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NORTH DAKOTA
STATE PLANNING BOARD

SUMMARY REPORT

OF

A PLAN OF WATER CONSERVATION

FOR

NORTH DAKOTA

VOLUME 2

JAMES RIVER DRAINAGE BASIN

JANUARY 1, 1937

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WATER PROGRAM

James River Basin

GENERAL

The James River rises in Wells County in Central North Dakota. It follows a tortuous course generally southeastward until it leaves the state in southeastern Dickey County. It drains an area in North Dakota of approximately 7,199 square miles, an area roughly 55 miles wide and 140 miles long. The valley through which the James River flows is about 100 feet deep, and from a few hundred feet to three miles in width. The river channel itself varies from 25 to 100 feet in width. The slope of the river bottom at the headwaters is about 2.5 feet per mile and it decreases to approximately .3 of a foot per mile at the state boundary.

The Basin is located in the midst of the drift prairie in North Dakota. The eastern portion is gently rolling but the western portion rises to the continental divide and is more hilly.

POPULATION

According to the 1930 census the population of the James River Basin in North Dakota was 73,577 persons. While the population of the Basin is predominantly rural, there is one urban center, Jamestown, with a population of 8,187. In addition to Jamestown there are 32 incorporated villages and cities. Nine of these have a population of over 500. Fessenden has 738, Ellendale 1,264, Oakes 1,709, New Rockford 2,195, Carrington 1,717, Streeter 711, Kulm 742, LaMoure 889, and Edgely 821.

RELIEF

During the peak month, March 1935, there were 25,367 persons receiving federal aid in the Basin. This represents 34.5% of the total population. This compares with the peak state average of 31.6%.

TOPOGRAPHY

The land in the Basin rises gradually from an elevation of about 1,300 at the state line to about 1,580 feet at the headwaters. The upper part of the river is merely a series of small ponds or sloughs, with the channel poorly defined. The tributary drainage has many shallow, undrained depressions characteristic of ground moraine topography. These undrained depressions occasionally contain some water, since the subsoil is so impervious that under ground seepage is slow. There are few or no permanent lakes except in the recessional moraine belts, and these are small and shallow. There are a few low bluffs in the southern part of the Basin in North Dakota.

NATURAL DRAINAGE

The drainage is toward the main stem of the James River. The Pipestem River has its source within a few miles of that of the James River but it flows continuously southeastward and joins the James at Jamestown whereas the James meanders west, north and east before turning southward to Jamestown. The Pipestem River drains much of the northwestern portion of the Basin.

SOILS

Most of the Basin has clay-loam derived from glacial drift, known as Carrington clay-loam. Over much of the area this soil is rich in humus and favorable to agricultural uses. There is some marginal land, especially in the western portion of the Basin. None of the Basin is forested.

RECREATION

There is a need for the development of recreational areas in the Basin. A primary recreational survey of the counties in the Basin shows that a number of small dams are needed to provide adequate recreational facilities. In Stutsman County, Arrowood, Spiritwood, and Jim Lakes make excellent recreational areas. Berising Lake in McIntosh County could be developed as could Lake Claire in Eddy County. There are six small lakes in Foster County which are possible recreational centers. The water level in these could be raised by small dams.

DRAINAGE FLOODS & STREAM REGULATION

During spring-run-off the James River and tributary stream channels are filled to capacity and often overflow. The surrounding lowlands are flooded but when the rivers recede the water drains off without the assistance of drainage ditches. There are only a few drainage systems in the Basin. These have been developed by individuals. There seems to be no need for any additional drainage facilities. During an average year many of the streams become nearly dry and during dry years the only flowing water found in the area is where there are abundant springs at the headwaters of small streams. Regulation of stream flow is the paramount problem in the Basin. Large reservoirs must be created to store the excess spring flow thereby preventing floods and facilitating the maintenance of stream flow in the James River during dry seasons.

IRRIGATION

At the present time there is no irrigation practiced in the James River Basin in North Dakota. Irrigation in this Basin is impractical. Some flood irrigation can be developed along the Pipestem River.

NAVIGATION

The James River is not used for navigation purposes in North Dakota.

WATER POWER

Hydroelectric developments in the Basin are impracticable because of the wide, flat bottoms, low banks, slight slope, and low run-off of the streams. In the upper reaches of the river or its tributaries where the drop is great enough the flow is so small and erratic that the small amount of intermittent power developed would be very expensive. Water-power can be eliminated in the development of a water plan for the Basin.

MUNICIPAL SUPPLY PROBLEMS

Most of the towns in the Basin are supplied with an ample supply of satisfactory water from shallow wells. A few towns have individual problems, however. Oakes appears to have an ample supply

of water for consumption from a series of wells. LaMoure also receives its water supply from wells. The water level in this well has been declining and has caused some concern. At present Jamestown gets an adequate water supply from sub-surface water by means of 7 wells which have shown very little decline in water level even in drought years. If it should become necessary to use a surface source of supply in order to insure an adequate water supply, it would be necessary to construct a treatment plant also. New Rockford has four wells and the supply from this source appears adequate for the future.

PROPOSED
IMPROVEMENTS
IN MUNICIPAL
WATER SUP-
PLIES.

Although the larger municipalities in the Basin appear to be assured of an adequate water supply from shallow wells for some time to come, it may be that at some future day it will be necessary to develop a surface supply. Jamestown could be supplied from the large reservoir on the Pipestem River proposed in this report.

It is proposed that, if occasion demands, the dam as proposed by the U. S. Army Engineer Corps be built to supply LaMoure. A CCC dam has been built at this location and, although it is not large enough to furnish a surface supply it will probably maintain the level in the shallow wells from which LaMoure receives its supply. A tabulated list of towns in the Basin having water problems and the proposed solution of these problems is given in Table B, and are shown on Plate I. In general it may be said that where a town supply is inadequate or unsatisfactory a survey must be made to determine the best location for shallow wells and the source thus located developed to give a satisfactory supply. Deep wells can be obtained in most parts of the Basin but they generally produce water which is too high in dissolved mineral content to be satisfactory for human consumption.

POLLUTION
OF STREAMS

A number of towns along the James River and its tributaries discharge untreated, sewage into the streams. Others have inadequate sewage treatment plants. Although Jamestown has a new and adequate treatment plant an unhealthy condition exists along the streams during summer months because of stream flow deficiency. A list of towns in the Basin having sewage disposal problems and the proposed solution of these problems is given in Table C, and are also shown on Plate I.

PRESENT
RESERVOIRS

There are at present a total of 102 dams and reservoirs in the James River Drainage Basin in North Dakota. These range in reservoir capacity from 10,000 acre feet or more as created in Arrowood Lake by the U. S. Bureau of Biological Survey to 2 or 3 acre feet in small reservoirs created by individual farmers for stock watering purposes. The total created storage capacity in the Basin is 20,635 acre feet. The total construction cost to provide this storage was \$384,400. A listing of these reservoirs is given in Table A and they are shown on Plate II.

ULTIMATE
DEVELOPMENT

The ultimate development of the surface water resources of the Basin would be provided by storage reservoirs sufficiently large and properly located to maintain a regulated flow in the James River and provide water along the main stream for sewage dilution, recreation, and stock watering purposes. Small dams creating reservoirs of from 20 to several hundred acre-feet capacity should be built up stream from the large reservoirs and along tributary streams where such reservoirs are desirable for recreational and stock watering purposes. A third general type of project is that of the restoration of some lakes in the area. In some cases this may be done by merely placing a dam at the outlet to the lake thus increasing its storage capacity. In other cases it is desirable to place a channel dam in a near by stream and divert part or all of the flow of the stream into the lake bed through the natural lake outlet or through a diversion ditch constructed for that purpose. Such recreated lakes would furnish recreational facilities for a large surrounding territory and would create excellent nesting grounds for migratory waterfowl in several cases.

PROPOSED
PROGRAM

It is proposed that several additional small dams be constructed in the Basin. It is further proposed that a large reservoir on the Pipestem River be created. In addition it is proposed that a moderate sized reservoir be created on the James River in section 11-146-64.

REGULATING
RESERVOIRS

The large reservoir on the Pipestem River, and the reservoir in section 11-146-64 would serve as flood control and flow regulating reservoirs. The Pipestem Reservoir in itself would probably provide sufficient flow regulation in the James River at Jamestown, LaMoure, and Oakes to properly dilute the treated sewage and to provide for stock watering along the stream from Jamestown to the South Dakota-North Dakota Boundary. The additional regulation from the reservoir on the James River would help maintain the level in the Biological Survey reservoirs on the James River. Proposed improvements in use of surface water resources of the James River Basin are listed in Table D and are shown on Plate II.

MISSOURI
RIVER
DIVERSION

The construction of the Missouri River Diversion Project, as outlined in the Devils Lake report, would make possible the diversion of a minimum of 200 cubic feet per second into the headwaters of the James River. This quantity of water would provide minimum stream flow greatly in excess of any minimum flow that could be obtained by utilizing the run-off from the Basin alone. The economic benefits to the inhabitants along the entire length of the river of such a flow becomes evident when it is realized that many of the municipalities that have reservoirs on the James River for water supply have been forced to obtain their water elsewhere during the drought of 1936 at considerable cost.

The U. S. Bureau of Biological Survey has a large investment in two waterfowl refuges on the river. There is not sufficient water during dry years to maintain their reservoirs at crest elevation. There is also an indefinite future with increased flow in the river for purposes of pollution abatement, recreation, wildfowl conservation, and municipal supply.

Details of the various suggested methods for diversion of water from the Missouri River are given in the Devils Lake Report.

ARROWOOD
RESERVOIR
AND THE
BIOLOGICAL
SURVEY

No consideration was given to the Arrowood Reservoir which would be created by a dam located in Statsman County section 14-141-64. This reservoir would have a storage capacity of 65,000 acre feet and would provide a regulated flow of 12 cubic feet per second below the dam. This reservoir is not proposed because of a number of considerations. The U. S. Bureau of Biological Survey has a fine migratory waterfowl refuge located along the James River in this area and their reservoirs and marsh areas would be completely submerged if the Arrowood Reservoirs were created. Although the maintenance of wildlife refuges is secondary to the consideration of obtaining water for municipal use, it is desirable to maintain such a refuge as the Arrowood and Jim Lakes Refuge if it is also possible to obtain sufficient water for municipal purposes.

WATER
AUTHORITY

It is proposed that a water authority having complete control over the use of waters in the James River be created by legislative action. It is further proposed that such an authority have as its primary purpose the maintenance when possible of sufficient water in the James River at Jamestown and points below to give proper sewage dilution and to permit the use of the waters for municipal supply and recreational purposes.

PIPESTEM
RESERVOIR
& JAMESTOWN
WATER SUPPLY

In addition to stream flow regulation and flood control, the Pipestem Reservoir could also be used as a surface water supply for the city of Jamestown. However, there seems to be an ample supply in the underground reservoir which can be tapped by additional wells for any demand anticipated for Jamestown in the near future. The Pipestem Reservoir would possibly also recharge this underground reservoir somewhat since it would be located within a few miles of Jamestown.

FLOOD
IRRIGATION

It has been found that land which is flooded during spring run-off and becomes completely saturated will produce a crop of hay and small grain even if the rainfall during the growing season is considerably below normal. Small dams with stop logs may be used at certain favorable locations to flood the surrounding lowlands during spring run-off. This process is called flood-irrigation. Several favorable sites for such projects are proposed for development.

RUN-OFF
EVAPORATION

The average annual run-off of the James River Basin is 8 acre feet per square mile and the minimum annual run-off is .5 acre feet

per square mile.

The average annual precipitation for the Basin is 18.41 inches and the average of the station minimums is 10.47.

The net evaporation in a normal year is 1.1 acre foot per acre and in a dry year it is 1.75 acre feet per acre. During an average year one square mile of drainage will support 7.3 acres of water surface and in a dry year it will support .29 acres of water surface.

RURAL
WATER
SUPPLY

A large number of small reservoirs have been proposed for the Sub-basin by various agencies. Those that would serve purposes of recreation, irrigation, and waterfowl refuges have been included in the proposed programs. It is proposed that before any more small dams for stock watering purposes be constructed in the Sub-basin, a detailed survey of rural water supply be undertaken to determine the best and most economical method of securing adequate and satisfactory water supplies for stock watering purposes. Where an adequate ground water supply is available it is probable that this would be through the construction of community wells. In other localities not having a reliable ground water supply the construction of surface reservoirs would be the only alternative. Following such a survey it is proposed that assistance be given in developing an adequate rural water supply.

WEATHER
OBSERVATION
AND STREAM
GAGING
STATIONS

Active weather observation stations in the James River Basin are shown on Plate III. No additional stations are proposed but it is urged that all existing stations be maintained. It is further proposed that a stream gaging station be installed at Jamestown to record the flow of the James River through that city. This is also shown on Plate III.

TABLE A

EXISTING RESERVOIRS

JAMES RIVER BASIN

No.	County	Sec.	Twp.	Rge.	Stg. A. F.	Cost Est.	Use	Designation	Description and Remarks	Survey
U. S. BIOLOGICAL SURVEY "ARROWOOD AND JIM LAKES MIGRATORY WATERFOWL REFUGE" ON JAMES RIVER:										
1.	Stutsman	25	144	65			VII	E	Dam---Outlet to Arrowood Lake, James River.	*****
2.	Stutsman	32	144	64			VII	G	Dam---Stoney Brook.	*****
3.	Stutsman	19	143	64			VII	E	Riden Channel Plug---James River.	*****
4.	Stutsman	33	143	64			VII	E	Dam---Outlet to Jim Lake---James River.	*****
5.	Stutsman	3	142	64			VII	E	DePuy Dam---James River.	*****
6.	Stutsman	SW $\frac{1}{4}$ 3	142	64			VII	F	Dam---Coulee.	*****
7.	Stutsman	SE $\frac{1}{4}$ 4	142	64			VII	F	Dam---Coulee.	*****
8.	Stutsman	4	142	64			VII	F	Dam---Coulee.	*****
9.	Stutsman	NW $\frac{1}{4}$ 4	142	64			VII	F	Dam---Coulee.	*****
10.	Stutsman	SE $\frac{1}{4}$ 8	144	64			VII	F	Dam---Coulee.	*****
11.	Stutsman	NE $\frac{1}{4}$ 8	144	64			VII	F	Dam---Coulee.	*****
1 to 11	Biological Survey Dams				14,000	\$27,100			4,500 acres of water surface.	
12.	Stutsman	24	140	64	12	1,700	VI	E	Dam---James River.	*****
13.	Stutsman	27	140	64	20	1,600	IV	G	Dam---Coulee.	*

TABLE A (Cont'd.)

EXISTING RESERVOIRS

JAMES RIVER BASIN

No.	County	Sec.	Twp.	Rge.	Storage A. F.	Cost Est.	Use	Designation	Description and Remarks	Survey
14.	Stutsman	36	140	64	31	\$ 2,900	III, IV	E	Dam--James River. At Jamestown.	*
15.	Stutsman	16	140	64	16	1,700	IV	G	Dam--Pipestem River.	*
16.	Stutsman	3	140	64	20	2,800	IV	G	Dam--Pipestem River.	*
17.	Stutsman	11	143	66	29	2,600	III, IV	E	Dam--Pipestem River. Near Edmunds.	*
18.	Stutsman	30	143	65	21	800	IV	G	Dam--Pipestem River.	*
19.	Stutsman	23	141	65	54	2,600	IV	F	Dam--Pipestem River.	*
20.	Stutsman	36	141	65	19	2,800	IV	F	Dam--Pipestem River.	*
21.	Stutsman	36	138	64	39	2,800	III, IV	E	Dam--Beaver Creek. Near Sydney.	*
22.	Stutsman	12	138	63	85	3,000	III, IV	E	Dam--James River. Near Ypsilanti.	*
23.	Stutsman	2	141	64	60	1,300	III, IV	G	Dam--James River.	*
24.	Stutsman	31	140	65	10	500	III, IV	E	Dam--Beaver Creek.	*
25.	Stutsman	16	141	64	10	1,000	IV	G	Dam--Coulee.	*
26.	Stutsman	10	141	65	25	700	IV	E	Dam--Pipestem River.	*
27.	Stutsman	26	140	64	20	2,000	III	G	Jamestown Park Board Dam--Pipestem River.	****
28.	Stutsman	12	140	64	10	500	IV	E	Dam--James River.	****
29.	Stutsman	25	140	64	100	5,000	III, IV	E	Jamestown City Dam. James River.	****

TABLE A (Cont'd.)

EXISTING RESERVOIRS

JAMES RIVER BASIN

No.	County	Sec.	Twp.	Rge.	Storage A. F.	Cost Est.	Use	Design- nation	Description and Remarks	Survey
30.	Stutsman	25	140	64	100	\$ 5,000	III, IV	G	Jamestown Park Board Dam. James River.	****
31.	Stutsman	23	137	63	20	2,000	III, IV	E	Dam--James River.	***
32.	Stutsman	3	137	63	10	500	IV	G	Dam--Beaver Creek.	***
33.	Stutsman	24	143	67	30	6,900	III, IV	E	Dam--Creek near Washti.	**
34.	Wells	✓ 23	146	69	341	16,000	VI	G	Dam--Pipeston River.	****
35.	Wells	✓ 18	149	68	100	2,000	IV	G	Dam--James River.	***
36.	Wells	✓ 27/34	147	73	232	3,500	IV	P	Dam--West Branch of James River head- waters.	**
37.	Wells	✓ 27	149	71	101	1,200	III, IV	G	Dam--James River. Near Manfred.	**
38.	Wells	✓ 27	149	70	192	9,800	III, IV	G	Dam--James River.	*
39.	Wells	✓ 25	149	69	91	2,600	III, IV	G	Dam--James River. Near Brecken. Year.	*
40.	Wells	✓ 22	149	68	91	600	IV	G	Dam--Coulee.	**
41.	Wells	✓ 18	147	68	10	1,000	IV	F	Dam--Coulee.	***
42.	Wells	✓ 32	147	72	10	500	IV	F	Dam--Coulee.	***
43.	Wells	✓ 21	146	71	10	500	IV	F	Dam--Coulee.	***
44.	Wells	✓ 4	146	71	12	1,500	IV	G	Dam--Rocky Run Creek.	**
45.	Wells	✓ 13	147	69	195	1,400	VI	F	Dam and dug Reservoir. At Catina.	****

TABLE A (Cont'd.)

EXISTING RESERVOIRS

JAMES RIVER BASIN

No.	County	Sec.	Twp.	Rge.	Storage A. F.	Cost Est.	Use	Disig- nation	Description and Remarks	Survey
46.	Wells	✓ 27	146	71	2	\$ 500	IV	F	Dam--Creek.	***
47.	Wells	✓ 22	147	68	44	2,500	IV	F	Dam--Coulee.	**
48.	Wells	✓ 22	146	71	6	500	IV	F	Dam--Creek.	***
49.	Wells	✓ 9	146	71	3	300	IV	P	Dam--Coulee.	***
50.	Wells	✓ 32	147	73	5	300	IV	P	Dam--Coulee.	***
51.	Wells	✓ 13	146	72	2	200	IV	F	Dam--Coulee.	***
52.	Wells	✓ 32	147	72	3	300	IV	F	Dam--Coulee.	***
53.	Wells	✓ 16	147	72	528	2,500	IV, III	F	Diversion dam and ditch from James River to Lake Delger.	**
54.	Wells	✓ 35	146	70	26	2,600	III, IV	E	Dam--Coulee. 4.5 acres water surface.	**
55.	Wells	✓ 10	145	69	254	17,000	III, IV	G	Dam--Coulee.	**
56.	Wells	✓ 21	145	68	10	1,000	IV	F	Dam--Creek.	***
57.	Wells	✓ 12	146	69	10	1,000	IV	G	Dam--Pipeston River.	***
58.	Foster	✓ 33	145	66	50	3,200	III, IV	G	Dam--Coulee. Near Melville.	**
59.	Foster	✓ 36	146	65	31	4,800	III, IV	E	Dam--Kelly Creek.	*
60.	Foster	✓ 19	146	67	370	26,300	III, IV	G	Dam--Pipeston River. Near Dover.	*
61.	Foster	✓ 5	145	67	10	1,000	IV	E	Dam--Pipeston River.	***

TABLE A (Cont'd.)

EXISTING RESERVOIRS

JAMES RIVER BASIN

No.	County	Sec.	Twp.	Rge.	Storage A. F.	Cost Est.	Use	Design- nation	Description and Remarks	Survey
62.	Eddy	✓ 25	148	67	200	\$ 3,000	IV	F	Dan---Outlet to Lake Claire.	**
63.	Eddy	✓ 33	148	67	100	5,000	IV	F	Dan---Creek.	***
64.	Eddy	✓ 33	149	66	20	1,000	III, IV	E	Dan---James River, Near New Rockford.	**
65.	Eddy	✓ 25/26	148	67	10	1,000	IV	G	Dan---Coulee	***
66.	Eddy	✓ 33	148	63	312	10,000	IV, VII	G	Dan---Round Lake Outlet.	**
67.	Ransom	✓ 6	135	58	21	4,700	IV	F	Dan---Coulee.	*
68.	LaMoure	✓ 24	133	59	137	6,900	III, IV	E	Dan---Bear Creek, Near Verona.	*
69.	LaMoure	✓ 6	133	61	20	3,200	III, IV	E	Dan---Cottonwood Creek.	*
70.	LaMoure	✓ 36	135	59	150	4,400	IV	G	Dan---Bear Creek.	*
71.	LaMoure	✓ 22	133	61	19	1,200	IV	E	Dan---Cottonwood Creek.	*
72.	LaMoure	✓ 34	134	64	26	6,800	III, IV	F	Dan---Coulee, Near Edgely.	*
73.	LaMoure	✓ 18	133	64	62	8,600	III, IV	E	Dan---Creek.	*
74.	LaMoure	✓ 11	133	61	104	12,400	III, IV	E	Dan---James River, At LaMoure.	*
75.	LaMoure	✓ 33	136	65	140	10,000	IV, VII	E	Dan---Bone Hill Creek.	*****
76.	LaMoure	✓ 29	136	64	16	2,100	III, IV	E	Dan---Bone Hill Creek, Near Norton- ville.	*
77.	LaMoure	✓ 33	135	61	69	2,900	III, IV	E	Dan---James River, Near Grand Rapids.	*

TABLE A (Cont'd.)

EXISTING RESERVOIRS

JAMES RIVER BASIN

No.	County	Sec.	Twp.	Rgo.	Storage A. Ft.	Cost Est.	Use	Design- nation	Description and Remarks	Survey
78.	LaMoure	✓ 24	133	61	43	\$ 1,300	IV	F	Dan---Cottonwood Creek.	*
79.	LaMoure	✓ 7	133	66	208	15,000	III, IV	G	Dan---Creek. Near Fredonia.	**
80.	LaMoure	✓ 10	134	65	70	7,000	IV	E	Dan---Creek.	***
81.	LaMoure	✓ 30	134	64	42	4,200	IV	G	Dan---Coulee.	**
82.	Dickey	✓ 33	129	62	450	17,500	IV	G	Dan---Maple River.	**
83.	Dickey	✓ 16	131	62	39	900	III, IV	E	Dan---Maple River. Near Fullerton.	*
84.	Dickey	✓ 16	131	63	11	1,200	III, IV	E	Dan---Creek. Near Manango.	*
85.	Dickey	✓ 24/30	130	62	200	8,000	IV, VII	E	Dan---Maple River.	*****
86.	Dickey	✓ 34	129	60	300	3,700	IV, VII	E	Dan---James River.	**
87.	Foster	✓ 26	145	67	10	2,000	IV	G	Dan---Pipeston River.	**
88.	Stutsman	NE $\frac{1}{4}$ 6	139	65	16	5,000	IV	F	Adkinson Dan---Coulee.	**
89.	Stutsman	SW $\frac{1}{4}$ 30	139	65	22	6,000	IV	G	Wiese Dan---Coulee.	**
90.	Stutsman	NE $\frac{1}{4}$ 7	138	67	30	6,000	IV	F	Sund Dan---Coulee.	**
91.	Stutsman	SW $\frac{1}{4}$ 12	137	66	11	4,000	IV	E	Alexander Dan---Creek.	**
92.	Stutsman	SE $\frac{1}{4}$ 11	141	66	91	3,000	IV	P	Fredrick Dan---Coulee.	**
93.	Stutsman	SE $\frac{1}{4}$ 32	141	65	21	3,900	IV	G	Bennet Dan---Coulee.	**

TABLE A (Cont'd.)

EXISTING RESERVOIRS

JAMES RIVER BASIN

No.	County	Sec.	Twp.	Rge.	Storage A. F.	Cost Est.	Use	Resig- nation	Description and Remarks	Survey
94.	Stutsman	NW $\frac{1}{4}$ 12	141	66	9	\$ 2,500	IV	G	Wood--Dan--Coulee.	**
95.	Stutsman	NW $\frac{1}{4}$ 4	140	67	27	6,500	IV	F	Simmernan Dan--Coulee.	**
96.	Stutsman	SW $\frac{1}{4}$ 9	138	67	34	3,000	IV	P	Schroeder Dan--Coulee.	**
97.	Stutsman	NW $\frac{1}{4}$ 4	139	63	18	5,000	IV	F	Frey Dan--Coulee.	**
98.	Stutsman	SW $\frac{1}{4}$ 22	142	66	5	3,000	IV	G	Koltz Dan #1--Coulee.	**
99.	Stutsman	NE $\frac{1}{4}$ 14	142	66	1	1,700	IV	G	Koltz Dan #2--Coulee.	**
100.	Stutsman	NW $\frac{1}{4}$ 34	141	67	14	2,500	IV	F	Troutman Dan--Coulee.	**
101.	Kidder	SE $\frac{1}{4}$ 7	144	70	49	3,600	IV	P	Schaubert Dan--Coulee.	**
102.	Kidder	SW $\frac{1}{4}$ 14	143	70	28	2,300	IV	F	Flemmer Dan--Coulee.	**
103.	Stutsman	28	141	69	500	5,000	VII	F	Chase Lake Project.	*****
104.	Dickey	34	130	60	500	5,000	VII	F	Dakota Lake Project.	*****
105.	Stutsman	5/5	140	64	500	10,000	VII	F	Pipesten Project.	*****

TOTAL EXISTING RESERVOIRS: 22,135 \$404,400

TABLE A (Cont'd.)

EXISTING RESERVOIRS

JAMES RIVER BASIN

LEGEND:

- * Constructed by CCC
- ** Constructed by FERA and WPA
- *** Constructed by Individuals
- **** Constructed by Railways and Municipalities
- ***** Constructed by U. S. Biological Survey

USE:

- III Recreation
- IV Stock Watering and Water Conservation
- VI Railway Supply
- VII Waterfowl Refuge

DESIGNATION:

- E Excellent
- G Good
- F Fair
- P Poor

TABLE B PROPOSED IMPROVEMENTS IN WATER SUPPLY

JAMES RIVER BASIN

PLANE I Map No.	Municipality	Pop.	Objection to Present Supply	Proposed Improvements	Surveys	Wells	Treatment Plant	Dist. System	Total Estimate
1.	Bowden	303	Inadequate for fire protection.	Survey and 2 wells	100	1,200			1,300
2.	Cathay	235	Inadequate for fire protection. Unsatisfactory.	Survey and 1 well	100	600			700
3.	Courtenay	350	Not satisfactory. No analysis. Inadequate.	Survey and 2 wells	100	1,200			1,300
4.	Cleveland	273	Inadequate for fire protection.	Survey and 2 wells	100	1,200			1,300
5.	Edgley	821	Highly mineralized.	Treatment plant. Construction changes at wells.			10,000	2,000	12,000
6.	Ellendale	1,264	Not satisfactory. High fluoride; highly mineralized.	Construction changes at standby reservoir. Survey, 6 wells, and treatment plant.	100	3,600	20,000	3,000	26,700
7.	Fossenden	738	Inadequate for fire protection.	Construction changes at wells and new equipment. Survey, 3 wells, and treatment plant.	100	1,800	10,000	2,000	13,900

TABLE B (Cont'd)

PROPOSED IMPROVEMENTS IN WATER SUPPLY

JAMES RIVER BASIN

PLATE I MAP NO.	Municipality	Pop.	Objection to Present Supply	Proposed Improvements	Surveys	Wells	Treatment Plant	Dist. System Estimate	Total
17.	New Rockford	2,195	Highly mineralized.	Treatment Plant. Provide effective chlorination for treated water.			20,000	1,200	21,200
18.	Orkes	1,709	Very hard. Danger of pollution.	Install new pumping equipment and new wells; keep wells out of pits. Softening plant.			15,000	5,000	20,000
19.	Pingree	266	Inadequate. Salty. Unsatisfactory.	Survey and 1 well	100	600			700
20.	Streeter	711	Inadequate.	Survey, 3 wells, and water system.	100	1,800	15,000	20,000	36,900
21.	Verona	222	Inadequate for fire protection. Highly mineralized.	Survey and 1 well.	100	600			700
Sub-Totals:					1,700	20,400	154,000	105,250	
TOTAL PROPOSED IMPROVEMENTS IN WATER SUPPLY:									\$ 281,350

PROPOSED IMPROVEMENTS IN WATER SUPPLY

JAMES RIVER BASIN

TABLE B (Cont'd)

STATE	MAP NO.	Municipality	Pop.	Objection to Present Supply	Proposed Improvements	Surveys	Wells	Treatment Plant	Dist System	Total Estimate
8.		Gackle	193	Inadequate	Survey, 2 wells and water system.	100	1,200	13,000	17,000	31,300
9.		Hamburg	187	Inadequate for fire protection. No analysis.	Survey and 1 well	100	600			700
10.		Kensal	120	Inadequate. Hard	Survey, 2 wells and water system.	100	1,200	13,000	17,000	31,300
11.		Kulm	742	Inadequate. No analysis.	Survey, 3 wells and water system.	100	1,800	15,000	20,000	36,900
12.		LaMoure	839	Danger of pollution. Highly mineralized.	Treatment Plant. Construction changes at wells.			10,000	1,000	11,000
13.		Ludden	164	Inadequate for fire protection.	Survey and 1 well	100	600			700
14.		Medinn	407	Inadequate for fire protection.	Survey, 2 wells, and water system.	100	1,200	13,000	17,000	31,300
15.		Montpelier	165	Inadequate. No analysis.	Survey and 1 well	100	600			700
16.		Monargo	211	Not satisfactory. Highly mineralized. Inadequate	Provide sanitary covers for reservoirs. Survey and 1 well.	100	600		50	750

TABLE B (Cont'd)

PROPOSED IMPROVEMENTS IN WATER SUPPLY

JAMES RIVER BASIN

SUMMARY

CLASS "A" PROJECTS DEMANDING IMMEDIATE ATTENTION:

Local surveys of available sources \$ 1,700
 Distribution systems and improvements--
 Edgely, Ellendale, Fessenden, Kulin, LaMoure,
 Monango, New Rockford, and Streeter. 49,250
 Treatment Plants -- Kulin and Streeter. 30,000

Total Class "A" Projects: \$ 80,950

CLASS "B" PROJECTS DEMANDING IMMEDIATE ATTENTION UPON COMPLETION OF SURVEY:

Shallow Wells 20,400

CLASS "C" PROJECTS IN PLAN NOT INCLUDED IN CLASSES "A" AND "B":

Distribution Systems 56,000
 Treatment Plants 124,000
 Total Class "C" Projects: 180,000

TOTAL PROPOSED IMPROVEMENTS IN WATER SUPPLY: \$ 281,350

TABLE C PROPOSED IMPROVEMENTS IN SEWAGE DISPOSAL

JAMES RIVER BASIN

PLANE I MAP NO.	Municipality	Pop.	Type and Adequacy of Sewage Treatment	Proposed Improvements	Estimated Cost.
<u>CLASS "A" PROJECTS DEMANDING IMMEDIATE ATTENTION:</u>					
22.	LeMoure	889	Comb, No Treatment, Inadequate.	Treatment Plant	\$ 30,000
23.	Oakes	1,709	Comb. No Treatment, Inadequate	Treatment Plant	35,000
24.	Kulm	712	No Sewage System	System and Treatment Plant	40,000
25.	S treeter	711	No Sewage System	System and Treatment Plant	40,000
26.	Ellendale	1,264	Comb, Septic Tanks. Inadequate	Treatment Plant	30,000
27.	Edgley	821	Comb, Septic tank. Inadequate	Treatment Plant	30,000
28.	Fessenden	738	Comb. P.S. Inadequate	Treatment Plant	25,000
Total Class "A" Projects:					\$ 230,000
<u>CLASS "C" PROJECTS IN PLAN NOT INCLUDED IN CLASSES "A" AND "B":</u>					
29.	Gackle	493	No Sewage System	System and Treatment Plant	30,000
30.	Kensal	420	No Sewage System	System and Treatment Plant	30,000
31.	Medina	407	No Sewage System	System and Treatment Plant	30,000
Total Class "C" Projects:					90,000
<u>TOTAL PROPOSED IMPROVEMENTS IN SEWAGE DISPOSAL:</u>					\$ 320,000

LEGEND FOR SEWAGE AND SEWAGE DISPOSAL:
 Comb. Combined System ; P.S. Pumping Stations.

PROPOSED IMPROVEMENTS IN USE OF SURFACE WATER RESOURCES

JAMES RIVER BASIN

TABLE D

Plate II Map No.	County	Sec.	Twp.	Rgc.	Storage Cap. A. F.-Est.	Cost Est.	Use	Designation	Description and Remarks	Survey
1.	Stutsman	9/10	140	64		\$ 5,000			Complete survey and design of Pipesten Reservoir on Pipesten River.	****
(2).	Entire Basin					10,000			Survey of small dams proposed for flood irrigation, recreation and waterfowl refuge purposes. Survey of available water resources for stock watering where present supplies are inadequate or unsatisfactory. Recommendations to be made for the most satisfactory and economical solution of the problem through the construction of community wells or surface reservoirs.	*
3.	Foster	19	147	63	1,100	5,000	III, IV	F	Dam--Outlet to Lake Juanita. Crest Elevation 1445.6: above mean sea level.	**
4.	Wells	35	149	72	54	8,400	III, IV	E	Dam--James River. Only 10.4 acres of water surface.	****
4a.	Wells	24	149	72					Alternate to No. 4.	*
5.	Foster	4	147	65	220	16,000	III, IV	G	Dam--James River. Near Brantford.	*****
5a.	Foster	12	147	65	(250)	(20,000)	III, IV	G	Alternate to No. 5.	*
6.	Stutsman	13	144	67	100	10,000	II	F	Dam--Pipesten River tributary. Flood Irrigation.	**

CLASS "A" PROJECTS DEMANDING IMMEDIATE ATTENTION:

TABLE D (Cont'd.) PROPOSED IMPROVEMENTS IN USE OF SURFACE WATER RESOURCES

JAMES RIVER BASIN

Plate II Map No.	County	Sec.	Twp.	Rge.	Storage Cap. A. F.-Est.	Cost Est.	Use	Designation	Description and Remarks	Survey
7.	Stutsman	20	142	65	100	\$ 10,000	II	G	Dam--Pipesten River. Flood Irrigation.	**
8.	Stutsman	33	142	65	100	10,000	II	G	Dam--Pipesten River. Flood Irrigation.	**
9.	Wells	25	149	69		8,000			Repair CCC Dam.	*
9a.	Wells	5	148	69	(100)	(10,000)	III, IV	G	Dam--James River. Alternate to No. 9.	****
					Total Class "A" Projects:	1,704	\$ 82,400			
<u>CLASS "B" PROJECTS DEMANDING IMMEDIATE ATTENTION UPON COMPLETION OF SURVEY:</u>										
1.	Stutsman	9/10	140	64	39,000	400,000	I, III, V, VII	E	Construction of Pipesten Reservoir on the Pipesten River near Jamestown.	****
<u>CLASS "C" PROJECTS IN PLAN NOT INCLUDED IN CLASSES "A" AND "B":</u>										
10.	Wells	9	149	68	94	9,400	III, IV	G	Dam--James River. Near Dronon.	****
11.	Wells	4	146	68	32	3,200	III, IV	G	Dam--Pipesten River.	****
12.	Wells	15	146	70	20	2,000	IV	G	Dam--Pipesten River. Near Heaton.	**
13.	Wells	15	147	70	55	5,500	IV, XII	G	Dam--Rocky Run Creek.	****
14.	Eddy	14	143	66	202	15,000	III, IV	G	Dam--James River.	****

TABLE D (Cont'd.)

PROPOSED IMPROVEMENTS IN USE OF SURFACE WATER RESOURCES

JAMES RIVER BASIN

Plate II Map No.	County	Sec.	Twp.	Rge.	Age.	Storage Cap. A. F.-Est.	Cost Est.	Use	Designation	Description and Remarks	Survey
15.	Foster	22	147	64	64	100	\$ 10,000	III, IV	G	Dan--James River. Near Grace City.	**
16.	Foster	27	149	67	67	100	10,000	IV	G	Dan--James River.	**
17.	LaMoure	11	133	61	61	760	13,300	V	E	Dan--James River. At LaMoure. To be built only if present source of water supply from wells is found to be inadequate.	***
18.	LaMoure	18	134	64	64	74	7,400	III, IV	E	Salzsieder Dam. Maple River. Near Deisen.	****
19.	Foster	11	146	64	64	1,435	25,000	I, III, IV, VII	E	Dan--James River. Recommended as auxiliary storage for Arrowood and Jin Lakes Refuge.	****
(2).	Entire Basin						<u>50,000</u>	IV		Construction of community wells for stock watering and the construction of surface water reservoirs in certain communities after surveys have shown that ground water resources in the areas are unsatisfactory.	*

Total Class "C" Projects: 2,372 \$150,800

TOTAL PROPOSED IMPROVEMENTS IN USE OF SURFACE WATER RESOURCES: 43,576 \$633,200

TABLE D (Cont'd.) PROPOSED IMPROVEMENTS IN USE OF SURFACE WATER RESOURCES

JAMES RIVER BASIN

SURVEY:	USE:
* None	I Flood Control and Steam Regulation
** Field Inspected by State Engineer	II Irrigation
*** Surveyed by U. S. Army Engineers	III Recreation
**** Surveyed by CCC	IV Stock Watering and Water Conservation
	V Municipal Water Supply
	VII Waterfowl Refuge

DESIGNATION:	
E	Excellent
G	Good
F	Fair
P	Poor

TABLE E PROPOSED IMPROVEMENTS IN STREAM GAGING AND WEATHER OBSERVATION FACILITIES

JAMES RIVER BASIN

PLATE III MAP NO.	Station	New or Rehabilitated	Type of Station	Reading to Be Taken	Cost Estimate
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CLASS "C" PROJECTS IN PLAN NOT INCLUDED IN CLASSES "A" AND "B":

1.	Jamestown	Rehabilitated. New equipment.	Automatic Recorder and Control	River Discharge Rates.	\$ 3,500
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TABLE F

PROPOSED PROJECTS

JAMES RIVER BASIN

SUMMARY

CLASS "A" PROJECTS DEMANDING IMMEDIATE ATTENTION:

Proposed Improvements in Water Supply	\$ 80,950
Proposed Improvements in Sewage Disposal	230,000
Proposed Improvements in Use of Surface Water Resources	82,400

Total Class "A" Projects: \$ 393,350

CLASS "B" PROJECTS DEMANDING IMMEDIATE ATTENTION UPON COMPLETION OF SURVEY:

Proposed Improvements in Water Supply	20,400
Proposed Improvements in Use of Surface Water Resources	400,000

Total Class "B" Projects: 420,400

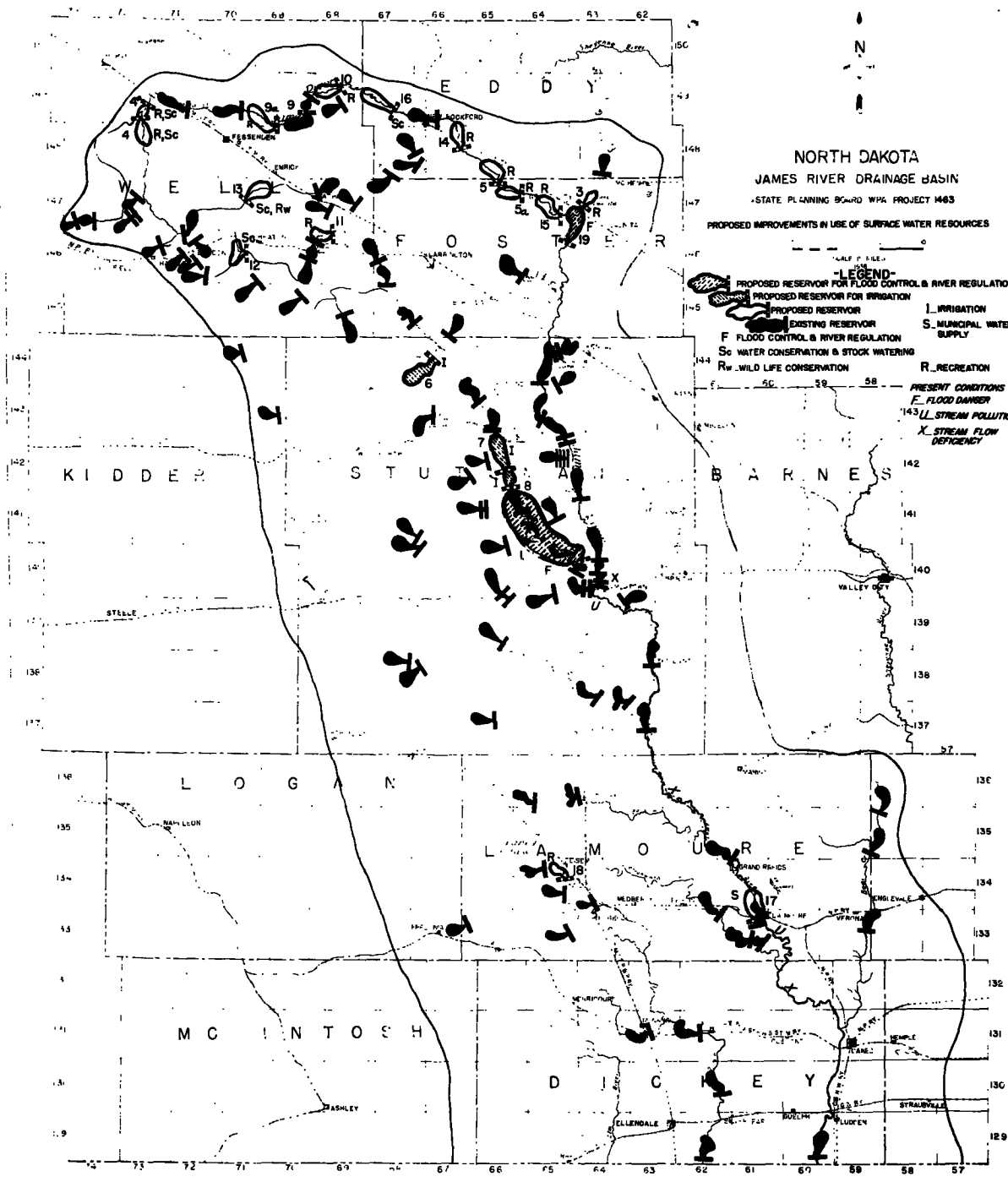
CLASS "C" PROJECTS IN PLAN NOT INCLUDED IN CLASSES "A" AND "B":

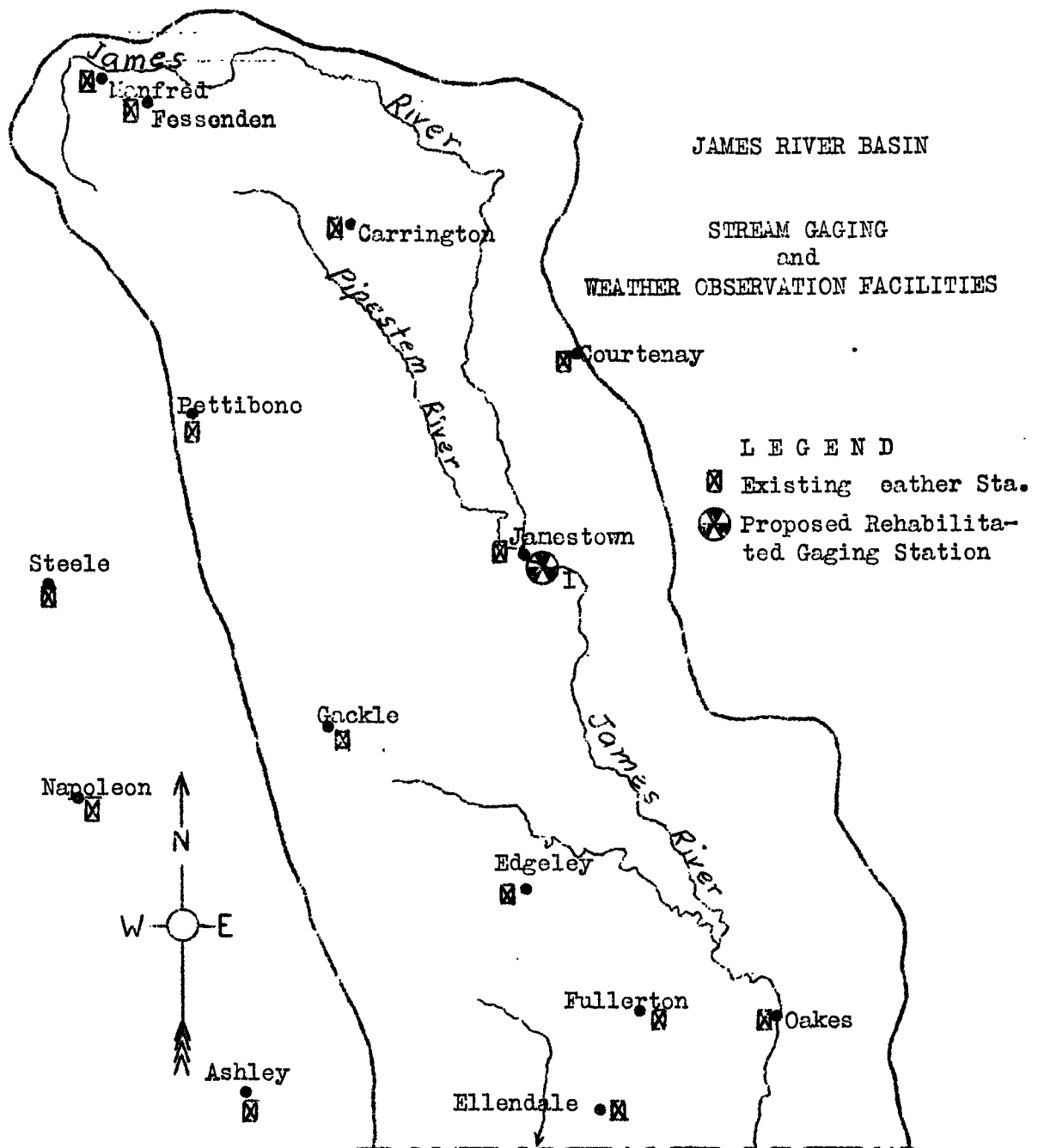
Proposed Improvements in Water Supply	180,000
Proposed Improvements in Sewage Disposal	90,000
Proposed Improvements in Use of Surface Water Resources	150,800
Proposed Improvements in Stream Gaging and Weather Observation Facilities.	3,500

Total Class "C" Projects: \$ 424,300

TOTAL PROPOSED PROJECTS:

\$ 1,238,050





NORTH DAKOTA
STATE PLANNING BOARD

SUMMARY REPORTS
OF
A PLAN OF WATER CONSERVATION
FOR
NORTH DAKOTA

- Volume 1 Letter of Transmittal
Foreward
Red River of the North Drainage Basin
- Volume 2 James River Drainage Basin
- Volume 3 Souris River--Devils Lake Drainage Basins
- Volume 4 Main Stem Missouri River Basin
- Volume 5 Slope Area Drainage Basins

BUY "DAKOTA MAID" FLOUR