

RECLAMATION

Managing Water in the West

**Bighorn River System
Long-Term Issues Group
Meeting**

Water Supply & Operations Meeting

Fort Smith, Montana

April 12, 2006

Yellowtail Unit and Bighorn Canyon National Recreation Area

**Project Authorization's,
Project Purposes and
Development Plans**

RECLAMATION

Yellowtail Unit

- **Authorization:**
Flood Control Act of Dec. 22, 1944 (ch.665 Stat. 887)

Senate Document 191—USACE/Reclamation plan for Missouri River Basin Development

- **Project Purposes**
 - **Flood Control**
 - **Hydropower**
 - **Irrigation**
 - **Recreation**
 - **Fish & Wildlife**
 - **Sediment storage**

RECLAMATION

Bighorn Canyon National Recreation Area

Authorization: Public Law 89-664, October 15, 1966

Purpose

“In order to provide for public outdoor recreation use and enjoyment of the proposed Yellowtail Reservoir and lands adjacent thereto in the States of Wyoming and Montana by the people of the United States....”

RECLAMATION

Yellowtail Unit

- **Authorization:**
Flood Control Act of Dec. 22, 1944 (ch.665 Stat. 887)

Commonly Known as Pick Sloan Act

Authorized the general Missouri River basin development program

“the general comprehensive plan set forth in House Document 475 and Senate Document 191 as revised and coordinated by Senate Document 247, Seventy-eighth Congress, second session, are hereby approved and the initial stages recommended are hereby authorized...”

RECLAMATION

Yellowtail Unit

Senate Document 191 (page 50)

Plans for development of 64,000 Acres of new lands and 16,600 AF supplemental supply. (Harden Project largest planned development)

Kane Reservoir: 750,000 AF, planned to serve as silt storage, flood control and power

Yellowtail Reservoir: 470,000 AF, Power and Irrigation diversion.

Below Yellowtail: “After all upstream development has taken place, the annual flow will be reduced to 1,560,000, with a maximum monthly flow of 329,000 and minimum monthly flow of 87,000 AF (Approximately 1,400cfs)

RECLAMATION

Yellowtail Unit

Senate Document 191

General Nature of Plans and estimates:

Reclamations “Board of Review” (included in Senate Document 191): “(a) That the general plan for the development of the basin as contained in the report be approved subject to such modifications and changes as may be indicated, from time to time, as the plan is effectuated.”

Senate Document 191 “Summary Forward” page 17: “The plan is based on specific information with respect to the character and needs of different sections of the basin, and on experience in designing, building, and operating works of the kinds that will be required in the Missouri River Basin. It is adapted to development in stages and to such modifications as changes in physical and economic conditions make necessary.”

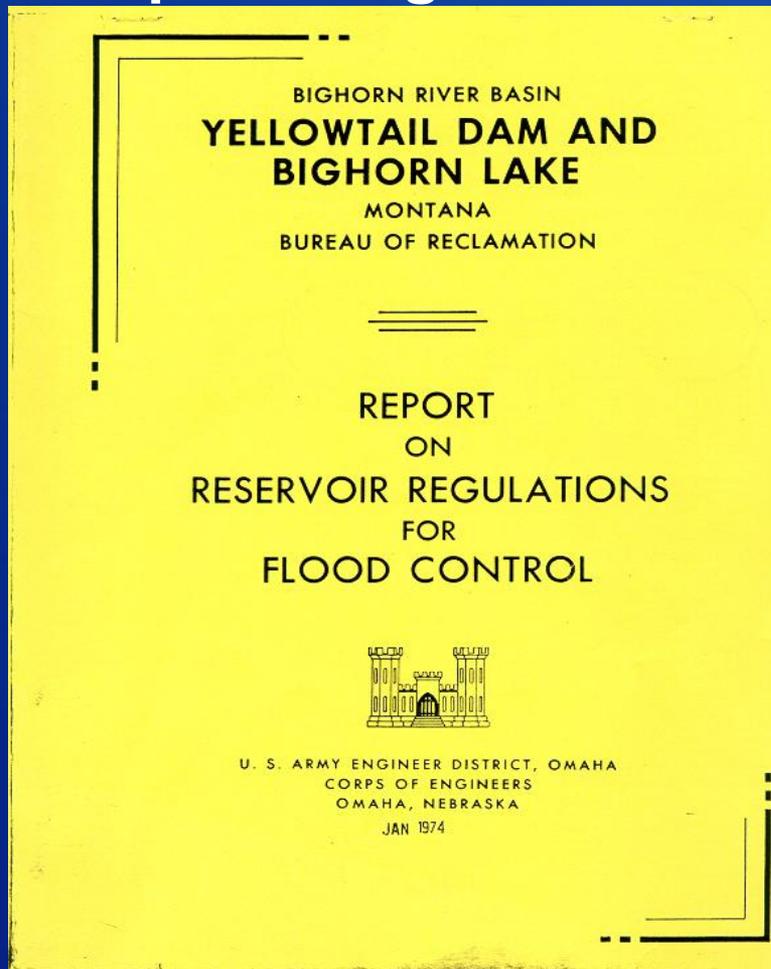
RECLAMATION

Yellowtail Unit

- **Project Purposes (Definite Plan Report)**
 - **Flood Control (Exclusive flood storage = 259K AF)**
 - **Hydropower (200 MW)**
 - **Irrigation**
 - **Recreation**
 - **Fish & Wildlife**
 - **Sediment storage**

Yellowtail Unit

Project Purposes- **Flood Control** (Exclusive flood storage = 259K AF), Coordinated with U.S. Army Corps of Engineers



RECLAMATION

Yellowtail Unit

- Project Purposes (Definite Plan Report)
 - **Hydropower** (200 MW planned)

As Constructed: The powerplant at the toe of the dam contains four 62,500 kilowatt generators for a total plant capacity of 250 megawatts.

Yellowtail Unit

- **Project Purposes (Definite Plan Report)**
 - **Planned Sediment storage**

1949 estimate of sediment that would be stored in Yellowtail Reservoir = 4,570 AF/yr

Storage space allocated for sediment = 315,000 af

Yellowtail Unit

Project Purposes (DPR)

Recreation:

Recreation Planning Report (NPS, 1962) Estimated local or regional recreation use in the canyon area at about 154,000 visitor-days and 406,000 visitor-days are estimated from beyond the local zone.

Proposed three major recreation sites: Yellowtail Dam, Horseshoe Bend, Barry's Landing, and seven minor sites.

Yellowtail Unit

Project Purposes

Recreation:

Recommendations made with Reclamation taking responsibility for initial action in collaboration with the National Park Service.

“1. That even though reservoir operations appear to be reasonably good for recreation interests at Yellowtail Reservoir, the Bureau of Reclamation give consideration to recreation needs in their ultimate water control plans of the Bighorn (Wind) River.”

Planned Fish & Wildlife

- **Bureau of Sport Fisheries & Wildlife, DOI**
- **Report: “Fish and Wildlife Resources and the Yellowtail Unit” dated February 1962**
- **Benefits:**
 - **Improvement to fishery in the Bighorn River below Yellowtail Dam due to reduction in silt load and colder water**
 - **Trout fishery to be established in the river**
 - **Maintenance of substantial and uninterrupted downstream releases of not less than 1,000 cfs.**
 - **Reservoir fishery for walleye and lake trout**
- **17,700 acres be made available to WY Game & Fish Commission for development of fish & wildlife resources**

Yellowtail Unit

Project Purposes (DPR)

Fish & Wildlife:

“No measures are suggested for the sole purpose of directly enhancing fish and wildlife in the post-development period.”

Recommendations

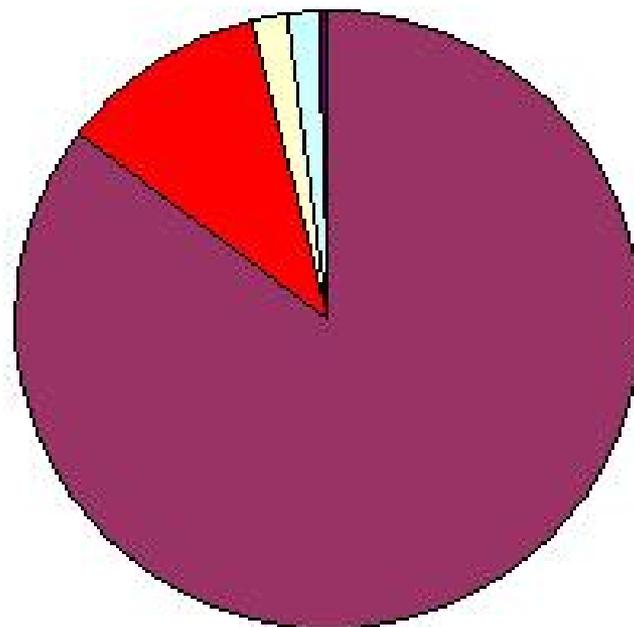
“(3) The planned schedule of flow releases through the afterbay dam be adhered to , and a minimum instantaneous firm flow of not less than 1,000 cubic feet per second be provided.”

Yea But: “Studies show that releases for power generation will be in excess of mandatory requirements for other purposes.”

(DPR page 16)

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Yellowtail Unit Cost Allocations January 1965



■ Hydropower 85%

■ Flood Control 11%

□ Fish & Wildlife 2%

□ Recreation 2%

■ Other .4%

YELLOWTAIL DAM AND BIGHORN LAKE DESIGN CRITERIA

DAM:

CONCRETE THIN-ARCH STRUCTURE

HEIGHT = 525 FEET

LENGTH = 1,480 FEET

VOLUME = 1,545,664 CUBIC YDS CONCRETE

POWERPLANT:

4 - 12 FT DIAMETER PENSTOCKS

4 - 87,500 HP FRANCIS-TYPE HYDRAULIC TURBINES

NAMEPLATE CAPACITY = 250 MW - 4 @ 62.5 MW EACH

POWERPLANT CAPACITY \approx 8,000 CFS @ 440 FEET HEAD



RIVER OUTLETS:

IRRIGATION OUTLET - 84 IN CONDUIT CONTROLLED BY RING FOLLOWER GATES

EVACUATION OUTLET 84 IN CONDUIT CONTROLLED BY RING FOLLOWER GATES

CAPACITY OF EACH OUTLET @ ELEVATION 3660 = 2,500 CFS = 5,000 CFS TOTAL

SPILLWAY:

OVERFLOW SECTION - LEFT ABUTMENT - CONTROLLED BY (2) 25 X 64.4 GATES

CAPACITY @ ELEVATION 3660 = 92,000 CFS

BIGHORN LAKE:

MAXIMUM WATER SURFACE: ELEVATION 3660: STORAGE = 1,381,189 AF

NORMAL OPERATING FULL POOL: ELEVATION = 3640: STORAGE = 1,070,029 AF

SURFACE AREA: ELEVATION 3660 = 17,940 ACRES: ELEVATION 3640 = 12,958 ACRES

RECLAMATION

Bighorn Canyon National Recreation Area

Authorization: Public Law 89-664

SEC. 3 Administration

“The Secretary shall coordinate administration of the recreation area with the other purposes of the Yellowtail Reservoir project so that it will in his judgment best provide (1) for public outdoor recreation benefits.....”

- **Memorandums of Agreement: between Reclamation and the National Park Service: December 1964 (signed by the Secretary) and updated in March 1972.**

RECLAMATION

Administration of the Yellowtail Unit and the Bighorn Canyon National Recreation Area

Memorandum of Agreement between Reclamation and the Park Service: **December 1964 (signed by the Secretary)**

General Provisions

1. “The Bureau shall retain complete authority over and responsibility for the construction, operation and maintenance of Yellowtail Dam and Reservoir for the primary project purposes ...”

“The Service shall administer all lands and waters within the project area, providing for recreation therein.”

RECLAMATION

Administration of the Yellowtail Unit and the Bighorn Canyon National Recreation Area

Memorandum of Agreement between Reclamation and the Park Service: December 1964 (signed by the Secretary)

General Provisions

2. “The parties to this agreement acknowledge that as authorized by Congress each has an interest in the storage, release, and utilization of the water which is to be contained by the Yellowtail Dam, and that the Yellowtail Unit was authorized, and is being constructed, for the primary purposes of irrigation, flood control, and generation of hydroelectric power and the incidental purposes of recreation, and fish and wildlife conservation. This agreement shall not be construed to conflict with the primary purposes of the project or to alter the Bureau’s control over storage and release of water.”

RECLAMATION

Administration of the Yellowtail Unit and the Bighorn Canyon National Recreation Area

Memorandum of Agreement between Reclamation and the Park Service: December 1964 (signed by the Secretary)

General Provisions

2. (continued) “However, to the extent permitted by the authorized primary purposes of said project the Bureau shall operate the dam and reservoir in keeping with the Secretarial policy which provides for full consideration of public recreation and fish and wildlife on reservoir projects undertaken by the Federal Government. The Service shall determine optimum and minimum pool levels desirable for public recreational use and provide the Bureau with this information for consideration in carrying out the purposes of this paragraph.”

RECLAMATION

Administration of the Yellowtail Unit and the Bighorn Canyon National Recreation Area

Memorandum of Agreement between Reclamation and the Park Service: December 1964 (signed by the Secretary)

Functions of the Bureau of Reclamation

7. “Coordination and preparation of a reservoir management plan, in cooperation with the Service and other concerned Federal, State and local agencies, for management of project area.

RECLAMATION

Administration: Yellowtail Unit and the Bighorn Canyon National Recreation Area

Memorandum of Agreement: Updated March 1972

General Provisions

1. b. “The parties acknowledge that, under their respective Congressional authorizations, each has an interest in the storage, release, and utilization of the water which is to be contained by the Yellowtail Dam. The Bureau shall operate Yellowtail Dam with attendant releases from Bighorn Lake in keeping with Congressional and Departmental policy, which requires full consideration of public recreation and fish and wildlife purposes on reservoir projects undertaken by the Federal Government. The Bureau shall be guided by this policy in operating Yellowtail Dam for the authorized purposes of the Yellowtail Unit; but this agreement shall not be construed to compromise those purposes. The Service shall determine optimum and minimum pool levels desirable for public recreational use and provide the Bureau with this information for consideration in carrying out the purposes of this paragraph.”

RECLAMATION

Administration: Yellowtail Unit and the Bighorn Canyon National Recreation Area

Memorandum of Agreement: Updated March 1972

Responsibilities of the Bureau of Reclamation

3. Consistent with its authorities, the Bureau shall be responsible for:
 - a. “Operation and maintenance of the Yellowtail Dam and all engineering works incidental thereto or in connection therewith , together with all appurtenances thereof for the proper storage, release, protection and utilization of water as provided for by Federal Reclamation Law. This includes responsibility for regulating the reservoir waters surface elevation, taking into account the Service’s recommendations, consistent with the functions of the Yellowtail Unit.”

RECLAMATION



**OPERATIONS - A BALANCING
ACT AMONG THE AUTHORIZED
PURPOSES OF THE YELLOWTAIL
UNIT and the AUTHORIZED
PURPOSES OF THE BIGHORN
CANYON NATIONAL
RECREATION AREA**



RECLAMATION

QUESTIONS?

Yea Buts?

RECLAMATION