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Nebraska Soil and Water Conservation Commission

# Annual Watershed Planning Report

STATE SOIL AND WATER  
CONSERVATION COMMISSION  
Box 9472, State House Sta.  
Lincoln, Nebraska 68509

Pla. 4

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Watershed Planning Section  
Soil and Water  
Conservation Commission

PROGRAMS:

SOIL & WATER CONSERVATION  
WATERSHED PROTECTION  
FLOOD CONTROL  
RIVER BASIN INVESTIGATIONS  
FLOOD PLAIN STUDIES  
STATE WATER PLAN

State of Nebraska  
Soil and Water Conservation Commission



February 10, 1969

TO: Warren D. Fairchild  
Executive Secretary  
Nebraska Soil and Water Conservation Commission

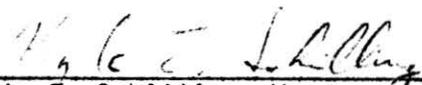
James Owen  
Chief, Planning Division  
Nebraska Soil and Water Conservation Commission

FROM: Kyle E. Schilling  
Head, Watershed Planning Section  
Nebraska Soil and Water Conservation Commission

This brief report is to condense the past year's activities for the Watershed Planning Section. The data contained herein shows that significant progress has been made toward the state's ultimate objective of developing additional Public Law 566 Watershed Work Plans over and above what could be provided by the federal government.

A considerable portion of the year's activities have involved training of the section's key personnel. As in any new technical endeavor, this has meant that much of our personnel's initial time was not devoted to active production; however, substantial progress is still evident in the enclosed summarization of planning results.

I hope you will find this report a suitable document for evaluation of the Watershed Planning Section's progress during the calendar year, 1968.

  
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Kyle E. Schilling, Head  
Watershed Planning Section

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## INTRODUCTION

The Watershed Planning Section of the State Soil and Water Conservation Commission has two major programs. The oldest provides aid to the Soil Conservation Service through surveying and kesh plotting assistance for planning in the small watershed program administered by the Soil Conservation Service. This service was started in 1959 with two survey crews and today there are three crews surveying for the Soil Conservation Service as well as the Watershed Planning Section of the Soil and Water Conservation Commission. In 1968 the survey crews worked on 16 watersheds for the Soil Conservation Service and 7 watersheds for the State Watershed Planning Section. The kesh plotting unit has worked on 7 watersheds for the Soil Conservation Service and 4 watersheds for the State Watershed Planning Section

The second major program of the State Watershed Planning Section is the planning of watersheds under Public Law 566, the Small Watershed Act. The necessity of this program became apparent following the rains of the summer of 1967. The Soil Conservation Service had a large back log of work and the Nebraska Legislature in recognition of the need for increased P.L. 566 planning capability provided funds to staff at the state level another watershed planning unit to augment the planning as provided by the Soil Conservation Service. Most of the key personnel have been hired, but one key position remains unfilled. Hopefully, it will be filled in the near future. Much of the past year has been devoted to training personnel and developing working and review procedures with the Soil Conservation Service. However, significant productive work has been accomplished on 7 of the 9 watersheds assigned to the Commission for planning.

## SURVEYING

During 1968, the survey crews worked on 16 watersheds for the Soil Conservation Service and 7 for the State Soil and Water Conservation Commission. Surveying, to establish elevations of all critical points, determine valley cross sections, stream profiles, the capacity of bridges and channels, is the starting point of watershed planning. This information is later used by the hydrologist to determine peak flows and capacities of the various watercourses, by the engineer to select structure sites, and by the economist to determine damages and to calculate benefits from proposed works of improvement. Additional surveys are needed later in the planning process to define and evaluate structural measures.

The Commission Watershed Planning Section provides 100 percent of all planning surveys needed by the Soil Conservation Service as well as the surveying necessary to meet its own needs. Types of surveys accomplished during 1968 are shown in Tables 1a and 1b.

TABLE 1a S.C.S. WATERSHEDS

WATERSHED	COUNTY	ACREAGE	VERTICAL CONTROL	STREAM PROFILE	VALLEY X SECTION	BRIDGE X SECTION	KELSH CONTROL	CHANNEL	CREW HOURS 3-MEN
Turkey Creek	Johnson, Pawnee, Nemaha, & Marshall in Kansas	179,420	*	100%	100%	100%			875
Winnebago-Bean	Richardson	12,100	*	*	*	*	100%		41
Blackwood	Hayes, Hitchcock	151,000	50%		100%				348
Long Branch	Johnson, Nemaha, Pawnee & Richardson	46,080	*	*	100%	100%			100
Tekamah-Mud	Burt	18,055	*	*	*	*	100%		58
Ash-Plum	Garden	18,100	*	*	*	*	*	100%	318
Middle-Big Nemaha	Johnson, Gage, Pawnee	136,475	*	*	100%	100%			261
South Fork	Pawnee, Richardson	30,400	20%						56
Antelope-Beaver	Cedar, Knox	60,577	*	*	*	*	*	100%	100
Rock Creek	Saunders, Lancaster	83,840	*	*	*	*	100%		152
Box Elder	Buffalo, Hall	16,280	*	*	*	*		75%	332
Lower Big Nemaha	Otoe, Johnson, Nemaha & Richardson	138,260	100%		90%	100%			198
Big Muddy	Richardson, Johnson & Nemaha	183,680	*	*	100%	100%			288
Clear Creek	Saunders	36,710	*	*	*	*		100%	84
Upper Salt	Lancaster, Saline, Saunders	114,408	*	*	*	*		100%	110
Wolf Wildcat	Gage, Pawnee	57,710	*	*	*	*	100%		236

TABLE 1b  
 COMMISSION WATERSHEDS

WATERSHED	COUNTY	ACREAGE	VERTICAL CONTROL	STREAM PROFILE	VALLEY X SECTION	BRIDGE X SECTION	KELSH CONTROL	CHANNEL	CREW HOURS 3-MEN
Dogtown	Fillmore	17,980							
Balls Branch	Thayer, Jefferson	13,200	100%	100%	100%	*	100%		172
Wahoo	Saunders	235,530	100%	100%	100%	100%			400
Bone	Butler	46,120							
Humbug	Wayne, Stanton	42,420	100%	100%	100%	100%			246
Lost and Dry	Phelps, Kearney	183,040	100%		15%		100%		211
Twin	Phelps	94,720	100%	100%	100%	90%	100%		633
Winters Creek	Scottsbluff, Sioux	89,710	100%	100%	100%	100%			218
Creighton Valley	Scottsbluff, Banner	32,000	*	100%	100%	*	100%		326
									5,765**

\* This surveying has been done in prior years.

\*\* One (1) crew hour equals on the average three man-hours. An additional 2,000 man-hours each of supervisory and office assistance is required each year.

## KELSH PLOTTING

The Watershed Planning Section also furnished all kelsh plotting assistance needed by the Soil Conservation Service as well as that necessary to meet its own needs. Kelsh plotting is the determination by photogrammetric means of ground elevations and contour lines from low level aerial photos. It cuts the cost and time for topographic maps on flood water reservoir sites by approximately 50 percent over conventional methods.

The kelsh plotting portion of the Commission's activities began modestly in 1966 to assist the Soil Conservation Service plotting operations and has grown through need to its present capacity. The 1968 progress of the kelsh plotting unit is shown on Table 2.

TABLE 2  
KELSH PLOTTING PROGRESS 1968

Watersheds	Counties	Acres	Plotting Man Hours	Drafting Man Hours
Tekamah-Mud	Burt	18,055	252	267
Winnebago-Bean	Richardson	12,100	120	124
South Fork	Pawnee, Richardson	30,400	240	251
Spring Creek	Dawson, Custer	175,000	16	20
Rock Creek	Saunders, Lancaster	83,840	288	304
Wolf-Wildcat	Gage, Pawnee	57,710	440	498
Blackwood	Hayes, Hitchcock	151,000	160	
*Papio	Washington, Sarpy, & Douglas	246,000	48	56
Winters Creek	Scottsbluff, Sioux	89,710	200	225
Creighton Valley	Scottsbluff, Banner	32,000	168	189
Balls Branch	Thayer, Jefferson	13,200	280	315
Lost and Dry	Phelps, Kearney	183,040	683	530
			<u>2,895</u>	<u>2,807</u>

\* Figures do not include approximately 2,000 man hours each of supervisors and photo laboratory work.

## OTHER ASSISTANCE TO THE SOIL CONSERVATION SERVICE

The Watershed Planning Section also furnished one engineering technician to the Soil Conservation Service in 1968, and has done so since 1959. The technician was permanently assigned to the Soil Conservation Service Watershed Planning Party in the state office. This technician assisted the planning party by planimetering acreages for storage in flood control structures and performing routine engineering calculations.

## WORK PLAN DEVELOPMENT

The development of actual Public Law 566 Watershed Work Plans was authorized by the Legislature in July of 1967. Since that time, three of the necessary four key positions have been filled, and one position's functions have been provided as available, at cost, by the Soil Conservation Service.

Work plan development consists of interpreting basic physical, hydrologic, economic, and geologic data in such a way as to develop an optimum engineering solution to a watershed's problems within the limits of feasibility. Data must be gathered in a logical, sequential order if proper decisions are to be made. That order is generally as shown on Table 3. The table shows that much of the early time-consuming work has been completed in 1968 and that the goal of plan completion is drawing near.

TABLE 3

WORK PLAN PROGRESS  
COMMISSION WATERSHEDS

	% Complete
Authorized	
Work Plan Prepared	
Sponsors Acceptance	
Agency Reviews	
Select Plan	
Present to Sponsors	
Final Alternate Comparison	
Benefit Determination	
Cost Estimates	
Refined Hydrology	
Detailed Engineering	
Detailed Geology	
Detailed Economics	
Site Surveys	
Planning Authorization	
P.I. Report	
Present to Sponsors	
Compare Alternatives	
Benefits	
Costs	
Preliminary Geology	
Preliminary Economics	
Prel. Engineering	
Preliminary Hydrology	
Basic Surveys	
Basic Data	
Exeter-Dogtown	0
Balls Branch	35
Wahoo	15
Bone	5
Humbug	10
Lost-Dry	5
Twin	10
Winters Creek	70
Creighton Valley	30

SUMMARY OF PLANNING STATUS  
1968

EXETER-DOGTOWN

Planning will be initiated on this watershed as soon as the current limits of the problem area and that of the watershed can be defined.

BALLS BRANCH

The Preliminary Investigation Report for Balls Branch Watershed has been discussed with the local sponsors. Some additional work is being done to meet the sponsors desires and to arrive at a more definite estimate of the cost of anchoring a 20" crude oil pipe line which is in the permanent pool area of one proposed reservoir. The plan is to present the Preliminary Investigation Report with the additional information to the local sponsors in February for their approval.

WAHOO

Vertical control, valley cross sections and bridge cross sections have been completed by the survey crews in Wahoo Creek Watershed. Economic and engineering investigations have been initiated. Hydrologic data is being developed in the U.S.D.A. Computer Center. Approximately 15 percent of the work for a Watershed Work Plan has been completed.

BONE

Basic information such as 3.2" to the mile aerial photographs and drainage maps have been secured. As soon as scheduling permits, survey crews will initiate preliminary surveys.

HUMBUG

Survey crews have completed vertical control and have run valley cross sections in Humbug Creek Watershed. Economic investigations have been initiated and hydrologic data is being prepared in the U.S.D.A. Computer Center. Approximately 10 percent of the work needed for a work plan has been completed.

LOST-DRY and TWIN

The watershed problems and their areas are in continuity in Lost-Dry and Twin Creek Watersheds so the Watershed Planning Section of the State Soil and Water Conservation Commission is planning these two watersheds together. The vertical control has been run and valley cross sections are essentially complete; hydrologic and economic investigations have been initiated. Meetings have been held with the Bureau of Reclamation, the Soil Conservation Service, the Army Corps of Engineers and the Tri-County Irrigation District to coordinate each organization's planning activities in the area.

WINTERS CREEK

The Preliminary Investigation Report for Winters Creek Watershed has been completed and accepted by the local sponsors. It has been approved by the Administer of the Soil Conservation Service in Washington for Watershed Work Plan development. A working draft of the Watershed Work Plan is complete. Structural details and cost estimates will be refined with additional hydrologic information on the break frequency of the Tri-State Irrigation Canal and additional information on the mechanical analysis of the soil from the reservoir area and proposed channel locations.

The Watershed Planning Section is also working on additional material with the Fish and Game Commission to determine the feasibility of maintaining trout fishing and spawning grounds in Winters Creek.

#### CREIGHTON VALLEY

The preliminary study phases and data collection necessary for the development of a Preliminary Investigation Report are nearly complete. Costs, benefits and alternative structural schemes will be compared and prepared for presentation to the sponsors during the spring of 1969.

## FUNDS EXPENDED: WATERSHED PLANNING

January 1, 1968 to December 31, 1968

	<u>Kelsh</u>	<u>Planning</u>	<u>Survey</u>	<u>SCS</u>	<u>Total</u>
Salaries	\$29,200	\$66,800	\$63,148	\$7,825	\$166,973
Travel		5,000	15,000		20,000
Contracts		6,315			6,315
Capital	9,000	2,500	1,500		13,000
Supplies	5,300	5,800	3,233		14,333
Total	\$43,500	\$86,415	\$82,881	\$7,825	\$220,621