

KRAMER  
VIC

J. Clark Salyer National Wildlife Refuge, Dam 320  
Along the Lower Souris River  
Bottineau County  
McHenry County  
North Dakota

HAER No. ND-4-A

HAER  
ND,  
5-KRAY,  
1-4-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record  
Rocky Mountain Regional Office  
National Park Service  
U.S. Department of the Interior  
12795 W. Alameda Parkway  
Denver, Colorado 80225

HISTORIC AMERICAN ENGINEERING RECORD

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J. Clark Salyer National Wildlife Refuge, Dam 320

HAER No. ND-4-A

**Location:** Along the Lower Souris River, in the J. Clark Salyer National Wildlife Refuge, Bottineau and McHenry Counties, North Dakota  
*KEAMER VIC.*  
UTM: NE End: 48 degrees, 36' 12" (lat.); 100 degrees, 38' 07" (long.)  
SW End: 48 degrees, 34' 17" (lat.); 100 degrees, 40' 36" (long.)  
Quad: Upham

**Date of Construction:** 1935-1936

**Present Owner:** U.S. Fish and Wildlife Service

**Present Use:** Damming Souris River

**Significance:** The dams within the J. Clark Salyer National Wildlife Refuge represent a historical movement to preserve wildlife and wildlife habitat in the United States, which began in the mid-19th century and continues today. The refuge dams are significant for their association with the development of the national wildlife refuge system during the New Deal Era. At the time of its creation, the J. Clark Salyer Wildlife Refuge was considered the most important project in the Federal Government's program of migratory waterfowl habitat restoration. The dams also are representative examples of dams designed by the Federal Government during the New Deal Era for conservation projects.

**Historians:** Frederick L. Quivik, RTI, Inc., August 1989  
Mary E. McCormick, RTI, Inc., August 1989  
Jane L. Carroll, St. Paul District Corps of Engineers, March 1990

For more historical information, see J. Clark Salyer National Wildlife Refuge Dams, HAER No. ND-4

#### J. CLARK SALYER NATIONAL WILDLIFE REFUGE DAMS (Lower Souris National Wildlife Refuge)

The J. Clark Salyer National Wildlife Refuge is located along a winding 75-mile stretch of the Souris River in Bottineau and McHenry counties in north-central North Dakota. Originally established in the mid-1930s as the Lower Souris National Wildlife Refuge, this refuge was renamed in 1967 in honor of J. Clark Salyer, II, the chief of the national wildlife refuge program from 1934-1961. The 58,700-acre refuge is largely comprised of native prairie lands, with some wooded bottom lands and aspen and brush-covered sandhills, as well as over 21,000 acres of restored river ponds, marshes, and wet meadows. Water developments in the refuge were established and are maintained by a network of five major dams and other diversion structures, including two small masonry dams and several dikes, levees and channels. The five major dams are located so that their reservoirs or backwaters extend nearly the entire length of the refuge, from near Upham north to the United States-Canada border. The headquarters for the refuge are situated west of the river, about two miles north-northeast of the town of Upham, and adjacent to one of the southernmost dams, Dam 326. Access to the refuge headquarters from Upham is provided by a county highway.

#### DAM 320

Dam 320 is the southernmost, or farthest upstream, of the five major dams at the J. Clark Salyer Refuge, and is located in McHenry County (E 1/2 Sec. 17, SE 1/4 Sec. 18, and N 1/2 and SW 1/4 Sec. 19, T159N, R77W; and SE 1/4 Sec. 24 and NE 1/4 Sec. 25, T159N, R78W). The dam is about 1-1/2 miles southeast, or upstream, from the refuge headquarters.

The dam consists of a homogeneous earthfill embankment, emergency spillway, and outlet works. The earthfill embankment is oriented along a northeast/southwest axis, and has a height of about 13 feet, a crest width of 16 feet, and a crest elevation of 1428.7 feet. The total length of the embankment, including the spillway is 15,575 feet. The upstream side of the embankment has a slope of 4:1. The surface of the embankment is vegetated with grass, except for the lower two-thirds of the upstream face, which is protected by rock riprap. The original plans for the dam called for the top soil at the site to be plowed before construction of the embankment. Earthfill for the embankment was apparently excavated from a nearby location. [1]

The emergency spillway is an uncontrolled weir located along the crest of the embankment, about 4,200 feet southwest from the right dam abutment. When it was originally constructed, the spillway consisted of a 700-foot-long stone masonry wall with flared stone masonry wing walls and a stone masonry apron below its downstream side. Since then, most likely in the late 1940s, the spillway wall was modified by the addition of new concrete wing walls, a concrete cap, and concrete buttresses that are spaced 12 feet on center along its downstream face. [2] The current crest elevation of the weir is 1425.8 feet.

There are two outlet structures for the dam. The main outlet works is located near the right abutment of the dam and spans the main river channel. It consists of a reinforced concrete structure with three radial gates. The concrete structure is comprised of four, 17-foot-long by 13-foot-high walls (two end walls and two piers), which serve as supports for the three radial gates. The downstream wing walls for the concrete structure are constructed of interlocking, corrugated sheet piling, and the upstream wing walls are concrete.

The radial gates each consist of a corrugated steel face (16 feet wide by 10 feet high) with channel section supports and angle section radials. The outer face of each gate is set along the upstream side of the concrete structure. Although there is no intake to the gates, the concrete walls between the gates extend downstream and serve as outlet structures. The outlet discharged into a stilling basin, consisting of a concrete apron and plunge pool.

The radial gates are operated by manual hoists and the hoist control for each gate is mounted on top of an adjacent concrete wall. Access to the hoist controls is provided by a cantilevered walkway along the structure's upstream side. The walkway is secured to the structure by angle section knee-braces and consists of a plank deck and an angle section rail. Along its downstream side, the concrete structure also supports a concrete walkway consisting of planks resting on two channel section stringers. This is the only one of the outlet works at the five dams that was not altered during 1949-1951 by raising the concrete walls/piers by 3 feet.

The other outlet works for the dam are located near its southwest abutment and consist of a long stop log structure and a conduit. Located on the upstream side of the embankment, the stop log structure has a reinforced concrete bulkhead. Interior walls of the structure hold 5-foot 3-inch long stop logs that can be adjusted manually to control the structure's top elevation. A 48-inch steel pipe extends from the stop log structure about 30 feet under the dam to the downstream side of the embankment where it empties into a low marshy area.

#### FOOTNOTES

- 1 Marshall Fox and Terry Clayton, "Inspection Report, J. Clark Salyer Dam #320, J. Clark Salyer National Wildlife Refuge, McHenry County, North Dakota, Federal Inventory Number ND 00329," p. 10, report prepared for the U.S. Fish and Wildlife Service, June 1984.
- 2 In 1946, drawings were prepared for repairs to the stone-masonry weir of the spillway for Lower Souris (J. Clark Salyer) Dam 357. These repairs called for the same modifications as those exhibited by this structure, i.e., new concrete gap and concrete buttresses. Therefore, it is assumed that the spillway for both dams, as well as for the three other dams at this refuge, were altered around this same time, see drawing M-No. DAK. 3-30, "Lower Souris: Improvements to Dam 357 Spillway," July 1946, included as attachment C-11 to Marshall Fox and Terry Clayton, "Inspection Report, J. Clark Salyer Dam #357, J. Clark Salyer National Wildlife Refuge, Bottineau County, North Dakota, Federal Inventory Number ND 00325," report prepared for the U.S. Fish and Wildlife Service, June 1984.

NOTE: See also J. Clark Salyer National Wildlife Refuge Dams, HAER No. ND-4.