

MEMORANDUM

To: Programs, Projects and Operations Subcommittee
From: Amanda Grint, Water Resources Engineer
Date: November 2, 2020
Re: Papio Watershed PL566 Site S-21 Completion of Federal Interest

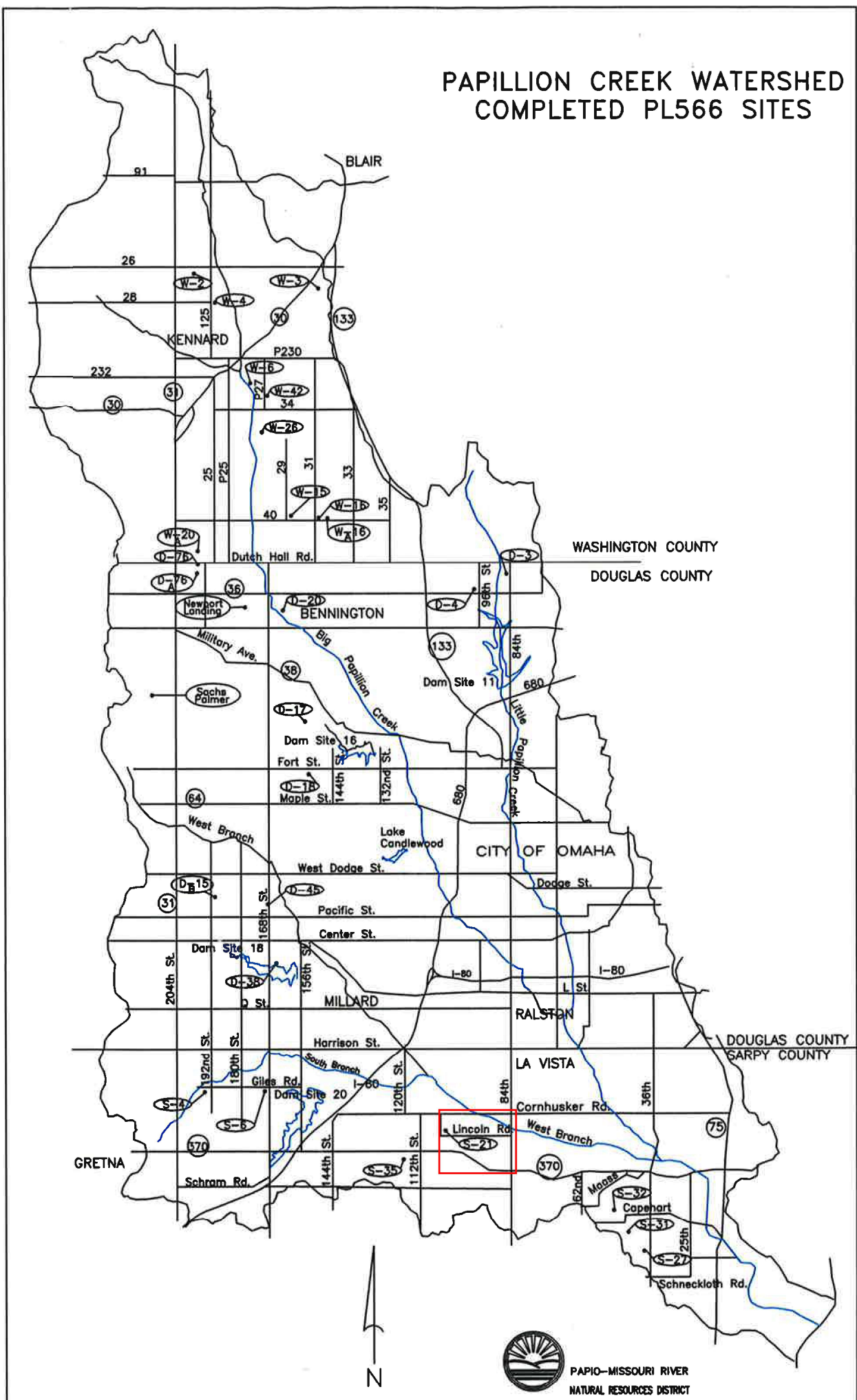
Papio Watershed PL 566 Site S-21 is a grade stabilization structure built in 1974. It included a 48-inch diameter corrugated steel pipe as the principal spillway and serves as county road crossing (108th Street near Lincoln Road) in Sarpy County, Nebraska, west of Papillion. See attached maps. The structure has not yet reached its 50-year design life. However, it is less than five years from reaching its design life and the District has requested that a Completion of Federal Interest be approved by the Natural Resources Conservation Service (NRCS). See attached Completion of Federal Interest document. Execution of this document is a federal requirement in order to remove an existing dam from the NRCS PL 566 program.

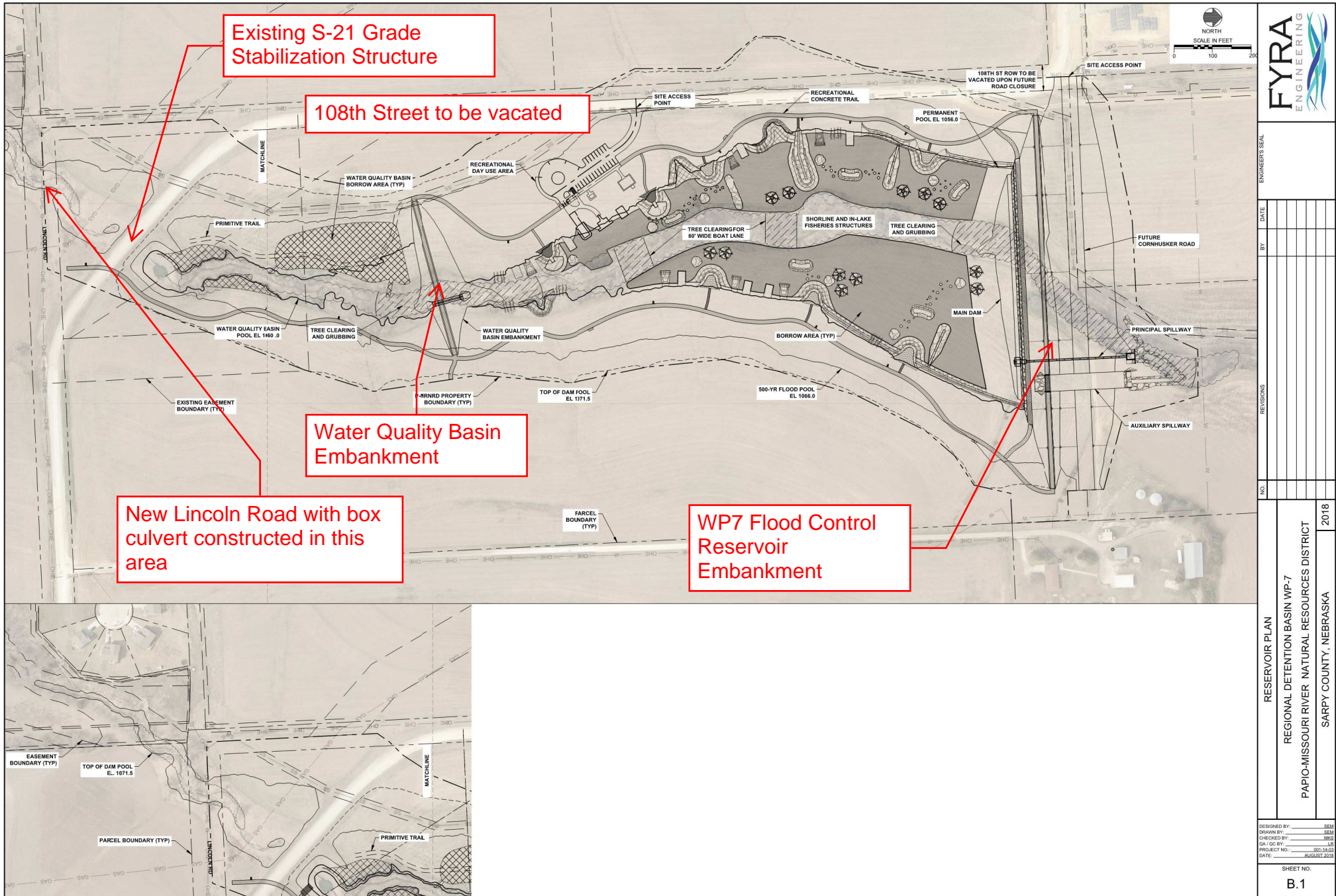
As a result of development in the area, a new section of Lincoln Road has been constructed as a major through street and the older 108th Street, where the grade control is located, has been vacated. With the construction of Lincoln Road, a box culvert was constructed just upstream of S-21 providing a hard point to stop stream degradation. Downstream of S-21, the District is constructing Big Elk flood control reservoir and water quality basin. Since both upstream and downstream conditions have changed, a plan was developed to establish a four-foot grade drop as part of the Big Elk flood control (WP7) project and remove the S-21 structure from the NRCS PL 566 program.

The District has worked with Nebraska NRCS staff on the completion of federal interest in S-21 and they concur with the District plan. A Completion of Federal Interest document attached for Board consideration. If the document is approved by the District Board it will then be signed by the General Manager and submitted to NRCS Headquarters for review and approval.

Staff recommends that the Subcommittee recommend to the Board that the General Manager be authorized to execute the Papillion Creek Watershed Site S-21 Completion of Federal Interest with NRCS subject to changes deemed necessary by the General Manager and approval as to form by District Legal Counsel.

PAPILLION CREEK WATERSHED COMPLETED PL566 SITES





Papillion Creek Watershed Site S-21

Completion of Federal Interest

October 2020

Background Information

The Papillion Creek Watershed Plan was completed in August 1966 and is still an active watershed today. It was prepared under the authority of the Watershed Protection and Flood Prevention Act. (Public Law 566, 83d Congress, 68 Stat. 666) It was prepared by the Soil Conservation Service, Sarpy Soil and Water Conservation District, Douglas Soil and Water Conservation District, Papio Soil and Water Conservation District, Douglas County Commissioners, Sarpy County Commissioners, Washington County Supervisors and Papio Watershed Board.

The sponsors were Douglas, Papio and Sarpy Soil and Water Conservation Districts and the Counties of Douglas, Sarpy and Washington. In 1972 Nebraska Natural Resource Districts were started and soon after, responsibility for many Watershed structures in Nebraska were transferred to the Natural Resources Districts including the Papillion Creek Watershed structures to the Papio NRD.

Documentation transferring Operation and Maintenance of Papio S-21 to the Papio NRD was signed March 10, 1983. The Papio NRD and the Middle Missouri Tributaries NRD merged in 1989 to become the Papio-Missouri River NRD. The project sponsor is now the Papio - Missouri River Natural Resources District (PMRNRD).

Planned structural works of improvement consisted of 52 grade stabilization structures. Papio Grade Stabilization Structure S-21 was completed in 1974. Cost of construction was \$32,822. It is in Sarpy County, Nebraska. The structure has been in place for 46 years of its 50-year plan life. The structure is a full-flow earth embankment structure with a drop inlet and 48-inch corrugated principal spillway pipe. Drainage area for the structure is 368 acres. This earth-fill structure is 26 feet high and contain 9,728 cubic yards of fill. The structure is in good condition.

The Papio-Missouri River NRD has provided excellent O&M for this site.

The Sponsor is in the process of constructing a flood control structure (dam), named Papio WP-7 immediately downstream of the Papio S-21 site. The Sponsor would propose to replace the Papio S-21 structure with a series of armored drops that are more compatible with the Papio WP-7 development and encroaching urban area.

Papillion Creek Watershed PLAN economics price base is 1965.

The nearest Census of Agriculture to the price base of 1965 is the 1964 Census of Agriculture. The most current available Census of Agriculture is the 2017 Census of Agriculture.

Table 1

	Change in Land Values		
	1964	2017	Increase in Value
Sarpy County	\$427	\$7,439	\$7,012
Nebraska (statewide)	\$109	\$2,645	\$2,645
Difference in value increase			\$4,367

The CPI index for the same time period:

$$1965 - 31.50 \quad 2017 - 245.12 \quad 245.12/31.50=7.78$$

Increase in Sarpy County land values:

$$1964 - \$427 \quad 2017 - \$7,439 \quad \$7,439/\$427=17.43$$

Agricultural land values in Sarpy County, Nebraska increased by a rate of 17.43 compared to an increase in the CPI rate of 7.78 during the same time period. Sarpy County agricultural land values increased by more than twice the rate than the CPI index.

This structure in place for 46 year has currently provided more than the planned 50-year benefits due to the steep increase in the land values that it has protected. The grade stabilization will continue to be provided by a series of armored drops to be constructed by the PMRNRD.

Therefore, both the sponsor, Papio-Missouri River Natural Resources District and the Natural Resources Conservation Service agree to end Federal Interest in the Papillion Creek Watershed Site S-21 structure.

Papio-Missouri River Natural Resources District

By _____

8901 S. 154th Street

Omaha, NE 68138-3621

Title _____

Date _____

The signing of this agreement was authorized by a resolution of governing body of the Papio-Missouri River Natural Resources District adopted at a meeting held on _____ (Date).

Secretary

Address

Zip Code

Natural Resources Conservation Service

United States Department of Agriculture

Approved by: _____

Date: _____

Appendix B

Supporting Data

TABLE 4 - ESTIMATED AVERAGE ANNUAL LAND DAMAGE REDUCTION BENEFITS
Papillion Creek Watershed, Nebraska
(Dollars) ^{1/}

Evaluation Unit	Amortization of Installation Costs ^{1/}	Operation and Maintenance ^{2/}	Total
<u>Grade Stabilization</u>			
<u>Structures (52)</u>			
D-2, 3, 4, 15, 15A, 15B, 17A, 18, 20, 23, 29, 31, 32, 38, 45, 49, 50, 54, 65, 76, 76A, 78			
S-1, 4, 5, 6, 7, 9, 15, 16, 17, 18, 21, 22, 24, 27, 30, 31, 32, 35			
W-2, 3, 4, 5, 6, 15, 16, 16A, 20, 20A, 26, 42	50,290	2,700 ^{3/}	52,990
Total	50,290	2,700 ^{3/}	52,990

^{1/} 1965 construction costs, amortized at 3 1/8 percent for 50 years.

^{2/} Long-term projected prices, 34 percent of construction costs.

^{3/} \$1,100 - Cash cost to sponsoring local organizations.

1,600 - Value of goods and services contributed by owners and operators of land upon whose property the works of improvement are located and the individual directors of the Papio Watershed Board.

August, 1966

TABLE 5 - ESTIMATED AVERAGE ANNUAL LAND DAMAGE REDUCTION BENEFITS
Papillion Creek Watershed, Nebraska
(Dollars) 1/

Item	Estimated Average Annual Damage 2/		Damage Reduction Benefit
	Without Project	With Project	
Erosion			
Gullies			
Agriculture	38,420	0	38,420
Urban	27,520	0	27,520
Bridges and Pipeline	1,560	0	1,560
Sediment	8,890	0	8,890
Indirect	6,940	0	6,940
Total	83,330	0	83,330

1/ Price base, long-term projected.

2/ This includes evaluated area only.

TABLE 6 - COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES
Papillion Creek Watershed, Nebraska
(Dollars) 1/

Evaluation Unit	Average Annual Benefits			Average Annual Cost	Benefit Cost Ratio
	Damage Reduction	Secondary 2/	Total		
<u>Grade Stabilization Structures (52)</u>					
D-2, 3, 4, 15, 15A, 15B, 17A, 18, 20, 23, 29, 31, 32, 38, 45, 49, 50, 54, 65, 76, 76A, 78					
S-1, 4, 5, 6, 7, 9, 15, 16, 17, 18, 21, 22, 24, 27, 30, 31, 32, 35					
W-2, 3, 4, 5, 6, 15, 16, 16A, 20, 20A, 26, 42	83,330	4,170	87,500	52,990	1.7:1
Total	83,330	4,170	87,500	52,990	1.7:1

1/ Price base - Benefits are long-term projected. Costs, see Table 4, Footnotes 1 and 2.

2/ Based on area depreciated without land treatment, farm crossings, roads, bridges, pipeline, sediment and urban.

Census by Year

2002
1997
1992
1987
1982
1978
1974
1969
1964
1959
1954
1950
1945
1940
1935

1964 Census Publications

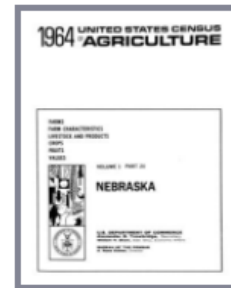
All files are in PDF format

Volume 1, Part 20:

Nebraska

INTRODUCTION

1. Introduction
2. State Map
3. Selected Measures of Agriculture: 1964 and 1959
4. Percent Change in Selected Measures of Agriculture: 1959 to 1964



Full PDF (31 MB)

STATE TABLES

Table Description

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NEBRASKA

TABLE 1. Farms, Acreage, and

[Data for value of land and buildings and land-use practices]

	SUBJECT	ROCK	SALINE	SARPY	SAUNDERS	SCOTTS BLUFF	SEWARD	SHERIDAN
1	FARMS NUMBER 1964 . .	270	1 347	587	1 842	1 371	1 399	792
2	1959 . .	319	1 507	648	2 062	1 555	1 549	942
3	APPROXIMATE LAND AREA ACRES 1964 . .	647 680	368 000	151 040	483 840	464 640	366 080	1 578 240
4	PROPORTION IN FARMS PERCENT 1964 . .	98.7	95.3	86.4	95.8	118.2	97.7	105.4
5	LAND IN FARMS ACRES 1964 . .	639 550	350 754	130 477	463 294	549 275	357 805	1 663 801
6	1959 . .	655 505	355 533	128 361	461 104	534 706	357 246	1 765 881
7	AVERAGE SIZE OF FARM ACRES 1964 . .	2 368.7	260.4	222.3	251.5	400.6	255.8	2 100.8
8	1959 . .	2 054.9	235.9	198.1	223.6	343.9	230.6	1 874.6
9	VALUE OF LAND AND BUILDINGS: DOLLARS 1964 . .	129 444	50 083	95 281	56 916	68 640	55 833	102 072
10	AVERAGE PER FARM DOLLARS 1959 . .	84 686	41 930	62 642	46 522	49 085	40 880	79 840
11	AVERAGE PER ACRE DOLLARS 1964 . .	54.11	187.65	426.77	227.13	168.62	228.17	48.64
12	1959 . .	38.26	168.13	297.68	196.94	140.82	172.17	43.08
13	PROPORTION OF FARMS REPORTING PERCENT 1964 . .	100	100	100	100	100	100	100
14	1959 . .	52	70	62	79	79	73	80

Table 8. Farms, Land in Farms, Value of Land and Buildings, and Land Use: 2017 and 2012 (continued)

[For meaning of abbreviations and symbols, see introductory text.]

Item	Red Willow	Richardson	Rock	Saline	Sarpy	Saunders	Scotts Bluff
FARMS AND LAND IN FARMS							
Farms number, 2017	333	708	220	717	417	1,118	760
2012	405	736	247	756	396	1,204	966
Land in farms acres, 2017	439,377	341,944	583,993	360,323	99,472	479,761	441,624
2012	419,608	319,179	644,551	361,904	91,718	469,462	445,217
Average size of farm acres, 2017	1,319	483	2,655	503	239	429	581
2012	1,036	434	2,610	479	232	390	461
Estimated market value of land and buildings farms, 2017	333	708	220	717	417	1,118	760
2012	405	736	247	756	396	1,204	966
\$1,000, 2017	855,319	1,459,222	664,392	1,699,395	739,985	2,706,512	899,924
2012	668,937	1,216,852	694,967	1,743,522	546,533	2,473,201	831,190
Average per farm dollars, 2017	2,568,525	2,061,048	3,019,965	2,370,146	1,774,545	2,420,851	1,184,110
2012	1,651,696	1,653,331	2,813,630	2,306,246	1,380,135	2,054,153	860,445
Average per acre dollars, 2017	1,947	4,267	1,138	4,716	7,439	5,641	2,038
2012	1,594	3,812	1,078	4,818	5,959	5,268	1,867

Appendix B

Request from Sponsor Letter

Completion of Federal Interest Program Report



To: Arlis Plummer, Nebraska NRCS
From: Amanda Grint, Water Resources Engineer
Date: June 23, 2020
Re: Completion of Federal Interest Report for Papio Site S-21 Grade Control Structure

Papio Site S-21 was built in 1974 and is a grade stabilization structure constructed of corrugated steel pipes at a road crossing (108th Street) in Sarpy County, Nebraska. The structure has not yet reached its lifespan however, it is less than five years from reaching it and the Papio-Missouri River NRD (P-MRNRD) requests that a Completion of Federal Interest be approved.

Recently, development in the area along with one of the P-MRNRD projects have had an impact on the S-21 structure. Development in the area has caused for a new road, Lincoln Road, to be constructed as a major through street and the older 108th Street, where the grade control is located, has been vacated. With the construction of Lincoln Road, a box culvert was constructed just upstream of S-21 providing a hard point to stop stream degradation at its outlet elevation of 1065.0 ft. The existing S-21 structure has a riser inlet elevation of 1064.0 ft and an outlet elevation of 1050.5 ft. Downstream of S-21, the P-MRNRD is constructing a flood control reservoir and water quality basin. S-21 outlets directly in to a permanent pool of water in the water quality basin which is at elevation 1060.0 ft. The difference in grade that we propose to make up is 4 ft, difference between S-21 inlet, 1064.0 ft and water quality pool, 1060.0 ft. For the reason of upstream and downstream development and conditions, we request that S-21 be removed.

The P-MRNRD has looked at the alternative of leaving the structure in place however, due to the lifespan of the structure's materials, the development in the area, the vacated roadway and the continued maintenance, this alternative was eliminated. Additionally, we looked at a 4-foot weir structure upstream of the water quality basin but with the number of homes in the area and the proximity to what will be a public recreation area (WP7 flood control reservoir), the proposed alternative with more gradual 1-foot grade drops was determined to be safer. The proposed alternative fits in with the current surroundings the best while still providing the needed grade control.

Enclosed please find the removal plan which shows our design to account for the 4-foot drop in grade and a profile.

A summary of the design concept is as follows:

- 4 ft elevation difference between NRCS riser structure inlet (El. 1064) and downstream water quality basin pool elevation (El 1060)
- 48" CMP NRCS outlet pipe (El. 1050.5) is completely submerged by water quality basin pool

- Excavate existing NRCS structure to grades identified on sheet R.1 and R.2 creating a meandering low flow channel with four 1-ft armored drops to achieve the required grade difference
- Geoweb to be placed in channel bed for stabilization; channel bed is intended to vegetate
- Berms graded approximately 1 ft above the channel grade that will be overtopped with a 2-year event
- Berms will be armored with rock riprap and topped with topsoil to encourage vegetated growth
- Design was run through a 2-D HEC-RAS model to determine velocities and guide stabilization methods, as well as to verify no negative impacts to Lincoln Rd culvert upstream
- Keep NRCS riser structure and pipe in place to take on flow while vegetation establishes
- Options for NRCS riser structure and pipe once vegetation has established:
 - Construct a manhole/area inlet over the riser inlet that can be opened to help maintain vegetation
 - Wait 5 years while mitigation monitoring is required and then plug and abandon
 - Do not plug and abandon to use as needed
 - Keep riser open and allow to help pass high flows

The cost of the work to provide the grade control as shown on the plans, if approved, will be change ordered in to the work that is already ongoing with a contractor for the P-MRNRD flood control reservoir and water quality basin. The estimated cost for Completion of Federal Interest is listed below:

Table 1. Design Concept Cost Estimate

Item	Unit	Quantity	Unit Cost	Total Cost
Strip, Stockpile and Replace Topsoil*	CY	392	\$ 8.00	\$ 3,136.00
Handling of Water*	LS	1	\$ 4,000.00	\$ 4,000.00
Erosion Control Matting	SY	1267	\$ 0.94	\$ 1,190.98
Common Excavation	CY	1591	\$ 3.33	\$ 5,298.03
Earthen Embankment - Class "A"	CY	216	\$ 5.28	\$ 1,140.48
Class "B" Rock Riprap	TN	159	\$ 54.53	\$ 8,670.27
6" Geoweb*	SY	438	\$ 12.00	\$ 5,256.00
Flowable Fill (Pipe Abandonment)	CY	71	\$ 57.00	\$ 4,047.00
Seeding - Conservation Buffer Mix	AC	0.4	\$ 888.53	\$ 355.41
Subtotal				\$ 33,094.17
Contingency				15%
Total				\$ 38,058.30