

STATE WATER CONSERVATION COMMISSION  
Minutes of Meeting  
Held at Ray Hotel, Dickinson, N. Dak.  
November 7, 1956

A regular meeting of the North Dakota State Water Conservation Commission was called to order on November 7, 1956, at the Ray Hotel, Dickinson, North Dakota, to consider routine business matters. The following were present:

MEMBERS OF THE STATE WATER CONSERVATION COMMISSION

Governor Norman Brunsdale, Chairman, Bismarck  
Curtis Olson, Vice Chairman, Valley City  
Earle F. Tucker, Member, Bismarck  
Einar Dahl, Member, Watford City  
Oscar Lunseth, Member, Grand Forks  
Math Dahl, Member, Bismarck  
Milo W. Hoisveen, Secretary, Bismarck  
Vernon Cooper, Assistant Secretary, Bismarck  
Fred Fredrickson, Planning Coordinator, Washington, D. C.

The meeting was called to order at 2:00 o'clock MST, by Vice Chairman Curtis Olson, with Commissioners Earle F. Tucker, Einar Dahl, Oscar Lunseth, Math Dahl, Secretary Hoisveen, Assistant Secretary Cooper and Mr. Fredrickson present.

It was moved by Commissioner Math Dahl and seconded by Commissioner Einar Dahl that the Minutes of the meeting held on September 24th at Valley City be approved and filed in the office of the State Water Conservation Commission. All members voted aye and said motion carried.

It was moved by Commissioner Earle Tucker and seconded by Commissioner Einar Dahl that the Financial Statements of September and October, 1956, be approved and filed in the office of the State Water Conservation Commission. All Commissioners voted aye and said motion carried.

Secretary Hoisveen reported on the Bowman-Haley municipal water study made by the Commission, as authorized at the August meeting. The material obtained from the survey is to be made available to the Corps of Engineers, Omaha Division, to aid in the establishment of a favorable benefit cost ratio for the construction of the proposed Bowman-Haley Dam. A copy of the report was made available to each of the Commissioners. The report showed a possible annual benefit of \$143,000 for municipal and industrial water uses. In the event the Corps of Engineers could gather an additional \$60,000 more in annual flood control benefits, this would justify a \$4,000,000 dam. It was felt that through the combined efforts of the Commission and the Corps of Engineers, there is a possibility of obtaining authorization and construction of this project.

Mr. Fred Fredrickson, Planning Coordinator, recommended that Secretary Hoisveen go to Omaha and discuss this matter with the Corps of Engineers and see what their reaction is to this additional information. Inasmuch as this project has been talked about for approximately 50 years, it was urged that everything be done to expedite the matter. Commissioner Math Dahl moved that Secretary Hoisveen be authorized to follow up on this project in any manner he deems advisable to get a favorable report from the Corps of Engineers. Commissioner Earle Tucker seconded said motion. All members voted aye and said motion carried. It was also pointed

out that 3640 acres of land in the proposed reservoir site had been withheld from settlement and was still available to the construction agency.

Assistant Secretary Cooper stated that the Water Commission has reserved the water in the North Fork of the Grand River for development of this project.

A copy of the report is hereto attached and marked Exhibit A.

Vice Chairman Olson read a letter from Senator Young dated October 15, 1956, in which the Senator stated that he had received a telegram from Col. Holle informing him that the Scranton flood protective project plans were under review in his office. Secretary Hoisveen stated that the Commission has agreed to participate in the cost of this project and that the people in the area were highly appreciative of the Commission's endeavors on this matter.

Secretary Hoisveen stated that he had received a telephone call this morning, November 7th, from the Ramsey Board of Commissioners relative to the construction of a control structure at the outlet of Lake Irvin. The structure when installed would increase the outlet capacity in an area that is now badly flooded. It would also permit regulation of water in the Lake Irvin reservoir. The Commission has been requested to assist the Ramsey County Commissioners in installing the combination control structure and bridge. The estimated cost of the project approximates \$12,000. The Chain Lakes Water Conservation District is much interested in this proposal as it will be helpful in solving their flood problem. He further stated that the Chain Lakes District Board has held two meetings relative to levying special assessments for the project facilities and the control structure would be used in conjunction with the proposed Mauvais Coulee channel improvement and outlet works. The channel improvement that the State Water Conservation Commission has proposed would afford only partial relief but would provide protection against most floods. Under this proposal the channel would have a 40 foot bottom width. The estimated cost of the project is approximately \$70,000. It would permit the utilization of Lake Irvin as a reservoir which would store some of the flood water. The eventual project which the Corps of Engineers plans to construct would have a 100 foot wide canal and would require the bridges to have equal clearance. It was Secretary Hoisveen's thought that unless special appropriations can be obtained for bridge construction in the Corps' appropriation, the project would be impractical. It is doubtful if the Corps can obtain funds for construction within the next four years. It was moved by Commissioner Earle Tucker and seconded by Commissioner Math Dahl that the Commission participate to the extent of 50% on the control and bridge structure to be located at Lake Irvin.

Mr. Fredrickson advised that at a meeting of the Conservancy District, it was indicated that it was not illegal or contrary to law to have Congress provide funds for bridge construction or modification on water projects. However, it was against the policy of the government to do so. He suggested that these items be reviewed and an attempt be made to get them approved with Federal funds to the same extent as Federal aid is given to highway programs. It was moved by Commissioner Earle Tucker and seconded by Commissioner Math Dahl that negotiations be carried on relative to obtaining Federal funds to assist in the construction of these bridges. All members voted aye and said motion carried.

Vice Chairman Olson reported that Mr. Fred Hagen, Fargo Water Commissioner, and Mr. Park Tarbell, Fargo City Engineer, had requested the State Water Conservation Commission to assist them in the repair of the Fourth Street Dam. A cost appraisal of the necessary repairs, which is estimated to be \$16,000, was made by the State Water Conservation Commission. In view of the fact that this is the ideal time of the year to do work on this particular job, Secretary Hoisveen contacted several

of the Commissioners previously and obtained their approval, and the Commission crew is presently working on the job. Commissioner Earle Tucker moved that the Commission pay 25% of the cost of the repair work, which motion was seconded by Commissioner Math Dahl. All members voted aye and said motion carried.

Commissioner Lunseth, who is also Mayor of Grand Forks, has requested the assistance of the Commission in making repairs on the Riverside Dam located on the Red River in Grand Forks. This structure is of extreme importance to industry and to the municipal water supply system of the city. At present Grand Forks obtains their municipal water supply from the Red Lake River in East Grand Forks. In the event that a failure of Riverside Dam should occur, the water level below the Red Lake River dam would be decreased to such a degree that this dam would also fail and Grand Forks would then be faced with a severe water problem, which would be more serious now because the city is presently supplying a jet air base with a considerable quantity of water. The estimated cost of the repairs approximates \$29,500. It was recommended by Vice Chairman Olson that the City of Grand Forks be authorized to proceed with the repairs to this dam and that amount of participation by the Commission will be determined after the exact figure has been ascertained. All of the members agreed to this recommendation.

Replies to Resolution 281, which was supported by the Water Commission, and mailed to our Congressional delegation, were read by Commissioner Olson. Letters of acknowledgment were received from Senator Langer, Senator Young and Congressman Krueger.

A letter of appreciation addressed to Governor Brunsdale from Major General E. C. Itschner for the congratulations extended him on his recent appointment as Chief of Engineers, was read by Vice Chairman Olson.

It was reported by Secretary Hoisveen that he had received a Petition and Resolution from Sargent County pertaining to the formation of a county-wide water conservation and flood control district. It was moved by Commissioner Math Dahl and seconded by Commissioner Lunseth that Secretary Hoisveen be authorized to hold a hearing on the Sargent County petition. All members voted aye and said motion carried.

Secretary Hoisveen reported on the Willow Creek Water Conservation and Flood Control District hearing which was held on October 15th. He stated that the Turtle Mountain area contributes largely to Willow Creek run-off. The area in the vicinity of the confluence of Willow Creek and the Souris River is badly inundated every spring. At the meeting it was disclosed that there is a segment of Willow Creek badly flooded in Bottineau County and that the petitioners in Willow Creek Township expected the district to be a joint one with the area of the Willow Creek basin in Bottineau County. It appears that the County Auditor of McHenry County misplaced the Petition and Resolution which accounted for the fact that it had never been received in the Commission office. Bottineau County now plans to send in a new Petition and Resolution and it will cover the portion of their county affected by Willow Creek flooding. At the Willow Creek hearing 12 voted in favor of the district and two opposed. It was Secretary Hoisveen's recommendation that the formation of the Willow Creek Water Conservation and Flood Control District be delayed until such a time as a hearing has been held in the Willow Creek basin of Bottineau County to ascertain whether or not a district should be formed in that county. In the event that Bottineau County establishes a district, he recommended that the Willow Creek District be formed as a joint venture with the Bottineau group. It was moved by Commissioner Earle Tucker and seconded by Commissioner Math Dahl that Secretary Hoisveen be authorized to hold a hearing in Bottineau County. Upon voice vote all members voted aye and said motion carried.

Vice Chairman Olson read a letter from Mr. Henry O. Londene of Adams, in which he enclosed a resolution of the Farmers Union requesting a second Walsh County Water Conservation District. Secretary Hoisveen stated that two hearings have already been held in Walsh County, and that a third hearing has been scheduled for November 20th at Park River, and recommended that this request for a second district be tabled until public sentiment has been determined at the Park River hearing. It was unanimously agreed among the members that Secretary Hoisveen be authorized to handle the matter as he sees fit, and that the request of the Farmers Union be held in abeyance until the third meeting has been held.

Petitions for exclusion from the Oak Creek Water Conservation and Flood Control District have been received and filed in the State Water Conservation Commission office. These were signed by landowners in Amity, Home, Pickering, Dalen, Whitteron, and Roland Townships and the City of Bottineau. These petitions were not received during the thirty day repeal period, as provided by law.

A letter from Mr. G. M. Redmond, President of the Union Stockyards Company of West Fargo, was read by Vice Chairman Olson. Mr. Redmond requests approval of the Commission to build a dam on the Sheyenne River which will not be more than two feet high above the low flow of water during the summer months. The water in this dam would be used solely for fire protection. Secretary Hoisveen stated that a low head dam, such as proposed, would not cause sufficient retardation to create flooding. It was moved by Commissioner Math Dahl and seconded by Commissioner Earle Tucker that Secretary Hoisveen write the Cass County Board of Commissioners relative to this matter and see what their reaction would be. It was also suggested that he advise the City of Fargo and keep them informed as to anything that might be done along this line. All members voted aye and said motion carried.

Resolutions pertaining to the following matters were received and filed in the office of the State Water Conservation Commission, copies of which were supplied all Commissioners: Small Irrigation Projects; Oakes Development Tract; Ransom County Development Farm; Modification of Federal Criteria for Water Resources Development Projects; Western Water Rights Settlement Act; Pembina River Project; North Fork Grand River North Dakota, Bowman-Haley Project; Red River Basin Compact; Little Missouri River Basin Compact; Pipestem Creek Dam and Reservoir; State Participation in Non-Federal Costs of Water Resources Projects; Williston Municipal Facilities; Rehabilitation of Dams; Honorable Norman Brunsdale, Governor of North Dakota and the North Dakota State Water Conservation Commission. These Resolutions were adopted by the North Dakota Reclamation Association at their 16th Annual Convention at Valley City, North Dakota, on September 23-25, 1956. The Commissioners expressed their appreciation for the cooperation and support of the Reclamation Association.

A resolution from the Garrison Diversion Conservancy District commending Mr. Fred Fredrickson for his efforts in promoting the water program of our State was read by Vice Chairman Olson. It was moved by Commissioner Math Dahl and seconded by Commissioner Earle Tucker that said Resolution be made a part of the minutes of this meeting. All members voted aye and said motion carried.

Mr. Fred Fredrickson acknowledged receipt of the resolution and expressed his appreciation.

Vice Chairman Olson read a letter received from Mrs. Sybil Isaacson, Clerk of the Village of Perth, requesting a municipal water survey. A letter from Mr. J. W. Brookhart, District Geologist, was also read in which Mr. Brookhart stated that a

reconnaissance survey of the area had been made. If a study is to be made, it will have to be relatively extensive as there is no assurance that a suitable water supply would be found in the area. Various Commissioners expressed the desire to purchase a state-owned drilling rig so they would be in a better position to assist some of these smaller localities. It was recommended that Secretary Hoisveen write the Village of Perth, advising them that the Commission is sympathetic of their situation and hope to work out something next spring.

Vice Chairman Olson read a letter from Mr. Paul Roney of Oakes, dated October 22nd, in which Mr. Roney states that the residents of that area are now ready to form an irrigation district. As soon as the necessary Petition and Resolution are received, a hearing will be held and a district organized.

Secretary Hoisveen stated that Mr. A. C. Harke of Bismarck, appeared at the Commission office relative to the Memorial bridge property. This property was acquired in 1943 for the purpose of constructing a pump intake for the Victory Garden project. The appraisal figure for the acre of land involved was \$300, of which Mr. Harke received \$50.00. The remaining money was to be given to five other possible heirs as the title was not clear. In the meantime, Harke states that he cleared the title and feels that he should be compensated for the balance, inasmuch as there were no other heirs when the title was cleared up. Mr. Harke has requested that he receive an additional \$150 and that the Commission deed back part of the land south of the bridge right-of-way. Commissioner Einar Dahl moved that Commissioners Tucker and Math Dahl and Secretary Hoisveen look into the matter and handle the matter as they deem best. All members voted aye and said motion carried.

Commissioner Oscar Lunseth moved that Secretary Hoisveen be authorized to attend the Mississippi Valley Association meeting to be held in Kansas City on November 30th. This is to be a conference on water resources for industry in the Missouri Basin. Said motion was seconded by Commissioner Math Dahl. All members voted aye and said motion carried.

Governor Brunsdale entered the meeting at 3:45 o'clock M.S.T.

The following water rights were considered:

#695 - City of Portland, Traill County, requests the right to divert 400 acre feet of water from the South Branch of the Goose River for municipal purposes. It was moved by Commissioner Tucker and seconded by Commissioner Lunseth that the City of Portland be granted the use of 400 acre feet of water. All members voted aye and said motion carried.

#694 - Messrs. T. J. Armstrong and Herman Erling of Bismarck, Burleigh County, North Dakota, request the right to divert 164 acre feet of water out of the Missouri River to irrigate 82 acres of land. Commissioner Einar Dahl moved that said request be granted, which motion was seconded by Commissioner Tucker. All members voted aye and said motion carried.

#693 - Messrs. T. J. Armstrong and Herman Erling of Bismarck, Burleigh County, North Dakota, request the right to divert 386 acre feet of water out of the Missouri River to irrigate 193 acres of land. Commissioner Einar Dahl moved that said request be granted, which motion was seconded by Commissioner Tucker. All members voted aye and said motion carried.

#692 - Montana Dakota Utilities, Williston Plant, has requested the right to divert .10 c.f.s. of water from groundwater sources for industrial purposes.

Commissioner Lunseth moved that they be granted the right to divert 73.0 acre feet of water, which motion was seconded by Commissioner Tucker. Motion carried.

#691 - Montana Dakota Utilities, Linton Plant, has requested the right to divert .10 c.f.s. of water from groundwater sources for industrial purposes. It was moved by Commissioner Lunseth and seconded by Commissioner Tucker that they be granted the right to divert 73.0 acre feet of water. Motion carried.

#690 - Montana Dakota Utilities, Beulah Plant, has requested the right to divert .5 c.f.s. of water from groundwater sources for industrial purposes. It was moved by Commissioner Lunseth and seconded by Commissioner Tucker that they be granted the right to divert 365.0 acre feet of water. Motion carried.

#689 - Montana Dakota Utilities, Kincaid Plant, Burke County, requests the right to divert .11 c.f.s. of water from groundwater sources for industrial purposes. Commissioner Lunseth moved that they be granted the right to divert 74.1 acre feet of water, which motion was seconded by Commissioner Tucker. Motion carried.

#688 - Montana Dakota Utilities, Ellendale Plant, has requested the right to divert .20 c.f.s. of water from groundwater sources for industrial purposes. Commissioner Lunseth moved that they be granted the right to divert 146.0 acre feet of water, which motion was seconded by Commissioner Tucker. Motion carried.

#687 - Montana Dakota Utilities, Bismarck Plant, has requested the right to divert 2.20 c.f.s. of water from groundwater sources for industrial purposes. It was moved by Commissioner Lunseth and seconded by Commissioner Tucker that they be granted the right to divert 1600 acre feet of water. Motion carried.

#676 - Alois Klandl, McKenzie County, requests the right to divert 57.8 acre feet of water from Bennie Pierre Creek to irrigate 57.8 acres of land. Commissioner Lunseth moved that this request be granted, which motion was seconded by Commissioner Tucker. Motion carried.

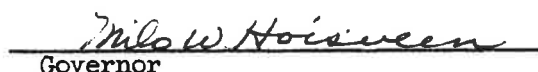
Secretary Hoisveen requested that the next meeting of the State Water Conservation Commission be held on December 14th at Bismarck. The annual Christmas party will be held that night, to which all Commissioners are invited. The actual meeting date will be arranged to meet Governor Brunsdale's schedule.

The meeting adjourned at 4:00 o'clock M.S.T.

Respectfully submitted,

  
Secretary

Attest:

  
Governor

*Estimate of 58*

**BOWMAN-HALEY MUNICIPAL WATER STUDY**  
By  
**NORTH DAKOTA STATE WATER CONSERVATION COMMISSION**  
Bismarck, North Dakota  
October 26, 1956

GENERAL

A survey was made at the request of the Bowman County Water Conservation and Flood Control District relative to the possible municipal water benefits that might be derived from a reservoir created from the construction of the proposed Bowman-Haley Dam. The towns to be benefited are located in Bowman and Adams County, all in North Dakota, and include the cities of Hettinger, Scranton, and the villages of Bowman, Gascoyne, Bucyrus, and Reeder. These municipalities are all serviced by the C.M. St. P. and P. Railroad and U. S. Highway #12. Their distance from the Grand River varies between 8 and 13 miles.

POPULATION TRENDS

The growth of population in this area since 1910 is shown in the following table:

	1910	1920	1930	1940 <sup>1</sup>	1950	1956
Adams County: Total	5407	5593	6343	4664	4910	-----
Bucyrus Village	-----	113	124	117	111	50
Hettinger City	766	817	1292	1138	1762	2300
Reeder Village	198	258	395	263	339	350
Bowman County: Total	4668	4768	5119	3860	4001	-----
Bowman Village	481	767	888	967	1382	1850
Gascoyne Village	-----	60	97	48	76	75
Scranton City	214	353	381	277	360	400

NOTE: Official U.S. Census figures 1910 thru 1950  
1956 figures, local estimate

<sup>1</sup> Population decline between 1930 and 1940 attributed to severe and extended drouth conditions.

The census figures show that both Bowman and Hettinger have grown substantially since 1940 and especially in the past six years. This is largely due to the present farm operation trend. Mechanization has permitted them to take advantage of the comforts of city life and successfully operate their farms several miles distant. The intense research for oil and uranium deposits in the surrounding area has also contributed to the population increase. The smaller communities are

barely sustaining their population or expanding only slightly.

Population trends of this area will be completely upset as developments in the uranium industry progress. Last week the International Resources Corporation requested Bowman to furnish them with sewage and water facilities for a 100 acre housing development. The development is in the planning stage, however, should it materialize the population of Bowman would double overnight. Considerable time was spent discussing the proposed uranium plant with local community representatives. Indications are that only the Atomic Energy Commission approval is necessary before construction begins. The completed uranium processing plant is expected to employ 150 persons. Estimates based on other projects of this type show that 6 or 7 men are required in the mining operation for each plant employee. This indicates future employment for approximately 1,000 persons in this one industry alone. The future uses of lignite for industrial purposes are causing firms to establish plants in the area. This could have a substantial influence on population increase in the area. One such new firm is American Colloid Co., a subsidiary of Union Carbon Corporation. The operations of the Knife River Coal Company which is located in this area are being expanded. Although the operations of both companies are located within 2 miles of Gascoyne the employees reside at Reeder 8 miles distant because of the water shortage that exists at Gascoyne. Conditions at Gascoyne are reflected in the attached statement which shows the adverse effect that poor quality and a water shortage can have upon a city. This statement was prepared by Mr. J. Brookhart, Geologist, U. S. Geological Survey, Groundwater Branch.

PRESENT WATER SUPPLIES

All municipal water supplies are derived from the ground or from tapping the Foxhill's formation. Bowman, Hettinger, Reeder, and Scranton have municipally owned systems while Gascoyne and Bucyrus have individual supply wells. Gascoyne hauls much of its water from Scranton using individual cisterns for storage. All water supplies seem to be taxed to a maximum and any increase in water demand would cause



a dilemma in any of the towns surveyed. Both Bowman and Scranton have been forced to lower their pump settings from 100' to 200' due to the severe drawdown encountered when pumping. This too indicates that if industrial wells were drilled in the aquifer, serious complications could effect all the municipalities with wells deriving their supply from the Foxhill formation. At Hettinger, a drawdown of 40' was noted in test wells 1,300' apart and at Bowman a drawdown of 100' was noted when the railroad pumped its well approximately 1/2 mile away. Since this discrepancy was noted, the railroad has switched to diesel locomotion and given all its wells in Hettinger and Bowman to the respective cities. During the summer, all cities pump 24 hours a day and the water remaining in storage is not sufficient for fire protection. At best, all present water supplies are limited and considered inadequate for future expansion.

The following table gives data on all present municipal supplies:

	Bowman	Hettinger	Reeder	Scranton
Number of wells	2	5	1	1
Depth	1058'	1050'-1100'	1307'	1180'
Surface Storage	None	100,000 gal.	None	None
Elevated Storage	300,000 gal.	50,000 gal.	50,000 gal.	50,000gal.
Treatment	Chlorination	Chlorination	Chlorination	Chlorination
Consumer Outlet	350	400	102	106

The most significant finding uncovered by this survey is evidence that the water is being mined from its present source. The water table in the Foxhill's formation appears to be receding as the municipalities of Bowman and Scranton were required to lower their pump settings from 100' to 200' in order to obtain sufficient capacity for their operations. Tapping of this aquifer by industry would only complicate the municipal supply problem. The municipalities are confronted with finding other sources for future water supply since this is the only good groundwater aquifer in the area. The only economical answer would be impoundment of surface water such as the proposed Bowman-Haley Dam.

WATER QUALITY

Since all deep wells are in the same aquifer, they have nearly the same quality. The water is quite soft but not palatable. It contains a large percent of sodium making it of poor quality for watering of gardens and lawns. As a result lawn sprinkling is held to a minimum. The following table is a mineral analysis of the water of municipal-owned systems in the area taken by North Dakota State Health Department from 1947 to 1954:

	<u>Bowman</u>	<u>Hettinger</u>	<u>Reeder</u>	<u>Scranton</u>
Total Dissolved Solids	1092	1485	1380	1363
Total Alkalinity(as				
$C_aCO_3$ )	630	710	760	664
Total Hardness(as				
$C_aCO_3$ )	10	166	6	3
Iron	.1	.18	1.0	.15
pH	8.6	8.5	8.9	9.0
Calcium ( $C_a$ )	4.0	15.5	2.4	1.2
Magnesium (Mg)	-----	31.0	-----	-----
Sodium (Na)	445	460	414	418
Fluoride (F)	1.0	2.2	1.4	1.2
Chloride (Cl)	25	152	104	40
Salphotes ( $SO_4$ )	232	-----	Trace	147
Bicarbonates ( $HCO_3$ )	638	784	790	664
Nitrates	-----	Trace	67.2	Trace
Carbonates	-----	40.8	-----	92.0

WATER USE (1955-1956)

The water supplies of Bowman, Hettinger, Reeder and Scranton are becoming more inadequate as time progresses. The shortage was eased for a year or two when the railroad deeded its wells to the municipalities, but the past year shortages were noted during the summer months. No restrictions were placed on water use but the supply has intermittently become depleted although pumping operations were conducted on a 24 hours a day program. This left no reserve for fire protection. This increase is due in part to modern water consuming appliances such as air conditioning, automatic washers, etc. but mainly due to the sustained growth in city population. The population of both Bowman and Hettinger increased approximately 35% in the past 6 years while Scranton increased 11% and Reeder 4%. Since there is a water shortage during the summer peak useage period, consumption is limited

to the available supply, and a evaluation cannot be made that would reflect water use if an ample supply of good quality water existed.

The following data was obtained from the respective municipal water superintendents and is the latest information available according to their records:

	<u>Bowman</u>	<u>Hettinger</u>	<u>Reeder</u>	<u>Scranton</u>
Water Sales				
Gal. per day	150,000	250,000	24,000	50,000
Gal. per capita per day	81.2	108.7	68.7	125.0

Reeder's low per capita consumption is a direct indication how the lack of a sewer system cuts water consumption and effect of extreme high water rates. Scranton's consumption jumped about 25% after the installation of a sewage disposal system in 1955. Bowman has a low figure due to very limited supply available from its present supply. Hettinger's supply barely meets the demand during peak use periods. The per capita figures are conservative as Bismarck last year had a consumptive use of 178 gal. per capita per day as compared to the national average of 137 gal. per capita per day. The area in which this report applies to is in the lowest rainfall belt in North Dakota. It seems reasonable to assume that if an adequate high quality water supply was available to these communities the consumptive use per capita would approximate that of Bismarck.

#### WATER RATES

The present quarterly water rates in effect by the municipalities in the Bowman-Haley area are as follows:

Bowman: minimum charge \$4.50, minimum amount - 3,000 gal.  
 Next 7,000 gal. - 60¢ per 1,000  
 Next 30,000 gal. - 50¢ per 1,000  
 Over 40,000 gal. - 40¢ per 1,000

Hettinger: minimum charge \$4.50, minimum amount - 6,000 gal.  
 Next 9,000 gal. - 50¢ per 1,000  
 Next 15,000 gal. - 40¢ per 1,000  
 Next 30,000 gal. - 30¢ per 1,000  
 Next 450,000 gal. - 20¢ per 1,000  
 Over 510,000 gal. - 18¢ per 1,000

Reeder: minimum charge \$5.00, minimum amount - 3,000 gal.  
 Over 3,000 gal. - \$1.00 per 1,000

Scranton: minimum charge \$2.00, minimum amount - 6,000 gal.  
 Next 4,000 gal. - 40¢ per 1,000  
 Over 10,000 gal. - 20¢ per 1,000

The water rates of Bowman and Hettinger are considered reasonable. Hettinger and Bowman provide their customers with an adjusted schedule which favors increased consumption. Should populations in these areas continue to increase it may be advisable for Reeder and Scranton to adopt new rates with better increments to satisfy the consumer and still maintain a satisfactory revenue. A uniform rate similar to Bowman's may be necessary for all municipalities when one considers the cost of developing adequate water supplies from Bowman-Haley reservoir.

#### FUTURE WATER REQUIREMENTS

##### Population

The future water requirements of the municipalities in the Bowman-Haley area can be based on two conditions, (1) normal population growth with an increased per capita use, and (2) the potential industrial development hinging on uranium processing and lignite coal.

The future population estimates under normal growth is shown in the following table using the population increases from 1920 to 1950 on an absolute rate of increase per year.

Population 1950	Normal Growth (Absolute Rate)			
	Absolute rate persons per year	Estimated Population 2000	Estimated Population 1956	Actual Population 1956
Bowman 1382	20.5	2407	1535	1850
Hettinger 1762	31.5	3337	1951	2300
Reeder 339	2.7	474	355	350
Scranton 360	6.7	695	400	400

The above table gives a conservative estimate as cities tend to grow at increasing absolute rates as they gain growth. Bowman and Hettinger are now beyond their predicted 1950 estimates already.

The immediate future needs based on the proposed construction of a 1000 ton uranium processing plant proposed by a uraniferous lignite processing company near

Bowman would create employment for 1000 persons. Figuring an average of four persons per family, this would increase the population in the area by 4000 persons. It is reasonable to assume that competitive plants would set up operations. A conservative estimate would be that plants having at least 500 ton capacity would locate in the area in the foreseeable future. Over a fifty year period this would create jobs for an additional 500 persons. As a result the area population would be increased by 2000 persons. The following table shows the population estimate over a fifty year development period and percentages of distribution are estimates relative to location of uraniferous deposits.

#### Industrial Development

	Estimated Population 1956	Distribution Percentage	Predicted Population 1966	Predicted Population 2000
Bowman	1850	60%	4250	5450
Hettinger	2300	20%	3100	3500
Reeder	350	10%	750	950
Scranton	400	10%	800	1000

#### Water Needs

The following tabulations translate the population forecasts into water requirements. The per capita consumption used will be a compromise between the present national average and future optimum use.

	Normal Growth			
	Bowman	Hettinger	Reeder	Scranton
Population	2407	3337	474	695
Gal. per capita per day	150	150	150	150
Gal. per day	361,050	500,550	71,100	104,250
Thousand gal. per year	131,783	182,700	25,952	38,051

The total municipal requirement would be 1,037,400 gallons per day which is equivalent to 3.2 acre feet of reservoir daily.

### Industrial Development

	Bowman	Hettinger	Reeder	Scranton
Population 2000	5450	3500	950	1000
Sales Gal. per capita per day	150	150	150	150
Gal. per day Thousand gal. per year	817,500	525,000	142,500	150,000
	298,387	191,625	52,013	54,750

Personnel interviewed representing a uranium industry, stated they would be willing to contract for water from Bowman-Haley reservoir for the processing of uranium. They estimated plant requirements by the year 2000 to be 3,000 gpm. or a total of 4,320,000 gal. per day. The combined plant and municipal requirements would be 5,955,000 gallons per day which would be equivalent to 18.2 acre feet of reservoir daily.

Comparing the two conditions shows that industrial development will increase six-fold the water requirements in the area in the next 50 year period. This clearly shows the imperative need for the immediate establishment of an adequate water supply in the Bowman-Haley area.

### ECONOMICS

To provide for future development, the municipalities would be required to drill additional wells. The following table shows the added investment in wells needed:

	Daily Water Use 1956	Future Daily Use	Diff. Daily Use	Addition Wells Needed <sup>/1</sup>	Added Wells Investment <sup>/2</sup>
Bowman	150,000 gal.	817,500 gal.	667,500 gal.	6	\$ 180,000
Hettinger	250,000	525,000	275,000	3	90,000
Reeder	24,000	142,500	118,500	1	30,000
Scranton	59,000	150,000	91,000	1	30,000

<sup>/1</sup> Based on U.S.G.S. recommendation of 2000' well spacing with maximum pumping capacity of 75 gpm.

<sup>/2</sup> Hettinger spent approximately \$30,000 to drill and equip a well in 1949.

The uranium processing plants would have to drill minimum of 37 wells to meet their 3000 gpm. requirement.

A gathering system with a minimum of 60,000 ft. of piping would be needed to consolidate this supply. The total investment to the uranium plants to provide an adequate supply would cost approximately \$1,200,000. The total combined added well investment of uranium plants and municipalities would be \$1,530,000. This does not include costs of distributing the water to the consumer.

A saving of about 50% of the present pumping costs per gallon could be obtained by the installation of a pipeline from the proposed Bowman-Haley reservoir to the municipalities. Using Bowman as the example, it would only require a total lift of 265' from reservoir as compared to a total lift of 500' from the present well system.

The estimated annual revenue using 18.2 acre feet per day at a cost of \$21.59 per acre foot would be \$143,400. This figure is based on the repayment contract between Dickinson, North Dakota and the U.S. Bureau of Reclamation which calls for payment of \$950,000 over a 40 year period for an annual raw water supply of 1100 acre feet annually.

The industrial payroll would amount to approximately 7.5 million dollars\* annually which would aid businesses in the area to prosper. This in turn would give added revenue to state and federal governments in both personal income tax and also thru business taxes in the area. It would give North Dakota an added revenue of approximately \$75,000 in personal income tax and \$150,000 in sales tax. The Federal income tax revenue would be approximately \$300,000. The tax revenues from businesses would be increased 15% to 20% above present amounts. From the real estate viewpoint, North Dakota's tax system is favorable to industry as can be verified by the low taxable value on some of the large industries now operating in our state. The advent of industry would materially stabilize the economy of this intermittent drought stricken area.

\*Based in on average salary of \$5,000 annually for 1,500 added jobs due to uranium.

What can lack of good water cost a city?

Here are the figures for 1940-50:

City	Pop. 1940*	Pop. 1950*	Increase	Percent Increase
Fargo	32,580	38,256	5,676	17.4
Grand Forks	20,228	26,836	6,608	32.7
Minot	16,577	22,032	5,455	32.9
Bismarck	15,496	18,640	3,144	20.3
Jamestown	8,790	10,697	1,907	21.7
Dickinson	5,839	7,469	1,630	27.9
Williston	5,790	7,378	1,588	27.4
Valley City	5,917	6,851	934	15.8
			Average	24.5 %
Devils Lake	6,204	6,427	223	3.6%

\*U.S. Bureau of Census

If Devils Lake had increased 24.5% the 1950 population would have been 7,724 or an increase of 1,520 instead of 223. The added increase would have averaged 130 persons per year in population in the 10 year period. Based on U.S. Dept. of Commerce figures the loss of income of the 130 additional persons per year would be as follows:

Year	Avg. N.D. per capita income*	Est. pop. increase based on avg. of 8 other cities 1940-50	Loss of income per year due to loss of est. pop. increase
1941	\$ 537	130	\$ 69,810
1942	741	260	192,660
1943	927	390	361,530
1944	1,075	520	559,000
1945	1,111	650	722,150
1946	1,144	780	892,320
1947	1,582	910	1,439,620
1948	1,514	1,040	1,574,560
1949	1,202	1,170	1,406,340
1950	1,298	1,300	1,687,400
		Total	\$ 8,905,390

\*Survey of Current Business, U.S. Dept. of Commerce

Assuming that 80% of this income would be spent locally the gross loss to the people of Devils Lake in the period 1940-50 was \$7,124,312. Since 1950 the loss has undoubtedly been more than 1.5 million dollars per year.

Is there any other reason that Devils Lake should not have had average growth other than the lack of good water?

Figures taken from N.D. Economic Studies No. 1, April 1954 Bur. of Economic & Bus. Research, UND School of Commerce. Pop. fig. from p. 45 & 48, income fig. from p. 149.



NORTH DAKOTA STATE WATER CONSERVATION COMMISSION  
MONTHLY REPORT OF APPROPRIATIONS AS OF NOVEMBER 30, 1956  
1955-1957 APPROPRIATIONS

Fund No.	Available July, 1955	Expended Oct. 31 '56	Expended to Nov. 1 '56	Balance Nov. 30 '56
1. Commissioners Per Diem & Expenses . . . . .	\$ 6,000.00	\$ 2,336.94	\$ 73.00	\$ 3,590.06
2. Administration . . . . .	40,000.00	24,625.48	1,672.51	14,289.64
Collections and Refunds . . . . .	587.63			
3. Maintenance of Dams . . . . .	100,000.00	137,712.36	11,236.91	1,268.03
Collections and Refunds . . . . .	50,217.30			
4. International and Interstate Commission's Conference Expenses . . . . .	8,000.00	4,142.15	367.07	3,490.78
5. Topographic & Conservation Cooperation with U.S.G.S. . .	30,000.00	17,188.15	1,415.22	11,396.63
6. Hydrographic & Conservation Cooperation with U.S.G.S. . .	25,000.00	10,575.18	4,424.82	10,000.00
7. Engineering & Geological Survey and Dem. . . . .	35,000.00	25,001.83	269.18	9,728.99
8. Cooperation with U. S. Departments & for Organizing Conservation and Irrigation Districts . . . . .	40,400.00	26,131.82	873.04	13,395.14
9. Small Projects & Investigations & Surveys . . . . .	106,000.00	69,440.44	7,828.73	28,730.83
10. Water Right Investigations . . . . .	12,000.00	8,126.51	680.94	3,192.55
	<u>\$453,204.93</u>	<u>\$325,280.86</u>	<u>\$58,841.42</u>	<u>\$99,082.65</u>

NORTH DAKOTA STATE WATER CONSERVATION COMMISSION  
 MONTHLY REPORT OF APPROPRIATIONS AS OF NOVEMBER 30, 1956  
 1953-1955 APPROPRIATIONS

Fund No.	AVAILABLE July, 1955	EXPENDED TO Oct. 30 '56	EXPENDED TO Nov. 1 '56	BALANCE Nov. 30 '56
1. Commissioners - Per Diem & Expenses . . . . .	\$ 5,000.00	\$ 5,294.61		\$ 706.29
2. Administration . . . . .	40,000.00	40,111.34		120.50
Collections and Refunds . . . . .	231.84			
3. Maintenance of Dams . . . . .	100,000.00	156,170.17		87.62
Refunds and Deposits . . . . .	56,257.79			
4. International & Interstate Commissioners' Conference Expenses . . . . .	8,000.00	8,000.00		NIL
5. Topographic & Conservation Cooperation with U.S.G.S. . . . .	30,000.00	33,000.00		NIL
Transfer from #10 . . . . .	3,000.00			
6. Hydrographic & Conservation Cooperation with U.S.G.S. . . . .	25,000.00	27,499.98		.02
Transfer from #10 . . . . .	2,500.00			
7. Salary-State Engineer . . . . .	6,000.00	6,000.00		NIL
9. Engineering & Geological Survey and Dem . . . . .	35,000.00	38,500.00		NIL
Transfer from #10. . . . .	3,500.00			
10. Cooperation with U. S. Departments and for Organizing Conservation & Irrigation Districts . . . . .	50,000.00	40,935.81		64.19
Less Transfers . . . . .	9,000.00			
11. Small Projects & Other Investigations . . . . .	100,000.00	102,399.70		136.92
Collections and Refunds . . . . .	2,536.62			
	<u>\$459,026.25</u>	<u>\$457,910.71</u>		<u>\$1,115.54</u>

NORTH DAKOTA STATE WATER CONSERVATION COMMISSION  
 MONTHLY REPORT OF APPROPRIATIONS AS OF NOVEMBER 30, 1956  
 CONSTRUCTION & RECONSTRUCTION DRAINS OR IRRIGATION  
 1953-1957

Appropriation Title	Available July 1, 1953	Expenditure to Nov. 30, 1956	Balance November 30, 1956
Construction and Reconstruction Drains or Irrigation	\$140,000.00	NIL	\$56,730.41
	<u>\$140,000.00</u>	<u>NIL</u>	<u>\$56,730.41</u>

NORTH DAKOTA STATE WATER CONSERVATION COMMISSION  
 MONTHLY REPORT OF APPROPRIATIONS AS OF NOVEMBER 30, 1956  
 CONSTRUCTION BOND GUARANTY FUND (CONTINUING APPROPRIATION)

Appropriation Title	Balance July 1, 1953	Expended	Balance Nov. 30, 1956
Construction Bond Guaranty Fund	\$70,541.00	NIL	\$70,541.00
	<u>\$70,541.00</u>	<u>NIL</u>	<u>70,541.00</u>

NORTH DAKOTA STATE WATER CONSERVATION COMMISSION  
 DEPOSITS IN THE BANK OF NORTH DAKOTA  
 NOVEMBER 30, 1956

Source of Deposits	Transit Number	Amount Deposited	Expended Nov. 30'56	Balance Nov. 30'56
Collections on Yellowstone Pumping Irrigation District \$3,500 Warrant. Tax collections for partial payment of interest and principal to April, 1953.				
Contributions for Ground Water Surveys:	501-118	\$2,235.68		\$2,235.68
Fessenden \$1,000.00	Hunter	\$ 750.00		
Mountain 100.00	Tioga	1,000.00		
Maddock 750.00	Mohall	1,000.00		
Lakota 1,000.00	Richardton	750.00		
Rolla 750.00	Bowbells	1,000.00		
Devils Lake 7,500.00	Michigan	580.00		
Anata 1,000.00	Wimbledon	1,000.00		
Litchville 1,000.00	Fairmount	1,000.00		
Wyndmere 1,000.00	Hope	1,000.00		
Portland 700.00	Sharon	250.00		
Kindred 1,000.00	Stanley	1,500.00		
Myle 250.00	Upham	750.00		
Neche 300.00	Minnewaukan	1,000.00		
Transfer .10	Streeter	1,000.00		
St. John 750.00	Powers Lake	250.00		
Hankinson 1,000.00	Landa	250.00		
Grafton 500.00	Hettinger	2,500.00		
Booklet	501-128	\$37,180.60	\$20,726.13	\$16,454.47
	501-127	2,887.57	2,002.06	885.51
TOTAL OF ALL BANK OF NORTH DAKOTA DEPOSITS AS OF NOVEMBER 30, 1956				\$19,575.66

PAYROLL  
NORTH DAKOTA STATE WATER CONSERVATION COMMISSION  
NOVEMBER 30, 1956

PERMANENT EMPLOYEES

Name	Position	Pay Grade	Salary November	With N. D. Tax	OASIS	Hosp. Ins.	Savings Bonds	Net Pay	Remarks
Hoisveen, Milo	State Eng-Chief Eng.	K-8	685.67	96.00		11.10	18.75	559.82	Inc. June '56
Anderson, Albin S.	Field Engineer	F-5	354.67	54.10	7.09	4.35	6.25	282.88	Adj. August '55
Baessler, Gordon	Draftsman	B-9	103.33	13.55	2.07			87.71	Inc. May '56
Baranyk, Duwayne	Rodman	A-8	181.50	22.80	3.63			155.07	Start April '56
Clark, Lorraine	Bookkeeper	C-9	237.67	32.80	4.75	11.10		189.02	Inc. November '56
Cooper, Vernon S.	Assistant Sec'y	K-5	551.34	61.60		11.10		478.64	Inc. June '56
Flinn, Dean	Rodman	A-6	277.50	37.20	5.95			254.35	Inc. November '56
Fredrickson, Fred	Planning Coordinator	D-5	252.00	15.40	5.04			231.56	Inc. August '54
Johnson, Lloyd	Construction Foreman	F-5	354.67	34.10	7.09	11.10		302.38	Inc. April '56
Karch, Esther	Clerk Typist	C-5	214.67	28.50	4.29			181.88	Inc. June '56
Krebsbach, Joseph	Instrumentman	B-5	268.67	24.00	5.97			268.70	Inc. October '56
Mohs, Jimmy	Rodman	A-6	66.72	8.28	1.33			57.11	Quit October '56
Olson, John	Rodman	A-7	29.50	3.70	.59			25.21	Quit September '56
Putz, Roy	Material Expert	A-6	172.50	21.30	3.45	4.35		143.40	Inc. June '56
Reiter, Daniel	Operator	D-5	252.00	15.40	5.04			231.56	Inc. August '56
Bonning, Ole	Operator	B-8	322.67	48.30	6.45			267.92	Inc. May '56
Schmitzke, Arnold	Laborer	D-5	398.85	42.50	7.98			348.37	Monthly November 1 '56
Schweigert, Luella	Chief Steno	F-3	299.84	54.80	5.99			239.85	Inc. November '56
Sell, Nancy	File Clerk	A-6	172.50	21.30	3.45		18.75	129.00	Inc. June '56
Sheldon, Marvin	Office Engineer	B-10	529.17	55.40		11.10		462.67	Inc. May '56
Torvik, Duane	Engineer	B-4	454.17	71.00	9.08			374.09	Start June '56
Westgate, Sam	Ass't State Engr.	K-5	634.67	31.60		11.10		591.97	Inc. June '56
Walterson, Howard	Operator	B-8	322.67	48.30	6.45			267.92	Inc. May '56
Zeigler, Victor	Engineer	C-6	421.67	57.40	8.43	11.10		344.74	Start June '56

PAYROLL  
 NORTH DAKOTA STATE WATER CONSERVATION COMMISSION  
 NOVEMBER 30, 1956

(TEMPORARY EMPLOYEES)

Name	Position	Salary November	With Tax	N.D. OASIS	Net Pay	Remarks			
Arnold, Alvin	Laborer	257.18		5.15	252.03	Working by the Hour			
Arnold, Alvin Jr.	Laborer	243.68	34.70	4.88	204.10	"	"	"	"
Danielson, Ray	Driller	263.90	15.40	5.28	243.22	"	"	"	"
Haarsager, Alfred	Laborer	66.00	9.80	1.32	54.88	"	"	"	"
Hellwig, Charles	Rodman	40.00	5.00	.80	34.20	"	"	"	"
Knutson, Lewis	Laborer	338.27	49.30	6.77	282.20	"	"	"	"
Markuson, Benhard	Laborer	296.18	44.00	5.93	246.25	"	"	"	"
Middleton, Joe	Laborer	50.00	6.80	1.00	42.20	"	"	"	"
Rufsvold, Linas	Laborer	294.53	12.90	5.90	275.73	"	"	"	"
Thykeson, Claris	Laborer	90.33	11.70	1.80	76.83	"	"	"	"
Vik, Clarence	Laborer	60.63	8.70	1.21	50.72	"	"	"	"
Vigen, Clarence	Laborer	67.50	2.80	1.36	63.34	"	"	"	"