Physical Features of the Pollock-Herreid Irrigation Unit

Cooperative Extension South Dakota State University

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Physical Features of the Pollock-Herreid Irrigation Unit

Published in cooperation with the Pollock-Herreid Irrigation District

Cooperative Extension Service
South Dakota State University
U.S. Department of Agriculture
The Pollock-Herreid area in Campbell County was first examined for possible irrigation development in 1940. The system of Missouri River reservoirs was not yet built and the area was examined as a possible pumping unit along with numerous other sites.

A reconnaissance study in 1959 indicated that the unit would not be feasible. Following this report the Lake Pocasse Dam was constructed in the northwestern portion of Campbell County by the U. S. Army Corps of Engineers. The completion of this physical features, plus a high degree of interest among local people, prompted a restudy. The new plan makes use of Lake Pocasse as a part of the distribution works and involves the principle of sprinkler irrigation.

The new study has resulted in a favorable benefit-cost-ratio for the 15,000-irrigable-acre project.

This publication provides basic engineering and drainage plan information most likely to be of interest to the people in the area. Persons desiring more information should consult the Campbell County Extension Office.

Other extension publications on the Pollock-Herreid Unit available are Fact Sheet 458, “Benefits and Costs of the Pollock-Herreid Irrigation Unit” and Fact Sheet 457, “Social and Economic Impact of the Pollock-Herreid Irrigation Unit.”

**PHYSICAL FEATURES**

The movement of the water from the main pumping plant near Pollock can be followed by reading each facility description and referring to map of proposed development within this publication for location.

The drainage plan is explained on the last pages of the bulletin.

**Main Pumping Plant.** Location—NW ¼ of Sec. 1, T 127 N, R 79 W; pumps—4 in number, turbine type, each powered by an 800 h.p. electric motor—capacity of each pump is 42.5 cubic feet per second (cfs), pumps to be mounted on sloping rails to permit raising and lowering as water level in reservoir changes.

**Pollock Canal.** Length—6.8 miles; bottom width 14 to 16 feet; water depth 4 to 4.4 feet; total area served between main pumping plant and Lake Pocasse is 2,464 acres; 1,762 acres of this total are served by lifting a part of the water through Relift P-1; 40 acres are served by again lifting a part of the water through Relift P-2; canal empties in Lake Pocasse. Over one-half of the necessary cuts would occur in a 1.3-mile reach near the center of the canal. Cuts would be from 12 to 24 feet in depth. About 70% of the canal would be lined. Silver Creek and one of its tributaries would be crossed by 66-inch diameter inverted siphon tubes.

**Relift Station P-1.** Location—NW ¼ of Sec. 30, T 128 N, R 78 W; lift—30 feet; 3 turbine type pumps with total capacity of 40 cfs, driven by electric motors; pumping to be done from a canal side sump.

**Relift Station P-2.** Location—NW ¼ of Sec. 28, T 128 N, 78 W; lift—52 feet; 3 turbine type pumps with total capacity of 14.0 cfs, driven by electric motors; pumping to be done from a lateral of the Pollock Canal.

**Lake Pocasse.** Would serve as a regulating reservoir for the fluctuating irrigation demands of the remaining 12,536 irrigable acres. The lake would serve as storage for a part of the irrigation return flow. The maximum fluctuation of the lake would be 3 feet.

**Relift Station A.** Would lift water from Lake Pocasse 46 to 49 feet into the Herreid Canal; Location—SE ¼ of Sec. 15, T 128 N, R 78 W; discharge structure on the SW ¼ of Sec. 14; pumps—6 vertical column, mixed flow, electrically driven with a total capacity of 240 cfs. Pumps discharge into a 78-inch diameter, 580-foot-long pipe.

**Herreid Canal.** This canal receives the water from Relift A. At the head end it has a bottom width of 16 feet. As it progresses through its 17.6 miles, the bottom width gradually decreases to 3 feet at the end. Water depth decreases from 5.1 feet at the head to 1.9 feet at the end. It serves 12,536 acres and passes through relift stations B and C.

About 75% of the canal would require lining. About one mile of the canal would require cuts in excess of 12 feet.


1 One cubic feet per second equals 450 gallons per minute, so in this case, pump capacity is 19,125 gallons per minute.
Relift Station B. Location—NE ¼ of Sec. 28, T 128 N, R 77 W; lift—36 feet; capacity 160 cfs; pumps—4 vertical column, mixed flow, powered with electric motors; water from pumps discharges into one 66-inch diameter, 630-foot-long pipe.

Relift Station C. Location—SE ¼ of Sec. 31, T 128 N, R 76 W; lift—60 feet; capacity 100 cfs; pumps—4 turbine type pumps powered with electric motors; water from pumps to discharge into one 54-inch diameter, 1,820-foot-long pipe.

Relift Station H-1. Would lift water from a canal side sump on the Herreid Canal to serve 1,418 acres via a lateral. Land served lies from one-fourth to three miles north and northeast of Lake Pocasse. Pump location—SE ¼ of Sec. 20, T 128 N, R 77 W; pumps—3 turbine type electrically driven; capacity—31 cfs; lift—29 feet; water from pumps to discharge into one 30-inch diameter, 250-foot-long pipe.

Relift Station H-2. Would lift water from one of the Herreid Canal laterals to serve 692 acres lying approximately two and one-half miles northeast of Herreid. Pump location—SE ¼ of Sec. 29, T 128 N, R 76 W; pumps—3 turbine type, eletrically driven; capacity—18.0 cfs; lift—38 feet; water from pumps to discharge into one 30-inch diameter, 250-foot-long pipe.

Laterals. (Only main laterals are shown on the map) the area will be served by a total of 56 miles of laterals that would deliver water from the canals to individual farm units. Laterals would have base widths of from 3 to 8 feet and water depths of from about 1 to 3 feet.

Control structures within the lateral system include 45 drop structures, 5 siphons, 150 turnouts, 34 irrigation mainline crossing points for farmers use and 74 check facilities to control water levels.

Farm Sprinkler Systems. (Not shown on map) the type of irrigation system and pump purchased to serve each farm unit would be the decision of each irrigator. Water would be delivered to a turnout or sump at each farm unit. The management of the water from this point on is the responsibility of the irrigator.

Fish and Wildlife Features. The project would result in both gains and losses to fish and wildlife habitat. In this project however, gains about equal losses for all types of fish and wildlife, except nesting areas for waterfowl production. There is a loss here since some of the smaller sloughs that in the past have provided spring and early summer nesting would be drained.

On the other hand, construction of the 535-acre Herreid Wildlife Area (area is indicated on the map by the wildlife symbol southeast of Herreid) would enhance wildlife resources. This land would be purchased as part of the project cost. About 110 acres would be planted to crops for wildlife use, about 165 acres would remain in grass and about 260 acres would be marsh.

Desirable water levels would be maintained in the wildlife area from the irrigation lateral directly north of it.

The four other areas noted on the map with the wildlife symbol are existing marshes through which the drainage system will pass. These four marshland areas will be developed to replace other losses to wildlife habitat. These marshes would serve as a part of the drainage channel. Drainage through them would maintain a relatively constant water level throughout the summer for wildlife use and their inclusion would enhance project feasibility. These four areas will be fenced as a part of project costs.

Municipal and Industrial Water. The towns of Pollock and Herreid could receive raw water supplies from the project at a cost of about 7.2 cents per 1,000 gallons. This would be the cost at canal side. The towns would have to provide for delivery works, treatment, and storage of winter water supplies.

Drainage Plan

Open (Surface) Drains. The open drains are for the propose of: (1) removing excess irrigation water, (2) removing storm water, and (3) collecting flows from closed (pipe) drains.

There would be 50 miles of open drains to collect and convey excess irrigation and storm water.

Spring Creek and its tributaries, Lake Pocasse and the Oahe Reservoir would serve as outlets for the drainage system.

The Spring Creek Pumping Plant, located on the SE ¼ of Sec. 23, T 128 N, R 78 W, would lift return irrigation flows from Spring Creek and discharge them into a diversion ditch going around the north side of Lake Pocasse. The ditch empties into the Oahe. Reservoir. Storm runoff would not be diverted. The diversion to Oahe Reservoir would prevent undue salt buildups in Lake Pocasse.

The Spring Creek Pumping Plant would consist of two electrically driven automatic starting pumps of 10 cfs each that would discharge into a 24-inch diameter, 92-foot pipe.

Closed (Pipe) Drains. The closed drain system would supplement natural drainage.

The 115 miles of closed drains would discharge into the surface drainage system at numerous points throughout the project.
### Project and Farm Owner Cost Allocations

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<th>Item</th>
<th>Project Cost</th>
<th>Farm Owner Cost</th>
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<td>Farm drains for disposal of surface water from each irrigated farm unit</td>
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<td>All other surface drains</td>
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<td>Delivery of water to each irrigated farm unit</td>
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<td>Water service charge (see FS 458 titled “Benefits and Costs Pollock-Herreid Irrigation Unit,” per acre)</td>
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</tbody>
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