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# Montana Sponsors 157 Irrigation Projects

\$11,000,000 Is Expended on Program Eastern Counties Benefit From Work

**M**ORE than \$11,000,000 has been expended for new irrigation projects in Montana within the last four years, under sponsorship of the Montana state water conservation board, either to bring new lands under irrigation or to provide additional water for older projects.

Many of these projects, including some of the largest in the state, have been constructed in southeastern Montana to stabilize the livestock and agricultural industries of this section and to create vast amounts of new wealth.

In all, 157 irrigation projects have been completed by the water conservation board since 1936, to supply water to 406,787 irrigable acres.

The tremendous value of this work is easily seen in a study of new wealth created on irrigated lands. Records of the federal bureau of reclamation reveal that the average production of new wealth from each acre of irrigated land under its supervision is slightly over \$40 per year. Rockwood Brown of Billings, vice chairman and secretary of the state water conservation board, says this figure may be slightly above the average for Montana, but that using \$25 per acre per year as a conservative estimate, it is found that more than \$10,000,000 of new wealth is created each year on the acreage developed by the state board in the last four years.

This is almost the entire cost of the projects recoverable every year, and all of this money goes through the channels of trade in Montana, benefitting every merchant, professional man, laborer, artisan and industry, Brown says.

**Receive Federal Aid**

In the financing of the irrigation projects controlled by the state board, the total amount of federal grants was \$5,824,538.85, and the total of the state investments was \$5,267,012.21, of which about \$4,000,000 was borrowed through the federal government and is repayable over a period of 20 years at 4 per cent interest. The average net repayable cost of the state projects is \$12.50 per acre, or about half what each acre produces in new wealth.

Financing of the projects was worked out by the water conservation board, organized in 1934 at the request of Governor Frank H. Cooney, in a unique manner which has become widely known as the Montana plan.

This plan in actual operation provides for organization of a non-profit water users' association, members of which are farmers served with water from the completed project. These members elect their own officers and run their own project, entering into a contract with the water board to buy a given amount of water at a specified price per year. With this money, revenue bonds covering the state's portion of the cost of construction, are retired. The price cannot be increased and there is no lien on the farmer's land. The project is operated like a public utility in that water users purchase water at a set price, and can be denied the use of the water if they fail to maintain their payments.



Visitors to Billings invariably comment upon the hundreds of new and modern houses which have been built throughout the city during the last few years. The above photograph, taken from the roof of the DeWitts hospital and looking north, toward the city, shows several residential blocks which did not exist only a short time ago. This residential district is one of the many new areas constructed in the city. The St. Vincent Hospital may be seen in the upper left portion of the picture.

The water conservation projects constructed by the state board vary in size from the Hofer dam in Powder River county, supplying water to 19 irrigable acres, to the Tongue river dam in Big Horn county, supplying water for 50,000 acres and costing a total of \$1,262,000.49.

Except for the Dead Man's Basin project in Musselshell county, now being completed, the water conservation board is not now working on any new projects, since no funds have been provided by the state legislature. Instead, the board is attempting to consolidate the gains which it has made.

At present, the consumption of water in Montana for all purposes is estimated at 5,000,000 acre-feet per year, and there are less than 2,000,000 acres of land under irrigation, while it is estimated that 48,000,000 acre-feet of water flows out of Montana in three great river basins each year.

**More Water Is Available**

Preliminary investigations by the state water board indicate that there is a probability of utilizing and putting to consumptive use water sufficient to irrigate an additional 5,000,000 to 8,000,000 acres of land in Montana.

There is hardly a county or river basin in the state where development of this character is not feasible within sound economic limits, Mr. Brown says.

Among the largest and most important irrigation projects constructed or under construction in the Billings area are the upper Musselshell project, Dead Man's Basin, Tongue river project, and the Big Dry project. In addition to these projects, supervised by the state water conservation board, the United States bureau of reclamation is working on the huge Buffalo Rapids project, the first unit of which was completed last September 26 at a cost of \$1,045,000.

The upper Musselshell project, completed last fall, includes two storage dams, one on the north fork of the stream and the other adjacent to the south fork. A lateral takes surplus water from the north fork reservoir to the south fork reservoir, and a canal then diverts the water almost to Harlowton—a distance of 59 miles. The project provides a supplementary irrigation supply for 10,000 acres in the vicinity of Martinsdale and Two Dot, and places under irrigation for the first time an additional 10,000 acres west of Harlowton. Cost of the project was \$844,884.67.

Difficulties encountered in diverting this water from farm lands may be responsible for developing a method for sealing irrigation ditches. The canal iron shale and gravel banks, and leaked badly in places completed, Brown related. A year ago engineers experimented with bentonite, a volcanic ash found in Montana and northern Wyoming, which was found to hold 10 or 15 times its original size when wet. Of the worst spots in the canal, on the C. M. Bair ranch lined with bentonite and this far appears to have no leakage entirely, Brown said.

**Experiment With Bentonite**

The experiment proved interesting to bureau of reclamation engineers, who are also trying this method. Bentonite is also used for grouting, replacing cement, this method of shutting off underground streams of which might weaken or destroy a dam.

The Dead Man's Basin project, scheduled for completion next fall, makes use of a natural reservoir with a storage capacity of 80,000 acre feet of water. The Dead Man's Basin project, together with the Musselshell project, is designed to conserve virtually all of the water in the Musselshell river. Several streams into the Musselshell river between the upper Musselshell and the Dead Man's Basin project, and the latter to hold 50,000 acre feet of water. Because the flow of the river is so variable from year to year, the state board plans to limit acreage served to 20,000 acres, always carrying over a full year's reserve supply. Cost of the project was \$511,888.00.

**Control Musselshell River**

The Musselshell valley is a livestock area, and about one acre foot of water per acre per year. The Dead Man's Basin project will provide this supply for 100,000 acres extending from Shawmut to well below Mead, a distance of about 125 miles. The upper Musselshell and Dead Man's Basin projects together will completely control the Musselshell river and develop the agriculture along the entire length of the stream.

Largest of the reservoirs created by the state conservation board is the Tongue River project, in a few miles north of the Montana-Wyoming line about 100 miles south of Miles City. The river runs between the dam and Miles City is about 200 miles, and the reservoir is about 100 miles long. The cost of the project, completed in the spring of 1939, was \$1,262,000.

The water conservation board anticipates slow development of irrigation under this project, and it prepared to sell 30,000 acre feet of water per year, finally increasing this to 80,000 acre feet.

Much of the Miles City farming area, now principally in forage crops, will change to growing beets and similar crops as soon as irrigation can be developed in the area, Brown predicts. This change

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## Full Review Of Irrigation Projects Including First Bentonite Experiments

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