie in Increased Drought Monitoring

Fremont Water System

Geographic Description

Fremont is located in southeastern Dodge County. The city's water system serves a population of 27,141 (2020).

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	High	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.
Water Quality	Medium	Some wells have water quality issues above required federal or state guidelines. However, it is currently being treated or will likely not require the community to drill a new well or construct a water treatment plant.
Capabilities Ordinances / Plans	Low	Does not have a drought ordinance or minimal defined parameters. Does not have many other water system plans (Engineering Report, Water Study, etc.).
Capabilities Staff	High	Has adequate staff and institutional knowledge to understand and operate the water system.
Local Drought Monitoring	Medium	Performs water levels and consumption monitoring fairly regularly (>1 a month). Has historical records that may or may not go back several years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Medium	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

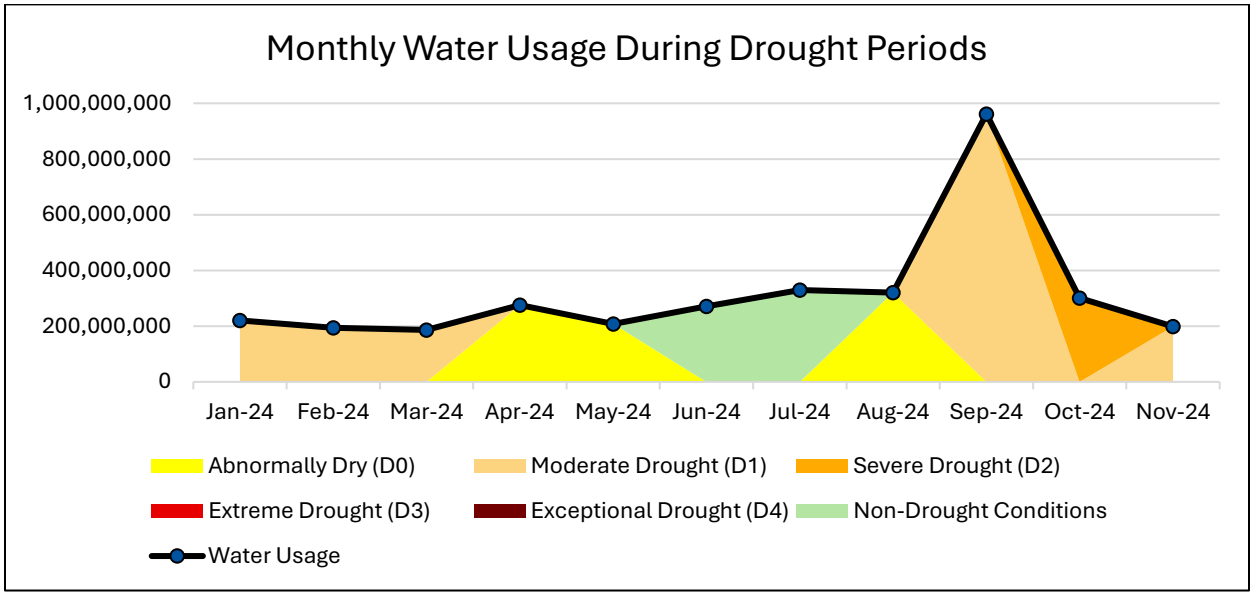
Current Supply	10/10	Very comfortable with the current water supply meeting the community's needs during a drought event.
Future Supply	10/10	Some significant population growth is anticipated over the next 5-10 years. The city is getting requests from large companies every year. However, the planned new wells and storage will cover the additional consumption.

Drought History and Monitoring Protocols

No major past drought events requiring mandatory or voluntary restrictions. No past drought impacts.

Consumption Overview

Average consumption: 304 million gallons annually.



Monitoring Schedule

Schedule	Description
Normal Schedule	Once A Month
During Drought/High Usage	Once A Month
Other Considerations	Major concerns would begin at a drop of 6-8 feet. Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
2000-1	2000 Rate: 1,500 gallons/min Depth (86ft) Top of Screen (44ft) Bottom of Screen (86ft) No Backup Generator No Transducer
2001-1	2001 Rate: 1,300 gallons/min

	Depth (74ft) Top of Screen (44ft) Bottom of Screen (74ft) Has a Backup Generator No Transducer
2005-1	2005 Rate: (?) Depth (76ft) Top of Screen (45ft) Bottom of Screen (76ft) No Backup Generator No Transducer
2005-2 Well #9	2005 Rate: 2,425 gallons/min Depth (70ft) Top of Screen (35ft) Bottom of Screen (70ft) Has a Backup Generator No Transducer
9 additional older wells	
Storage	**Description**
Reservoir	5,000,000-gallon volume

Infrastructure Additional Information

- Fremont helps to provide backup operators for several smaller communities.
- Fremont plans to add horizontal wells and storage within 1-3 years. A reservoir is anticipated to be west of the city, with a study under development as of 2025.

Water Quality

Water quality issues include manganese, which is treated with tripolyphosphates.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	Yes	2010
Drought/Water Ordinance	No	
Water System Emergency Response Plan	Yes	Emergency water source plan is to use other wells.
Water Study/Water System Engineering Report	Yes	Currently under development
Mutual Aid Agreements	Yes	NeWARN

Recommendations

Key Concerns

- Funding for future expansion and other large water system projects
- Existing regional drought tools are not being utilized
- Does not have a drought ordinance

Best Management Practices & Mitigation Strategies

- Install Transducers on Wells
    - Christianson Park West wells
- Increase Drought Monitoring at a Local and Regional Level
- Create and Pass a Drought Ordinance
    - Tie in Increased Drought Monitoring
- Construct New Horizontal Wells and Storage

Ithaca Water System

Geographic Description

Ithaca is located in central Saunders County. The water system serves a population of 160 in the Village.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	High	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.
Water Quality	Medium	Some wells have water quality issues above required federal or state guidelines. However, it is currently being treated or will likely not require the community to drill a new well or construct a water treatment plant.
Capabilities Ordinances / Plans	Low	Does not have a drought ordinance or minimal defined parameters. Does not have many other water system plans (Engineering Report, Water Study, etc.).
Capabilities Staff	Medium	Does not have any water operators on staff. Hires an outside company to handle the water system. Or Has minimal staff but agreements with other communities for emergency backup staff.
Local Drought Monitoring	Medium	Performs water levels and consumption monitoring fairly regularly (>1 a month). Has historical records that may or may not go back several years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Medium	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

Current Supply	9/10	Very comfortable with the current water supply meeting the community's needs during a drought event. Water level stays consistent and doesn't drop much.
Future Supply	9/10	No major population growth or change is anticipated in the next 10 years.

Drought History and Monitoring Protocols

No major past drought events requiring mandatory or voluntary restrictions. No impacts from past drought events.

Consumption Overview

Average consumption: 4,000,000 gallons per year. Consumption and water levels are tracked on paper.

Historical water levels and usage are not available for analysis.

Monitoring Schedule

Schedule	Description
Normal Schedule	Once A Month
During Drought/High Usage	Monthly. Additional checks are triggered if levels drop 5ft.
Other Considerations	Levels have always been consistent. Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
87-1	1987 Rate: 225 gallons/min Depth (127ft) Top of Screen (92ft) Bottom of Screen (122ft) Have Backup Portable Generator No Transducer
87-2	1987 Rate: 135 gallons/min Depth (116ft) Top of Screen (86ft) Bottom of Screen (300ft) Have Backup Portable Generator No Transducer
Storage	**Description**
Hydro Pneumatic Tank	10,000-gallon volume

Water Quality

Water quality issues include minor issues with copper. Copper levels come and go and do not require mitigation. The last violation was in 2024, and the system achieved compliance.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	Yes	2000
Drought/Water Ordinance	No	
Water System Emergency Response Plan	Yes	Emergency water source plan is to truck in water. They have a contact list for this.
Water Study/Water System Engineering Report	No	
Mutual Aid Agreements	No	

Recommendations

Key Concerns

- Existing regional drought tools are not being utilized.
- Does not have a drought ordinance and has a limited number of other water system planning documents.

Best Management Practices & Mitigation Strategies

- Increase Drought Monitoring at a Regional Level
- Create and Pass a Drought Ordinance
    - Tie in Increased Drought Monitoring
- Store Historical Consumption and Water Level Information Electronically
- Install Transducers on Wells

Lindsay Water System

Geographic Description

Lindsay is located in northern Platte County. The water system serves a population of 255 in the Village.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	High	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.
Water Quality	Medium	Some wells have water quality issues above required federal or state guidelines. However, it is currently being treated or will likely not require the community to drill a new well or construct a water treatment plant.
Capabilities Ordinances / Plans	High	Has a well-defined, in-depth drought ordinance. Has some water system plans (Engineering Report, Water Study, etc.) and are recent.
Capabilities Staff	High	Has adequate staff and institutional knowledge to understand and operate the water system.
Local Drought Monitoring	High	Regularly checks water levels and consumption (>1 a week). Has historical records that go back many years.
Regional Drought Monitoring	Medium	Is aware of other drought-related tools and may check them every so often.
Emergency Supply	Low	Does not have a MOU or agreement in place for emergency water. Is not connected to another water system. Would have difficulty providing adequate water if one well went down.
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

Current Supply	9/10	Very comfortable with the current water supply meeting the community's needs during a drought event. Any concern would relate to water quality.
Future Supply	9/10	Quantity can meet future needs. The only concern is water quality. New growth includes new apartment complex (14 units), housing development (10 homes), and housing development (12 homes). Upgrades to the plant, new fire hall, and a new school (with limited demand increase). The community is growing in population. Several businesses have reduced water usage.

Drought History and Monitoring Protocols

The system has seen large swings in water levels but has not had direct negative impacts from drought. The system has not instituted mandatory restrictions in the past. During the 2012 drought, voluntary restrictions were implemented instead.

Consumption Overview

Average Daily Water Pumped – 123,258 Gal

Average Daily Used – 54,009 Gal

Pumped the most in 2022, followed by 2012.

Lindsay Corporation is the largest water user (2/3 of total use). There is a good working relationship between the community and business.

Monitoring Schedule

Schedule	Description
Normal Schedule	Daily reports
During Drought/High Usage	Daily reports
Other Considerations	Lindsay Corporation has several monitoring wells because it is a superfund site. Water levels can drop 12-25ft in the summer. They also monitor the weather and regional drought levels on the U.S. Drought Monitor.

Water System Infrastructure

Wells	Description
83-1	1983 Rate: 650 gallons/min Depth (85ft) Top of Screen (65ft) Bottom of Scree (?) No Backup Power. Has a Transducer *Not used for consumption. Currently only use it for testing and fire supply backup.*
89-1	1989 Rate: 500 gallons/min Depth (105ft) Top of Screen (80ft) Bottom of Screen (?) No Backup Power (Has a Right-Angle Drive) Has a Transducer
2013-1	2013 Rate: 650 gallons/min Depth (211ft) Top of Screen (188ft)

	Bottom of Screen (?) No Backup Power (Has a Right-Angle Drive) Has a Transducer
Storage	**Description**
Elevated Water Storage Tank	2019 100,000-gallon volume

Infrastructure Additional Information

Aging water mains lead to additional leaks and breaks.

Water Quality

Minor water quality concerns regarding nitrates. Two wells are blended to lower overall nitrate levels. One well is not used for consumption but solely for fire protection and testing.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	Yes	2015
Drought/Water Ordinance	2006	Very detailed. Has three stages with triggers, goals, education actions, management actions, regulation actions, and declaration.
Water System Emergency Response Plan	Yes	Emergency water source plan is to fill from another hydrant source. No agreements or MOUs in place.
Water Study/Water System Engineering Report	Yes	2017
Mutual Aid Agreements	Yes	Nebraska Rural Water

Recommendations

Key Concerns

- Nitrate levels in one well require blending.
- Need for updating/upgrading water mains.
- No agreements or MOUs in place for emergency water.

Best Management Practices & Mitigation Strategies

- Look Into Using Well 83-1 to Supply the Nonportable Lindsay Corporation Plant Uses.
- Create Agreements or MOUs for Emergency Water Supplies.

Malmo Water System

Geographic Description

Malmo is located in central Saunders County. The water system serves a population of 94 in the Village.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	High	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.
Water Quality	Medium	Some wells have water quality issues above required federal or state guidelines. However, it is currently being treated or will likely not require the community to drill a new well or construct a water treatment plant.
Capabilities Ordinances / Plans	High	Has a well-defined, in-depth drought ordinance. Has some water system plans (Engineering Report, Water Study, etc.) and are recent.
Capabilities Staff	Medium	Does not have any water operators on staff. Hires an outside company to handle the water system. Or Has minimal staff but agreements with other communities for emergency backup staff.
Local Drought Monitoring	Medium	Performs water levels and consumption monitoring fairly regularly (>1 a month). Has historical records that may or may not go back several years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Low	Does not have a MOU or agreement in place for emergency water. Is not connected to another water system. Would have difficulty providing adequate water if one well went down.
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

Current Supply	10/10	Very comfortable with the current water supply meeting the community's needs during a drought event.
Future Supply	10/10	No major population growth is expected in the coming years.

Drought History and Monitoring Protocols

No major past drought events requiring mandatory or voluntary restrictions. No past impacts from drought events.

Consumption Overview

Historical water levels and usage are not available for analysis.

Monitoring Schedule

Schedule	Description
Normal Schedule	Monthly
During Drought/High Usage	Monthly.
Other Considerations	Unsure what water level would cause major concerns about providing enough water for the community. Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
75-1	1976 Rate: 120 gallons/min Depth (58ft) Top of screen (46ft) Bottom of Screen (58ft) No Backup Generator No Transducer
41	1942 Rate: 100 gallons/min Depth (50ft) Top of Screen (?) Bottom of Screen (50ft) No Backup generator No Transducer
Storage	**Description**
Water Tower	2000 50,000-gallon volume

Infrastructure Additional Information

Operators from Wahoo run Malmo's water system, and Wahoo handles water system billing.

Water Quality

No water quality issues to report.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	Yes	2002
Drought/Water Ordinance	No	
Water System Emergency Response Plan	Yes	Unsure of an emergency water source.
Water Study/Water System Engineering Report	No	
Mutual Aid Agreements	Yes	

Recommendations

Key Concerns

- Aging water system infrastructure, especially the Well 41, which was drilled in 1942
- Existing regional drought tools are not being utilized.
- Does not have a drought ordinance or many other water system plans.

Best Management Practices & Mitigation Strategies

- Increase Drought Monitoring at a Regional Level
- Create and Pass a Drought Ordinance
- Identify Alternative Emergency Water Sources
- Create Agreements or MOUs for Emergency Water Supplies
- Install Transducers on Wells

Mead Water System

Geographic Description

Mead is located in central Saunders County. The water system serves a population of 617 in the village.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	High	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.
Water Quality	Medium	Some wells have water quality issues above required federal or state guidelines. However, it is currently being treated or will likely not require the community to drill a new well or construct a water treatment plant.
Capabilities Ordinances / Plans	High	Has a well-defined, in-depth drought ordinance. Has some water system plans (Engineering Report, Water Study, etc.) and are recent.
Capabilities Staff	High	Has adequate staff and institutional knowledge to understand and operate the water system.
Local Drought Monitoring	High	Regularly checks water levels and consumption (>1 a week). Has historical records that go back many years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Medium	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

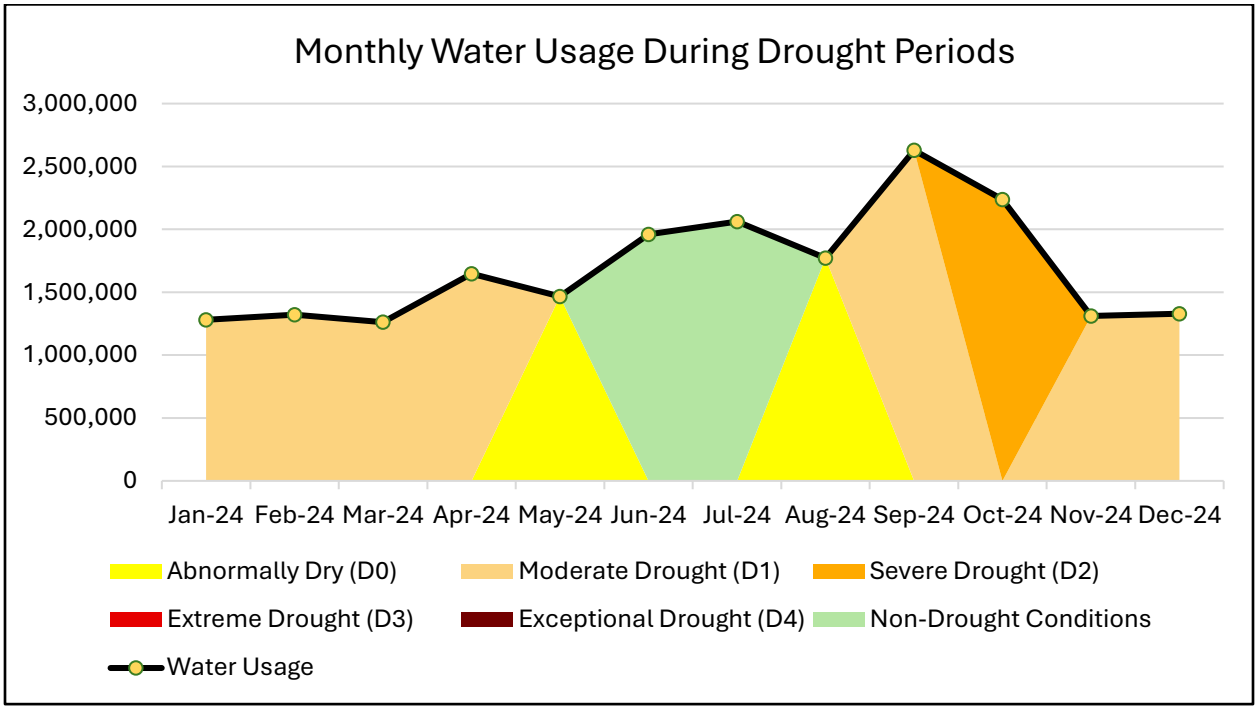
Current Supply	10/10	Very comfortable with the current water supply meeting the community's needs during a drought event.
Future Supply	10/10	No significant population growth or changes are anticipated for the next 5 - 10 years.

Drought History and Monitoring Protocols

During the drought in 2012, the village implemented water restrictions. The public had no issues with the restrictions. No other drought impacts were reported.

Consumption Overview

Average annual consumption: 20,280,316 gallons (2024)



Monitoring Schedule

Schedule	Description
Normal Schedule	Daily
During Drought/High Usage	Daily
Other Considerations	Uses the SCADA system to monitor the wells. Normal fluctuations about 2 ft. A drop of 10 ft would be concerning. Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
2017-2A	2017 Rate: 400 gallons/min Depth (133ft) Top of Screen (98ft)

	Bottom of Screen (?) Has Portable Generator Has a Transducer
2017-2B	2017 Rate: 235 gallons/min Depth (131ft) Top of Screen (94ft) Bottom of Screen (?) Has a Portable Generator Has a Transducer

Storage	Description
Water Tower	150,000-gallon volume

Infrastructure Additional Information

David City is contracted to be the village's water operator.

Water Quality

Water quality issues include Arsenic, Iron, and Manganese, which are treated through the water treatment plant.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	Yes	2001
Drought/Water Ordinance	Yes	2006. Very detailed. Has three stages with triggers, goals, education actions, management actions, and regulation actions.
Water System Emergency Response Plan	Yes	2024. Emergency water source plan is to truck in water and use the National Guard. No written agreements, just contacts.
Water Study/Water System Engineering Report	Yes	
Mutual Aid Agreements	Yes	David City

Recommendations

Key Concerns

- Existing regional drought tools are not being utilized
- Does not have contracts or agreements for emergency sources of water

Best Management Practices & Mitigation Strategies

- Increase Drought Monitoring at the Regional Level
- Create Agreements or MOUs for Emergency Water Supplies

Memphis Water System

Geographic Description

Memphis is located in southeastern Saunders County. The water system serves a population of 109 in the Village.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	High	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.
Water Quality	High	Has no water quality issues above required federal or state guidelines.
Capabilities Ordinances / Plans	Low	Does not have a drought ordinance or minimal defined parameters. Does not have many other water system plans (Engineering Report, Water Study, etc.).
Capabilities Staff	Medium	Does not have any water operators on staff. Hires an outside company to handle the water system. Or Has minimal staff but agreements with other communities for emergency backup staff.
Local Drought Monitoring	Medium	Performs water levels and consumption monitoring fairly regularly (>1 a month). Has historical records that may or may not go back several years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Low	Does not have a MOU or agreement in place for emergency water. Is not connected to another water system. Would have difficulty providing adequate water if one well went down.
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

Current Supply	10/10	Very comfortable with the current water supply meeting the community's needs during a drought event.
Future Supply	10/10	Not anticipating significant population growth or changes in the next 5-10 years.

Drought History and Monitoring Protocols

No major past drought events requiring mandatory or voluntary restrictions. No reported impacts from past drought events.

Consumption Overview

Historical water levels and usage are not available for analysis. Consumption and water levels are tracked on paper.

Monitoring Schedule

Schedule	Description
Normal Schedule	Monthly
During Drought/High Usage	Monthly
Other Considerations	Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
Well 1	1973 Rate: 200 gallons/min Depth (100ft) Top of Screen (?) Bottom of Screen (?) PTO Backup Power No Transducer
Well 2	1994 Rate: (?) Depth (184ft) Top of Screen (?) Bottom of Screen (?) No Backup Generator No Transducer
Storage	**Description**
Tank	5,000-gallon volume

Infrastructure Additional Information

Water system operation is contracted out to People's Service.

Water Quality

No water quality issues.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	Yes	1999
Drought/Water Ordinance	No	
Water System Emergency Response Plan	Yes	Unsure of their source of emergency water.
Water Study/Water System Engineering Report	No	
Mutual Aid Agreements	No	

Recommendations

Key Concerns

- No water meters
- Limited funds and flat fees prevent any large water system projects
- Does not have a drought ordinance or many other water system planning documents
- Existing regional drought tools are not being utilized
- Historical data is not stored electronically
- Does not have an identified source of emergency water

Best Management Practices & Mitigation Strategies

- Install Water Meters on All Homes
    - Implement Tiered Water Rates
- Increase Drought Monitoring at a Local and Regional Level
- Install Transducers on Wells
- Create and Pass a Drought Ordinance
    - Tie in Increased Drought Monitoring
- Store Historical Consumption and Water Level Information Electronically
- Create Agreements or MOUs for Emergency Water Supplies
- Identify Alternative Emergency Water Sources

Morse Bluff Water System

Geographic Description

Morse Bluff is located in northern Saunders County. The water system serves a population of 117 in the village.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	High	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.
Water Quality	High	Has no water quality issues above required federal or state guidelines.
Capabilities Ordinances / Plans	High	Has a well-defined, in-depth drought ordinance. Has some water system plans (Engineering Report, Water Study, etc.) and are recent.
Capabilities Staff	Medium	Does not have any water operators on staff. Hires an outside company to handle the water system. Or Has minimal staff but agreements with other communities for emergency backup staff.
Local Drought Monitoring	Medium	Performs water levels and consumption monitoring fairly regularly (>1 a month). Has historical records that may or may not go back several years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Medium	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

Current Supply	8 to 10/10	Very comfortable with the current water supply meeting the community's needs during a drought event.
Future Supply	8 to 10/10	No significant population growth or development is anticipated within the next 1-10 years.

Drought History and Monitoring Protocols

No major past drought events requiring mandatory or voluntary restrictions. No reported impacts from past drought events.

Consumption Overview

Average consumption – 8,000 gal/day in the summer; 5,000 gal/day in the winter.

Monitoring Schedule

Schedule	Description
Normal Schedule	Monthly
During Drought/High Usage	Monthly
Other Considerations	Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
79-1	1979 Rate: 285 gallons/min Depth (196ft) Top of Screen (188ft) Bottom of Screen (Unknown) Has a Backup Power Source No Transducer
2014-1	2014 Rate: 350 gallons/min Depth (206ft) Top of Screen (158ft) Bottom of Screen (206ft) No Backup Generator Has a Transducer
Storage	**Description**
Standpipe	75,000-gallon volume

Infrastructure Additional Information

Have a verbal agreement with a certified operator in Cedar Bluffs to serve as a backup operator.

Water Quality

No water quality issues.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	Yes	2003
Drought/Water Ordinance	Yes	2013. Very detailed. Has three stages with triggers, goals, education actions, management actions, and regulation actions.
Water System Emergency Response Plan	Yes	2024. Emergency water source plan is to truck in water and use bottled water. No written agreements, just contacts.
Water Study/Water System Engineering Report	Yes	2016
Mutual Aid Agreements	No	

Recommendations

Key Concerns

- Existing regional drought tools are not being utilized

Best Management Practices & Mitigation Strategies

- Increase Drought Monitoring at a Local and Regional Level
- Install Transducers on Wells
- Install Backup Generator on Well 2014-1

Newman Grove Water System

Geographic Description

Newman Grove is located on the border between southern Madison County and northern Platte County. The water system serves a population of 667 in the Village.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	High	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.
Water Quality	High	Has no water quality issues above required federal or state guidelines.
Capabilities Ordinances / Plans	High	Has a well-defined, in-depth drought ordinance. Has some water system plans (Engineering Report, Water Study, etc.) and are recent.
Capabilities Staff	Medium	Does not have any water operators on staff. Hires an outside company to handle the water system. Or Has minimal staff but agreements with other communities for emergency backup staff.
Local Drought Monitoring	Low	Performs minimal water levels and consumption monitoring. Has minimal historical records.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Medium	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

Current Supply	10/10	Very comfortable with the current water supply meeting the community's needs during a drought event. Unsure of what water level would cause major concerns about providing enough water for the community.
Future Supply	8/10	No significant population growth is expected in the coming years. Comfortability with the current system meeting needs in the next 5-10 years is an 8/10 because the system is getting older and may need repairs.

Drought History and Monitoring Protocols

No major past drought events requiring mandatory or voluntary restrictions, but they were close once. No reported impacts from past drought events.

Consumption Overview

Historical water levels and usage are not available for analysis. Consumption records are kept but not organized. Water levels are not tracked.

Monitoring Schedule

Schedule	Description
Normal Schedule	Monthly
During Drought/High Usage	Monthly
Other Considerations	Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
92-1	1992 Rate: 450 gallons/min Depth (135ft) Top of Screen (15ft 5in) Bottom of Screen (133ft 5in) PTO Backup Power Has a Transducer
63-1	1963 Rate: 330 gallons/mi Depth (112ft) Top of screen (97ft) Bottom of screen (112ft) No Backup Power Has a Transducer
Storage	**Description**
Standpipe	223,374-gallon volume

Infrastructure Additional Information

The system is getting older and may need repairs.

Water Quality

No water quality issues were reported.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	No	
Drought/Water Ordinance	Yes	Very detailed. Has three stages with triggers, goals, education actions, management actions, regulation actions, and declaration.
Water System Emergency Response Plan	Yes	2024. Emergency water source plan is to truck in water and use bottled water. No written agreements, just contacts.
Water Study/Water System Engineering Report	No	
Mutual Aid Agreements	Yes	Verbal agreement with Lindsay to help if repairs are needed.

Recommendations

Key Concerns

- Aging infrastructure
- Existing regional drought tools are not being utilized
- Local consumption and water level information is either not organized or not kept

Best Management Practices & Mitigation Strategies

- Increase Drought Monitoring at a Local and Regional Level
- Store Historical Consumption and Water Level Information Electronically
- Work with LPNNRD to Potentially Identify Locations Near the Village to Install Groundwater Monitoring Wells

North Bend Water System

Geographic Description

North Bend is located in southwestern Dodge County. The water system serves a population of 1,177 in the City.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	Medium	Can meet current demand and likely some future growth demand. Drought has caused issues in the past.
Water Quality	Medium	Some wells have water quality issues above required federal or state guidelines. However, it is currently being treated or will likely not require the community to drill a new well or construct a water treatment plant.
Capabilities Ordinances / Plans	Medium	Has a basic drought ordinance but is minimal. Has some water system plans (Engineering Report, Water Study, etc.) and may be outdated.
Capabilities Staff	High	Has adequate staff and institutional knowledge to understand and operate the water system.
Local Drought Monitoring	Medium	Performs water levels and consumption monitoring fairly regularly (>1 a month). Has historical records that may or may not go back several years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Medium	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

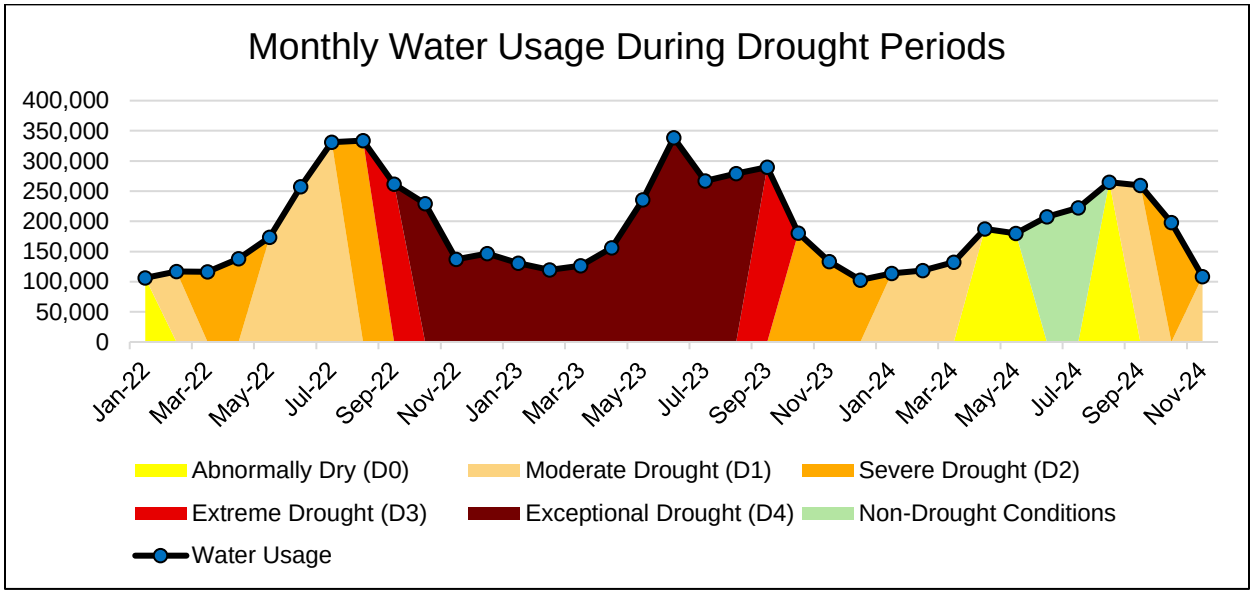
Current Supply	5/10	The more water they run, the lower the quality of the water. There are concerns about the treatment plant keeping up without issues. Water quantity is less of a concern.
Future Supply	5/10	Concerns for water quality. New development includes new housing (20 new houses, 12 new mobile homes). Water quantity is less of a concern.

Drought History and Monitoring Protocols

Higher pumping has happened in the past as a result of drought. This has resulted in more manganese in the water. The community has not instituted water restrictions in the past.

Consumption Overview

Average consumption: 191,000 gallons per day.



Monitoring Schedule

Schedule	Description
Normal Schedule	Monthly
During Drought/High Usage	Monthly (not much fluctuation)
Other Considerations	A drop of 50% in the water level would be cause for concern. Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
Well 1 (North) 811	1968 Rate: 500 gallons/min Depth (77ft) Has a Backup Power Generator No Transducer
Well 2 (West) 671	1981 Rate: 500 gallons/min Depth (55ft) Top of Screen (38ft) Bottom of Screen (55ft)

	Has a Backup Power Generator No Transducer
2018-1	2018 Rate: 500 gallons/min Depth (169ft) Has a Portable Generator Has a Transducer

Storage	Description
Water Tower	300,000-gallon volume
Clearwell	70,000-gallon volume

Infrastructure Additional Information

- Well 2 has water quality issues that worsen as pumping increases and must be replaced.
- Water treatment plant needs a new filter and expansion.

Water Quality

Water quality issues include manganese, which is treated at the water treatment plant.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	Yes	2011
Drought/Water Ordinance	Yes	2008. Basic restricted use ordinance.
Water System Emergency Response Plan	Yes	2024. Emergency water source plan is to truck in water and use bottled water. No written agreements, just contacts.
Water Study/Water System Engineering Report	Yes	Under Development
Mutual Aid Agreements	Yes	Contract with People's Service.

Recommendations

Key Concerns

- Water treatment plant needs a new filter/expansion
- Well 2 has manganese issues that get worse when pumping increases
- Additional groundwater monitoring wells are needed
- Has a very basic drought ordinance
- Existing regional drought tools are not being utilized

Best Management Practices & Mitigation Strategies

- Drill a New Well to Replace Well 2
- Add a New Filter to the Water Treatment Plant and Expand the Plant
- Work with the LPN NRD to Possibly Add Groundwater Monitoring Wells Near the City

- Increase Drought Monitoring at a Local and Regional Level
- Create and Pass a More Robust Drought Ordinance
    - Tie in Increased Drought Monitoring
- Install Transducers on Wells

Platte Center Water System

Geographic Description

Platte Center is located in northern Platte County. The water system serves a population of 336 in the village.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	High	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.
Water Quality	High	Has no water quality issues above required federal or state guidelines.
Capabilities Ordinances / Plans	Low	Does not have a drought ordinance or minimal defined parameters. Does not have many other water system plans (Engineering Report, Water Study, etc.).
Capabilities Staff	Medium	Does not have any water operators on staff. Hires an outside company to handle the water system. Or Has minimal staff but agreements with other communities for emergency backup staff.
Local Drought Monitoring	Medium	Performs water levels and consumption monitoring fairly regularly (>1 a month). Has historical records that may or may not go back several years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Medium	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

Current Supply	10/10	Very comfortable with the current water supply meeting the community's needs during a drought event.
Future Supply	10/10	Anticipating the addition of 25-100 homes in the next 5-10 years. Even with the additional homes, there are no concerns with water quantity.

Drought History and Monitoring Protocols

Instituted restrictions during 2012 drought conditions. The public responded well during those restrictions. No other impacts were reported during past drought events.

Consumption Overview

Historical water levels and usage are unavailable for analysis.

Monitoring Schedule

Schedule	Description
Normal Schedule	Monthly
During Drought/High Usage	Monthly
Other Considerations	Normal drawdown is ~2 ft. Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
2011-1	2011 Rate: 275 gallons/min Depth (211ft) Top of Screen (180ft) Bottom of Screen (208ft) Has a Backup Generator No Transducer
2021-1	2021 Rate: 275 gallons/min Depth (185ft) Top of Screen (162ft) Bottom of Screen (178ft) Has a Backup Generator Has a Transducer
78-1	Inactive, for emergency use 1978
Storage	**Description**
Water Tower	50,000-gallon volume

Water Quality

No current water quality issues.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	Yes	2014
Drought/Water Ordinance	No	
Water System Emergency Response Plan	Yes	Emergency water source plan is to truck in water. No written agreements, just contacts.
Water Study/Water System Engineering Report	Yes	Under development
Mutual Aid Agreements	Yes	Monroe NeWARN

Recommendations

Key Concerns

- Existing regional drought tools are not being utilized
- Does not have a drought ordinance
- Does not have agreements for emergency sources of water

Best Management Practices & Mitigation Strategies

- Update the Wellhead Protection Plan
- Increase Drought Monitoring at a Local and Regional Level
- Create and Pass a Drought Ordinance
    - Tie in Increased Drought Monitoring
- Create Agreements or MOUs for Emergency Water Supplies
- Install Transducers on Wells

Prague Water System

Geographic Description

Prague is located in western Saunders County. The water system serves a population of 291 in the Village.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	Medium	Can meet current demand and likely some future growth demand. Drought has caused issues in the past.
Water Quality	Medium	Some wells have water quality issues above required federal or state guidelines. However, it is currently being treated or will likely not require the community to drill a new well or construct a water treatment plant.
Capabilities Ordinances / Plans	Medium	Has a basic drought ordinance but is minimal. Has some water system plans (Engineering Report, Water Study, etc.) and may be outdated.
Capabilities Staff	High	Has adequate staff and institutional knowledge to understand and operate the water system.
Local Drought Monitoring	Medium	Performs water levels and consumption monitoring fairly regularly (>1 a month). Has historical records that may or may not go back several years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Medium	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

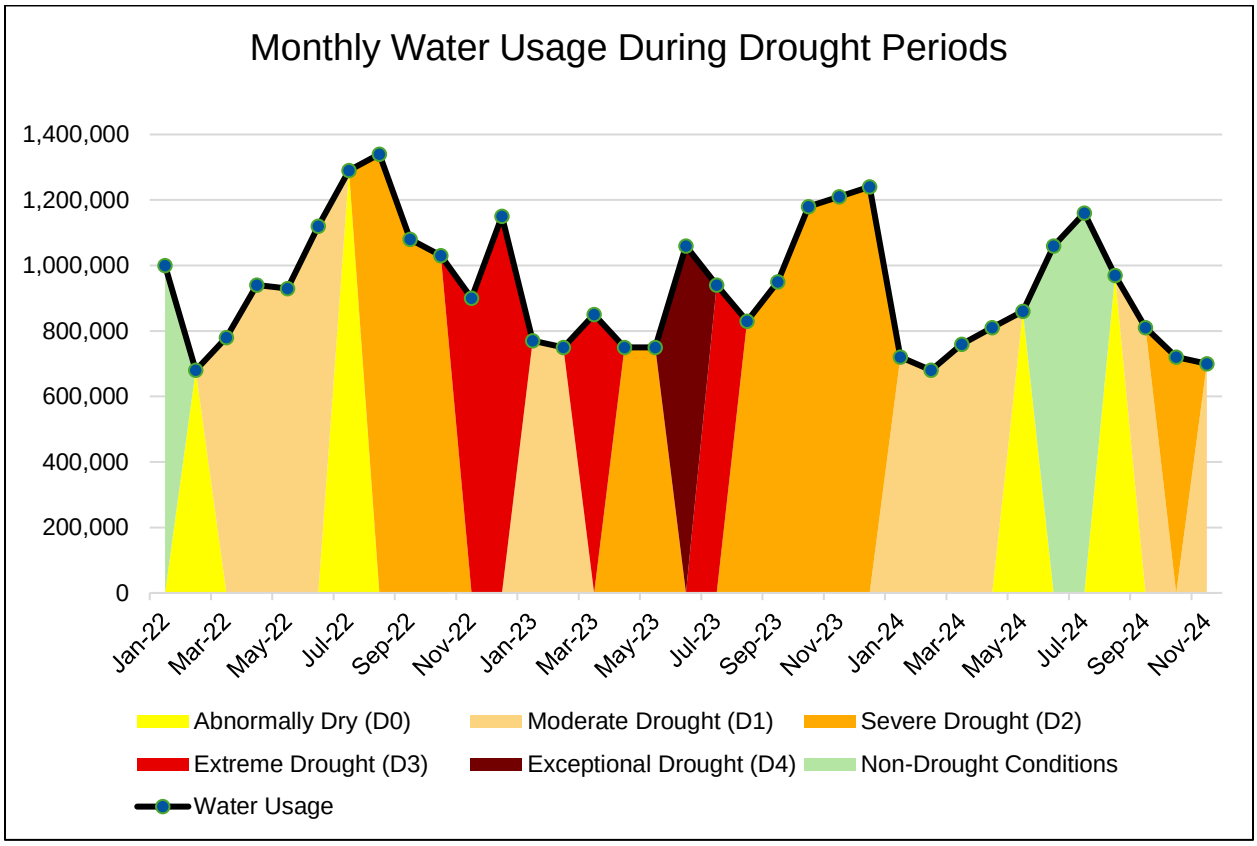
Current Supply	5/10	Comfort with the current water supply is due to water quality issues and the age of the wells.
Future Supply	7/10	Population is stable, and they are not expecting major population growth or change within the next 10 years.

Drought History and Monitoring Protocols

The community has encountered lower water levels and higher pumping during past drought events. Water restrictions have not been implemented in the past.

Consumption Overview

Average consumption: 929,444 gallons/month. Consumption and water levels are tracked on paper.



Monitoring Schedule

Schedule	Description
Normal Schedule	Monthly check from May to September, otherwise quarterly
During Drought/High Usage	Monthly
Other Considerations	Start having major concerns at the 50 ft level. Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
61-1	1961 Rate: 160 gallons/min Depth (110ft) Top of screen (87ft) Bottom of screen (137ft) Has a 3 Phase Generator (Portable) No Transducer
70-1	1966 Rate: 180 gallons/min Depth (137ft) Top of screen (117ft) Bottom of screen (137ft) Has a 3 Phase Generator (Portable) No Transducer
Storage	**Description**
Stand Pipe	110,000-gallon volume

Water Quality

Water quality issues include iron, manganese, and arsenic. These are all treated at the water treatment plant.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	Yes	2001
Drought/Water Ordinance	Yes	2006. Very detailed. Has three stages with triggers, declarations, response actions, and violations.
Water System Emergency Response Plan	Yes	2024. Emergency water source plan is to truck in water and use bottled water. No written agreements, just contacts.
Water Study/Water System Engineering Report	Yes	2023
Mutual Aid Agreements	Yes	NeWARN

Recommendations

Key Concerns

- Aging wells and treatment plant
- Historical consumption and water levels are not stored electronically
- Existing regional drought tools are not being utilized
- Limited local drought monitoring

Best Management Practices & Mitigation Strategies

- Look Into Drilling a New Well or Hooking Up to Rural Water
- If Water Quality Do Not Improve, Construct a Water Treatment Plant
- Install Transducers on Wells
- Increase Drought Monitoring at a Local and Regional Level
- Store Historical Consumption and Water Level Information Electronically

Rogers Water System

Geographic Description

Rogers is located in southeastern Colfax County. The water system serves a population of 95 in the village with 42 water hookups.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	High	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.
Water Quality	High	Has no water quality issues above required federal or state guidelines.
Capabilities Ordinances / Plans	Low	Does not have a drought ordinance or minimal defined parameters. Does not have many other water system plans (Engineering Report, Water Study, etc.).
Capabilities Staff	Low	Has minimal staff that are close to retirement or minimal staff that lack institutional knowledge about the water system.
Local Drought Monitoring	Low	Performs minimal water levels and consumption monitoring. Has minimal historical records.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Low	Does not have a MOU or agreement in place for emergency water. Is not connected to another water system. Would have difficulty providing adequate water if one well went down.
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

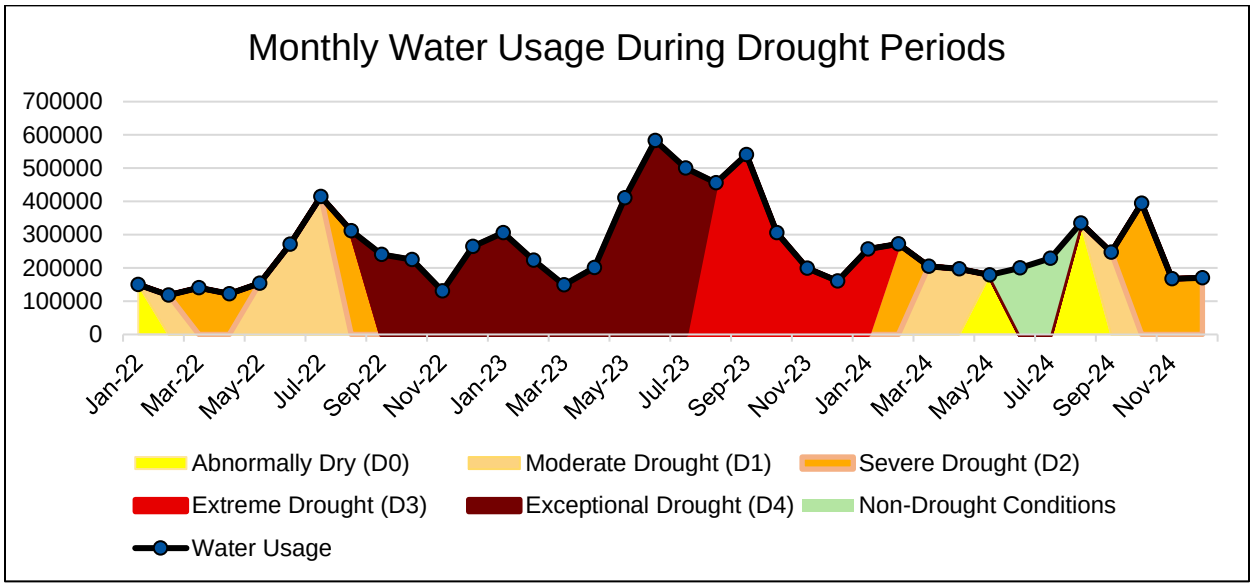
Current Supply	10/10	Very comfortable with the current water supply meeting the community's needs during a drought event.
Future Supply	10/10	No major changes are planned for the next 5-10 years.

Drought History and Monitoring Protocols

No major past drought events requiring mandatory or voluntary restrictions. No reported impacts from past drought events.

Consumption Overview

Average consumption: 328,102 gallons/monthly. Consumption and water levels are tracked on paper.



Monitoring Schedule

Schedule	Description
Normal Schedule	Gallons Pumped: Monthly Static Water Level: Rarely
During Drought/High Usage	Gallons Pumped: Monthly Static Water Level: Rarely
Other Considerations	Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
43-1	1943 Depth (36ft) *Not being used due to State requirements*
94-1	1994 Rate: 350 gallons/min Depth (106ft) Top of Screen (86ft) Bottom of Screen (106ft) No Backup Power (Has a Right-Angle Drive) No Transducer
Storage	**Description**
Water Tower	30,000-gallon volume

Infrastructure Additional Information

- Well 43-1 cannot currently be used due to State requirements.
- One water operator and no agreements with other communities.

Water Quality

No current water quality issues. Sometimes, water quality will show coliform during warm conditions.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	No	Wellhead protection map was completed in 2014.
Drought/Water Ordinance	Yes	Basic restricted use ordinance.
Water System Emergency Response Plan	Yes	2024. Emergency water source plan is to truck in water and use bottled water. No written agreements, just contacts.
Water Study/Water System Engineering Report	No	
Mutual Aid Agreements	Yes	Schuyler North Bend

Recommendations

Key Concerns

- Only one well that can be used for drinking water
- Existing regional drought tools are not being utilized
- Minimal water level monitoring
- Historical consumption and water levels are not stored electronically
- Does not have a well-defined drought ordinance
- Only one water operator
- Identified emergency supply is the well that is not allowed to be used

Best Management Practices & Mitigation Strategies

- Backup Generator for Well 94-1
- Work with LPN NRD to possibly Install Groundwater Monitoring Wells Near the Community
- Increase Drought Monitoring at a Local and Regional Level
- Update and Pass a More Robust Drought Ordinance
    - Tie in Increased Drought Monitoring
- Store Historical Consumption and Water Level Information Electronically
- Create Agreements with Other Communities for Backup Water Operator Coverage
- Install Transducers on Well(s)
- Identify Alternative Emergency Water Sources

Schuyler Water System

Geographic Description

Schuyler is located in eastern Colfax County. The water system serves a population of 6,211 in the City.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	High	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.
Water Quality	Medium	Some wells have water quality issues above required federal or state guidelines. However, it is currently being treated or will likely not require the community to drill a new well or construct a water treatment plant.
Capabilities Ordinances / Plans	Medium	Has a basic drought ordinance but is minimal. Has some water system plans (Engineering Report, Water Study, etc.) and may be outdated.
Capabilities Staff	High	Has adequate staff and institutional knowledge to understand and operate the water system.
Local Drought Monitoring	High	Regularly checks water levels and consumption (>1 a week). Has historical records that go back many years.
Regional Drought Monitoring	Medium	Is aware of other drought-related tools and may check them every so often.
Emergency Supply	Medium	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).
Local Funding Ability	High	Would not be able to fund any large water system project (new well, water treatment plant, water storage, etc.). May have many other large projects going on.

Overall Drought Comfortability:

Current Supply	9/10	Once the last two wells are online, there will be no water quantity concerns during drought.
Future Supply	9/10	Anticipated growth within the next 1-10 years includes another packing plant, a larger business potentially expanding and hooking onto the system, a lake development south of town that might have to hook onto Schuyler's system because of water quality, and the possibility of supplying water to the Village of Rogers.

Drought History and Monitoring Protocols

Past drought events have not required voluntary or mandatory restrictions. The system addresses consumers one-on-one when they see them not conserving water in peak months. The system would like to put together a social media program. No impacts were reported from past drought events.

Consumption Overview

Year	Annual Gallons Pumped
2018	354,538,000
2019	317,320,000
2020	394,394,000

Monitoring Schedule

Schedule	Description
Normal Schedule	Daily
During Drought/High Usage	Daily
Other Considerations	Major concerns if pumping level gets below pump depth. Keep track of the water table by monitoring wells in different locations in town.

Water System Infrastructure

Wells	Description
Well #14	1960 Rate: 540 gallons/min Depth (84ft) Top of Screen (29ft) Bottom of Screen (84ft) No Backup Generator Has a Transducer
Well #22	2007 Rate: 782 gallons/min Depth (78ft) Top of Screen (51ft) Bottom of Screen (78ft) Has a Backup Generator Has a Transducer
Well #23	2008 Rate: 602 gallons/min Depth (86ft) Top of Screen (56ft) Bottom of Screen (86ft) Has a Backup Generator No Transducer
Well #24	2009

	Rate: 560 gallons/min Depth (89ft) Top of Screen (54ft) Bottom of Screen (89ft) Has a Backup Generator Has a Transducer
Well #25	2023 Rate: 595 gallons/min Depth (70ft) Top of Screen (52ft) Bottom of Screen (70ft) Has a Backup Generator Has a Transducer
Well #26	*Under construction 2025* Rate: 800 gallons/min Depth (72ft) Top of Screen (51ft) Bottom of Screen (71ft) Has a Backup Generator Has a Transducer
Well #27	*Under construction 2025* Rate: 600 gallons/min Depth (80ft) Top of Screen (52ft) Bottom of Screen (77ft) Has a Backup Generator Has a Transducer

Storage	Description
Downtown Water Tower	500,000-gallon volume
Northern Water Tower	500,000-gallon volume

Water Quality

Water quality issues include uranium in Well #24 and historically high nitrates. Currently, blend all the wells so any uranium or nitrate issues are reduced.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	Yes	2014
Drought/Water Ordinance	Yes	Drought ordinance has two stages with triggers and management actions.
Water System Emergency Response Plan	Yes	Risk and Resilience Assessment Report Water System Emergency Response Plan - Emergency water source plan is to use bottled water. No written agreements, just contacts.
Water Study/Water System Engineering Report	Yes	2021 - PER

Plan / Study	Present	Description
Mutual Aid Agreements	No	

Recommendations

Key Concerns

- No mutual aid agreements in place
- Would like to have social media outreach materials for drought conservation
- If water quality continues to be an issue, a water treatment plant may be necessary
- Currently have four water operators, but five would be ideal

Best Management Practices & Mitigation Strategies

- Create a Social Media Program for Drought Conservation
- If Water Quality Do Not Improve, Construct a Water Treatment Plant
- Hire an Additional Water Operator

Wahoo Water System

Geographic Description

Wahoo is located in central Saunders County. The water system serves a population of 4,818 in the City.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	High	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.
Water Quality	High	Has no water quality issues above required federal or state guidelines.
Capabilities Ordinances / Plans	Low	Does not have a drought ordinance or minimal defined parameters. Does not have many other water system plans (Engineering Report, Water Study, etc.).
Capabilities Staff	High	Has adequate staff and institutional knowledge to understand and operate the water system.
Local Drought Monitoring	High	Regularly checks water levels and consumption (>1 a week). Has historical records that go back many years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Medium	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

Current Supply	8/10	Very comfortable with the current water supply meeting the community's needs during a drought event. The city feels like they have good well diversity.
Future Supply	8/10	A couple of new housing subdivisions are planned, but no major population growth is expected.

Drought History and Monitoring Protocols

No major past drought events requiring mandatory or voluntary restrictions. No reported drought impacts from past drought events.

Consumption Overview

Year	Annual Gallons Pumped
2017	221,400,000
2018	205,100,000

Average Daily Demand – 590,000 gallons
Maximum Daily Demand – 1,900,000 gallons

Monitoring Schedule

Schedule	Description
Normal Schedule	Daily
During Drought/High Usage	Daily.
Other Considerations	Concern is triggered when the drawdown is around 20 ft. Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
63-1 #4	1963 Depth (103ft) Rate: 1,200 gallons/min Top of Screen (73ft) Bottom of Screen (103ft) Has Backup Generator Has a Transducer
95-1 #5	1995 Rate: 1,000 gallons/min Depth (132ft) Top of Screen (89ft) Bottom of Screen (132ft) Has Backup Generator Has a Transducer
2009-1	2009 Rate: 760 gallons/min Depth (133.9ft) Top of Screen (102.5ft) Bottom of Screen (133ft) Has Backup Generator Has a Transducer
33-1 #1	*Emergency use only, not hooked up to the system.* Rate: 500 gallons/min

	Depth (85ft)
Storage	**Description**
Water Storage Tank Tower	750,000-gallon volume

Infrastructure Additional Information

- Wahoo provides water to the Village of Colon. The original Colon water system often had trouble meeting standards for nitrate and arsenic. This led to a cooperative project to run a 5-mile water line from Wahoo to Colon. The NRD operates both the rural water line and the Colon water utility, purchasing water from Wahoo for delivery to Colon residents.
- Wahoo provides backup water operators to other communities.

Water Quality

No water quality issues were identified.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	No	Wellhead Protection Map 2016
Drought/Water Ordinance	No	
Water System Emergency Response Plan	Yes	Risk and Resilience Assessment 2021 Water System Emergency Response Plan 2021 – No emergency water supply identified. Colon ERP 2021
Water Study/Water System Engineering Report	Yes	2020
Mutual Aid Agreements	Yes	NeWARN

Recommendations

Key Concerns

- Does not have a drought ordinance
- Existing regional drought tools are not being utilized
- Does not have an identified emergency water supply outside of the wells

Best Management Practices & Mitigation Strategies

- Work with the LPN NRD on Possibly Adding Groundwater Monitoring Wells Near the Community
- Increase Drought Monitoring at the Regional Level
- Create and Pass a Drought Ordinance
    - Tie in Increased Drought Monitoring
- Identify Alternative Emergency Water Sources

Weston Water System

Geographic Description

Weston is located in southern Saunders County. The water system serves a population of 250 in the Village.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	High	Is easily able to meet current and projected future demand. Drought has not caused any or only minor issues in the past.
Water Quality	High	Has no water quality issues above required federal or state guidelines.
Capabilities Ordinances / Plans	Low	Does not have a drought ordinance or minimal defined parameters. Does not have many other water system plans (Engineering Report, Water Study, etc.).
Capabilities Staff	Medium	Does not have any water operators on staff. Hires an outside company to handle the water system. Or Has minimal staff but agreements with other communities for emergency backup staff.
Local Drought Monitoring	Medium	Performs water levels and consumption monitoring fairly regularly (>1 a month). Has historical records that may or may not go back several years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Medium	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

Current Supply	10/10	Very comfortable with the current water supply meeting the community's needs during a drought event.
Future Supply	10/10	Not expecting major population growth or change within the next 10 years.

Drought History and Monitoring Protocols

No major past drought events requiring mandatory or voluntary restrictions. No reported impacts from past drought events.

Consumption Overview

Sell approximately 8 to 10 million gallons a year.

Monitoring Schedule

Schedule	Description
Normal Schedule	Monthly.
During Drought/High Usage	Monthly.
Other Considerations	Unsure at what water levels they would start having concerns. Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
2002-1	2002 Rate: 100 gallons/min Depth (177.3ft) Top of Screen (140ft) Bottom of Screen (175ft) Has a Backup Generator No Transducer
82-1	1982 Rate: 200 gallons/min Depth (124ft) Top of Screen (99ft) Bottom of Screen (124ft) No Backup Generator No Transducer
Storage	**Description**
Water Tower	80,000-gallon volume

Water Quality

Water quality issues. They have had to treat for coliform in the past.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	No	Wellhead Protection Map - 2005
Drought/Water Ordinance	No	

Plan / Study	Present	Description
Water System Emergency Response Plan	Yes	Unsure of emergency water supply.
Water Study/Water System Engineering Report	No	
Mutual Aid Agreements	Yes	Wahoo

Recommendations

Key Concerns

- Does not have a drought ordinance
- Existing regional drought tools are not being utilized
- Unsure of the community's emergency water source
- No transducers on wells

Best Management Practices & Mitigation Strategies

- Work with the LPN NRD on Possibly Adding Groundwater Monitoring Wells Near the Community
- Increase Drought Monitoring at a Local and Regional Level
- Create and Pass a Drought Ordinance
    - Tie in Increased Drought Monitoring
- Create Agreements or MOUs for Emergency Water Supplies
- Identify Alternative Emergency Water Sources
- Install Transducers on Wells

Yutan Water System

Geographic Description

Yutan is located in eastern Saunders County. The water system serves a population of 1,352 in the City.

Drought Resilience Matrix

Category	Rating	Rating Description
Water Quantity	Medium	Can meet current demand and likely some future growth demand. Drought has caused issues in the past.
Water Quality	High	Has no water quality issues above required federal or state guidelines.
Capabilities Ordinances / Plans	Low	Does not have a drought ordinance or minimal defined parameters. Does not have many other water system plans (Engineering Report, Water Study, etc.).
Capabilities Staff	High	Has adequate staff and institutional knowledge to understand and operate the water system.
Local Drought Monitoring	High	Regularly checks water levels and consumption (>1 a week). Has historical records that go back many years.
Regional Drought Monitoring	Low	Does not monitor any regional drought-related tools.
Emergency Supply	Medium	Is not connected to another water system. May have an MOU or agreement in place for emergency water. Would be able to provide adequate water if one well went down (1+ additional wells that can be used).
Local Funding Ability	Medium	Would have difficulty funding a large water system project (new well, water treatment plant, water storage, etc.) but would likely find a way to make it work. May have other large projects going on.

Overall Drought Comfortability:

Current Supply	10/10	Very comfortable with the current water supply meeting the community's needs during a drought event.
Future Supply	7/10	Significant anticipated growth within the next 1-10 years includes apartments and the possibility of a new subdivision. The option of adding a 3rd well is currently being discussed to meet the community's demands in the future.

Drought History and Monitoring Protocols

No major past drought events requiring mandatory or voluntary restrictions. No reported impacts from past drought events.

Consumption Overview

Year	Annual Water Produced
2016	8,745,000 gallons
2017	45,174,000 gallons
2018	45,800,000 gallons
2019	29,500,000 gallons

Consumption and water levels are tracked on paper.

Monitoring Schedule

Schedule	Description
Normal Schedule	Daily
During Drought/High Usage	Daily
Other Considerations	Unsure at what water levels they would start having concerns. Does not utilize regional drought monitoring tools.

Water System Infrastructure

Wells	Description
Well 69-1	*Inactive, possibly decommissioning* 1969 Rate: 250 gallons/minute Depth (232ft)
Well 2014-1	2014 Rate: 525 gallons/minute Depth (232ft) Top of Screen (182ft) Bottom of Screen (232ft) No Backup Generator Has a Transducer
Well 90-1	1990 Rate: 400gpm Depth (245ft) Top of Screen (?) Bottom of Screen (?) Has a Backup Generator Has a Transducer
Storage	**Description**
Water Tower	300,000-gallon volume

Infrastructure Additional Information

The community has discussed the addition of a third well within the next 5+ years to help meet future demand.

Water Quality

Iron and manganese are present in the system but do not exceed thresholds. The system chlorinates and flushes hydrants and water tower twice a year.

Existing Plans and Studies

Plan / Study	Present	Description
Wellhead Protection Plan	Yes	2002
Drought/Water Ordinance	Yes	Basic restricted use ordinance
Water System Emergency Response Plan	Yes	No MOUs or agreements for emergency water supply.
Water Study/Water System Engineering Report	Yes	2020
Mutual Aid Agreements	No	

Recommendations

Key Concerns

- Historical consumption and water levels are not stored electronically
- Does not have a well-defined drought ordinance
- Existing regional drought tools are not being utilized
- May need a 3rd well to meet future demand

Best Management Practices & Mitigation Strategies

- Install a Backup Generator for the Water Tower
- Drill a 3rd Well to Meet Future Demand
- Increase Drought Monitoring at a Regional Level
- Create and Pass a More Robust Drought Ordinance
    - Tie in Increased Drought Monitoring
- Work with the LPN NRD on Possibly Adding Groundwater Monitoring Wells Near the Community