

# **The Yellowtail Unit**

**Pick-Sloan Missouri Basin Program**

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## **The Yellowtail Unit**

The Yellowtail Unit resulted from the Flood Control Act of 1944 (more popularly known as the Pick-Sloan Program) which attempted to reconcile problems between Reclamation and the Army Corps of Engineers. Yellowtail Unit helps Montana residents control flooding of the Bighorn River, and provides hydroelectric power and the potential for crop irrigation in the region. Born out of the Pick-Sloan Missouri Basin Project of the 1940's, the Yellowtail Unit was one of many projects designed to entice reverse settlement from the High Plains counties of the Missouri River Basin states by combining the efforts of the Army Corps of Engineers and Reclamation.<sup>1</sup> The largest concrete dam built on the Missouri River Basin, Yellowtail Dam also provides a recreation area for the region.<sup>2</sup>

### **Project Location**

The Yellowtail Unit is located in the Great Plains at the mouth of Bighorn Canyon, which contains the Bighorn River. The Unit stretches through south-central Montana, with the potential to provide irrigation for 42,600 acres of land north of the dam, referred to as the Hardin Unit (due to its location adjacent to Hardin, Montana.) The majority of the project is within Big Horn County.

The primary feature of the Yellowtail Unit is Yellowtail Dam, located ninety miles southeast of Billings, Montana, and forty-three miles southwest of Hardin, Montana. The project's reservoir, Bighorn Lake, with a surface area of 17,300 acres and a length of seventy miles, is formed by Yellowtail Dam, and lies south of it. The Yellowtail Powerplant lies at the toe of Yellowtail Dam. Finally, the Yellowtail Afterbay Dam is two and two-tenths miles

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1. William E. Warne. *The Bureau of Reclamation*, (Boulder and London: Westview Press, 1985), 161, 183.  
2. United States Department of Interior, Bureau of Reclamation, *Yellowtail Dam and Powerplant: Technical Design and Construction*, (Denver: Government Printing Office, 1975), 9.

downstream from Yellowtail Dam, and reduces downstream variations in the Bighorn River.<sup>3</sup>

The Bighorn River has an average annual flow of 2,604,000 acre feet.<sup>4</sup> Due to its interior location and northern latitude, the climate is semiarid with periods of drought and rainfall. The Bighorn region has extreme mountains and intermontane basins. These features create cavernous canyons like the one used for the Yellowtail Unit.

### **Historic Setting**

It is believed that in prehistoric times, the Bighorn River Basin was formed as an outwash of the eroded mountains (present day Rocky Mountains) to the west. The Bighorn River, in south-central Montana, is part of a river system formed by glaciers and erosion during this Tertiary period. The Absarokee or “Crow” Indians believe their ancestors, migratory hunters, headed west from present day Minnesota in the 1600's, searching for buffalo and settling along the Bighorn River.<sup>5</sup> In 1804, the Lewis and Clark Expedition explored the area north of the Yellowtail Unit. In 1807, the St. Louis Missouri Fur Company got its start with the efforts of Manuel Lisa. His trading post at the confluence of the Bighorn and Yellowstone Rivers promoted white settlement of the area and functioned until the Blackfeet Indians attacked it in 1810.<sup>6</sup>

The Crow Indian Reservation, which surrounds the Yellowtail Unit, was established via Congressional treaty in 1851. Here, the Crow were allotted roughly 38.5 million acres by the government as their reservation apportionment. The Homestead Act of 1862 encouraged white

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3. United States Department of Interior, Water and Power Resources Service, *Project Data*, (Denver: U.S. Government Printing Office, 1981), 1013-5.

4. *Project Data*, 1017.

5. Joseph Medicine Crow, *From the Heart of the Crow Country: The Crow Indians' Own Stories*, (New York: Crown Trade Paperbacks, 1992), 1-2.

6. Clark C. Spence, *Montana: A Bicentennial History*, (New York: W. W. Norton and Company, Inc, 1978), 15-7.

settlers to develop 160-acre farms in the region surrounding the reservation.<sup>7</sup> In 1866, heavy use of the Bozeman Trail necessitated the construction of three United States forts on Crow territory. The Crow were convinced that the forts' arrival had precluded animal habitation within their lands, since whites affiliated with the forts were hunting there, and forcing the Crow to compete with other tribes for the remaining animals. Consequently, by 1885, the bison herd was disappearing and out of necessity, tribal members moved onto the reservation and began farming for subsistence.<sup>8</sup>

Threatened by neighboring tribes, the Crow aligned themselves with white settlers in order to more effectively fight off Sioux enemies in the region. Between 1851 and 1904, they surrendered millions of acres of tribal land in pursuit of support from the United States government. The Crow's last large cession of land to the United States (2.5 million acres) occurred in 1904. Around 1900, the Indian Service, faced with diminishing wildlife food resources, designed a systematic program to aggressively promote agriculture among the Crow. The leaders of the tribe supported this idea. Each Crow family was allotted 1,040 acres for grazing and farming purposes.<sup>9</sup> From 1900 to 1910, a new wave of white farmers migrated to this region. The government built several forts specifically on the Bighorn River to protect adjacent trade routes and migrating settlers. These outposts also encouraged white settlement in the area.<sup>10</sup>

In order to study the possibility of creating a gravity diversion and canal system along the west side of the Bighorn River, the Reclamation Service first conducted investigations during 1903-1905, entitled "The Savage Stockton Survey." Thorough investigations commenced in

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7. *Project Data*, 1016.

8. Burton M. Smith, "Politics and the Indian Land Cessions," *Montana*, (Autumn 1986): 28.

9. McGinnis and Sharrock, 53.

10. Spence, 17, 54, 58.

1913. By 1917, an October 24 report advised construction of a gravity diversion from Bighorn River with a 150 foot dam, and sixty-two miles of highline canals for irrigation purposes.<sup>11</sup>

During the Dust Bowl years of the Great Depression, plans were laid to lure settlement toward the Missouri River Basin region. Government planning took the form of the Pick-Sloan Program of 1944, which merged the goals of the Army Corps of Engineers and the Bureau of Reclamation to promote flood control, navigation, irrigation, and power services along the Missouri River Basin. The government instituted the Pick-Sloan Program to simultaneously provide jobs for World War II veterans. The Bighorn River region was included in this program as a result of investigations between 1939 and 1942, and the site was deemed to be suitable for development. A low dam at the Yellowtail site and one at Kane, Wyoming, were suggested. In 1950, the government decided that a single high dam at the Yellowtail site would require less funding in the long run.<sup>12</sup>

After World War II, the two most important products for Montana's economy were grain and beef. In order to capitalize on these cooperatives and fight the drought of the 1950's, irrigation was desired to make more acreage farmable, and the potential of the Yellowtail Unit answered this need.<sup>13</sup>

### **Project Authorization**

The Yellowtail Unit was authorized under the Pick-Sloan Missouri Basin Project to develop the Missouri River's water resources. The Definite Plan Report was first authorized by Reclamation on November 10, 1950. But the government did not allocate funds for construction

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11. *Project Data*, 1016.

12. Warne, 161-4; *Project Data*, 1016.

13. Spence, 182-3.

until 1961, when they granted \$39,809,359 for construction of the project.<sup>14</sup>

Initially, the government faced legal issues in acquiring the lands needed for the dam, reservoir, and surrounding structures. Of the area to be flooded, the Crow Indians owned 5,678 acres, and the dam would have to be placed entirely on tribal land.<sup>15</sup> Therefore, negotiations between the Crow and Bureau of Reclamation were required, and commenced in October of 1946. By December of that year, the tribe approved Reclamation's proposed exploratory work necessary for construction plans and land value estimates.

After the Crow initiated lawsuits against the government valuation of lands condemned by the project, the government responded in 1958 with a proposed \$2,500,000 in compensation for the lands to be used in the Yellowtail Unit. This was considered to be a settlement on the Crow's right-of way issue for the Yellowtail Unit.<sup>16</sup>

### **Construction History**

The initial plans for the Yellowtail Unit predicted the need for a tremendously high and heavy dam to fit and successfully function in the canyon. These plans required pre-construction work in 1946 which included drilling and foundation explorations to determine the physical character of the rock. (The government allocated \$50,000 for this initial endeavor.) A diamond core drill was used to accomplish this task. The canyon walls had to be explored extensively to assure that they would provide a solid foundation for a potential dam.<sup>17</sup>

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14. National Archives and Records Administration, Rocky Mountain Region, Records of the Bureau of Reclamation, Record Group 115, "Project Histories: Pick-Sloan Missouri Basin Program, Upper Missouri Region: Yellowtail Unit 1962, Vol. III, vii (hereafter cited as "Project History" with year, volume number, unit name, and page.)

15. Robert Herdman and Carl S. Sloan, "Yellowtail Dam and the Crow Country," *Reclamation Era*, (April 1946): 94.

16. "Project History, Yellowtail Unit" 1946/60, Vol. I, 27; Toni Rae Linenberger and Leah S. Glaser, *Dams, Dynamos, and Development: The United States Bureau of Reclamation's Power Program and Electrification of the West*, (Denver: 2001), 172; Lawson, Michael L. *Dammed Indians: The Pick-Sloan Plan and the Missouri River Sioux, 1944-1980*, (Norman: University of Oklahoma Press, 1982), 199.

17. R. L. Branam, "Black Diamonds," *Reclamation Era*, (July 1947): 160-2.

Bids to construct Yellowtail Dam and Powerplant were opened on April 11, 1961. Eventually, the contract was awarded on April 24, 1961, to a group of five companies from various parts of the country, assuming the name “Yellowtail Constructors.” The Yellowtail Constructors consisted of Morrison-Knudsen Company, Inc, Boise, Idaho; Kaiser Company, Oakland, California; Perini Corporation, Framingham, Massachusetts; Walsh Construction Company, Davenport, Iowa; and F and S Contracting Company, Butte, Montana. Receiving \$39,809,359 to complete the project, they began excavations for the spillway intake area on June 16, 1961.<sup>18</sup>

Reaching a height of 525 feet, Yellowtail Dam is the largest concrete dam built by the Bureau of Reclamation on the Missouri River Basin.<sup>19</sup> Groundbreaking ceremonies for the dam and powerplant took place on October 18, 1961. Then Yellowtail Constructors began the tunneling for the river diversion. The first year of construction, service roads were acquired and built, as well as temporary facilities and sewer systems for visitors, police, and construction workers. A bridge fifty feet long was created to facilitate construction over Bighorn Canal.<sup>20</sup>

After doing more exploratory drilling to obtain data on the proposed dam’s underlying material, Yellowtail Constructors had to adjust their construction plans. Because the foundation was deemed to be adequate, Reclamation revised initial dam measurements. The new dam design was thinner and eliminated 218,000 cubic yards of concrete-the original design. The Grapevine Tunnel intake, designed for potential irrigation purposes, consequently had to be moved, and the plans for the powerplant location were accordingly changed. The sewer stabilization pond did not hold water, therefore an asphalt membrane lining had to be installed.

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18. “Project History, Yellowtail Unit,” 1960, 1961, Vol. II, 1, 12.

19. “Reclamation Milestones,” *Reclamation Era*, (January 1962): 24.

20. “Project History, Yellowtail Unit,” 1960, 1961, Vol. II, 1-14.



Furthermore, Amsden shale found at the damsite proved to be unable to support the powerplant's control cables, therefore a tunnel was dug to provide their adequate stabilization.<sup>21</sup>

Despite surprise setbacks during initial construction, work continued. The lower and middle sections of Madison limestone, where three-fourths of the dam would rest, were found to be excellent foundation rock. Workers soon discovered, however, that the upper hundred feet of the canyon walls would not give the dam as sturdy a foundation. Clay rock breccia, of dubious strength, was present, requiring that open cavities in this stratum of the canyon would have to be grouted and plugged to prevent leakage. That same first year of construction, government workers began building the adjacent Fort Smith government camp.<sup>22</sup>

For Yellowtail Constructors, the first challenge of the year came in the form of a large cavity found in the upper and middle Madison rock formations along the canyon walls of the dam site that had to be filled. Then in June, electrical workers conducted two statewide strikes, further delaying construction work. Furthermore, a slide occurred on June 16, above the dam's right abutment, an area known to be an area of potential instability. This area had to be stabilized. In addition, a dispute between the project's ironworkers and general laborers (related to a disagreement over the placement of anchor bars in the stilling basin) resulted in picketing, adding to the unrest at the construction site. On a more positive note, the Government camp, Fort Smith, was finished in April of 1962. Classrooms and residential areas for the government community were constructed here.<sup>23</sup>

In January of 1963, the contractor diverted the Bighorn River through the completed diversion tunnel. By March, the first bucket of concrete was placed in Yellowtail Dam. But the

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21. "Project History, Yellowtail Unit," 1960, 1961, Vol. II, 15-8.

22. "Project History, Yellowtail Unit," 1960, 1961, Vol. II, 19-22.

23. "Project History, Yellowtail Unit," 1962, Vol. III, 20-7.

rest of the year was riddled with construction problems. Spring flooding from heavy rains washed out a culvert, which was the only public access point to the dam site. Then ironworkers, pipefitters, and plumbers at the site picketed during various times in early summer. Scientists came in and took seismic measurements of the Yellowtail site, which ended 1963 on a positive note when the seismic tests deemed the limestone abutments sound.<sup>24</sup>

In early 1964, excavations were finally completed for the right and left abutments of Yellowtail Dam and for its foundation drainage tunnel. In January, Reclamation completed specifications for a Yellowtail Afterbay Dam two and two-tenths miles downstream which would minimize downstream fluctuations in the river. Construction of the Yellowtail Afterbay Dam required removal of the surviving headworks and the Bighorn Diversion Dam midway between Yellowtail Dam and the Yellowtail Afterbay Dam.<sup>25</sup> By May of 1964, workers began placing roofing materials on the Yellowtail Powerplant. Heavy rains brought flooding and rock slides to the site in June, causing major damage to the construction site. Despite the setback, workers were able to erect power and control cable lines from the switchyard to the afterbay dam site. By mid-June, excavation was complete for diversion of the Bighorn Canal near the afterbay dam site. Then a landslide occurred the morning of June 26, blocking a road to the top of the dam, delaying construction once more.<sup>26</sup>

Due to good weather in July, workers rebounded from prior delays by pouring 717,690 cubic yards of concrete and completing concrete placement for the dam, powerplant, and outlet structures. As work was progressing on Yellowtail Dam, the Bighorn River was simultaneously diverted for the construction of Yellowtail Afterbay Dam. Initial placement of concrete and

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24. "Project History, Yellowtail Unit," 1963, Vol. IV, 1-7.

25. *Project Data*, 1016.

26. "Project History, Yellowtail Unit," 1964, Vol. V, 1-2.

earth embankment materials for the Yellowtail Afterbay Dam occurred in September. After discovering that Yellowtail Dam's right abutment was still unstable, workers had to drain a slide area to prevent rock fall over the canyon wall onto the powerhouse area. On the labor front, ironworkers concurrently picketed at the dam site, and construction was severely hampered since other craft workers would not cross their picket lines. Fourteen ironworkers ultimately quit their jobs due to working conditions they considered unsatisfactory.<sup>27</sup>

At the end of 1965 after one year's work, the Yellowtail Afterbay Dam was ninety-seven percent completed. Concrete had been placed for the dam and tunnels, the diversion tunnel had been closed, and the drainage tunnel was finished. On November 9, closure of the evacuation outlet was initiated and the reservoir filled. In December of 1965, the contractor completed ninety-eight percent of work on Yellowtail Dam and Yellowtail Powerplant having used only eighty-six percent of the contract time. Unfortunately, eighty to one hundred mile per hour winds caused minor damage to construction areas in late December.<sup>28</sup>

The following year, 1966, marked the last year of work on the Yellowtail Dam and Powerplant. The spillway tunnel and stilling basins were finished, providing regulation for the river and structural protection for the dam. Non-government workers completed a total of 373,541 man hours on the Yellowtail Unit, with only four injuries. Government employees clocked 195,477 hours with only two recorded injuries. The Yellowtail Unit proved to be a generally safe venture for all workers until the last year of construction, on June 16, when Bernard J. Schrader, Yellowtail Power Operation and Maintenance Superintendent, was killed in a mobile truck crane accident.

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27. "Project History, Yellowtail Unit," 1964, Vol. V, 1-17.

28. "Project History, Yellowtail Unit," 1965, Vol. VI, 5-6.

On December 22, all work was accepted by Reclamation on the Yellowtail Unit.<sup>29</sup> Despite disgruntled workers, inclement weather, and unstable rock foundation in the upper canyon, workers still completed the project nearly a year in advance of the intended deadline.<sup>30</sup> Major site cleanup began in 1967. A visitor center and adjacent parking area were finished by Brezini Construction Company, and Reclamation transferred the unit to operation and maintenance status on August 1, 1967. On October 31, 1968, Secretary of Interior Stewart L. Udall presided at dedication ceremonies for Yellowtail Dam and Bighorn Canyon National Recreation Area.<sup>31</sup>

When finished, Yellowtail Dam contained 1,545,664 cubic yards of concrete and rose 525 feet to a crest at elevation 3,660 feet. The crest is 1,480 feet long and twenty-two feet wide. The spillway in the left abutment of the dam is an unlined inlet channel controlled by two twenty-five by sixty-four and four tenths feet radial gates which flows into a concrete lined tunnel which ends at the stilling basin. The outlet works also provide the heading for the nine and five-tenths foot diameter Grapevine Tunnel, which was intended to carry water to the Hardin Unit, but has never been put into use.<sup>32</sup>

Yellowtail Reservoir (or Bighorn Lake) has a total capacity of 1,375,000 acre-feet and an active capacity of 363,700 acre-feet. The Yellowtail Powerplant, above ground at the toe of Yellowtail Dam, has four twelve-foot diameter penstocks that furnish water to four 87,500 horsepower, Francis-type hydraulic turbines, which operate the generators. The powerplant has a capacity of 250,000-kilowatts of electric energy. Housed in a structural steel framework, the

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29. "Project History, Yellowtail Unit," 1966, Vol. VII, 6, 29.

30. "Reclamation Milestones," *Reclamation Era*, (January 1962): 24.

31. "Project History, Yellowtail Unit," 1967, Vol. VIII, 6; "Project History, Yellowtail Unit," 1968, Vol. IX, 5.

32. *Project Data*, 1015.

building is faced with brick. It spans nearly the entire width of the riverbed.<sup>33</sup>

Yellowtail Unit's Afterbay Dam forms a pool. Having a seventy-two foot high concrete gravity structure with embankment wings, the afterbay dam has a crest length of 1,360 feet and contains 21,600 cubic yards of concrete and 162,000 cubic yards of earth material and riprap. The Yellowtail Afterbay Reservoir has a capacity of 3,140 acre-feet and its discharges provide a consistent flow into Bighorn River. Diversion capacity for the Bighorn Canal, at the Yellowtail Afterbay Dam, with headworks next to the sluiceway, is 750 cubic feet per second.<sup>34</sup>

One of the unique things about Yellowtail Dam is its streamlined look. The *Reclamation Era* article entitled, "No Power Cables in Sight" cited the absence of steel towers and conductor wires that are often present at such sites. The National Beautification Program, spearheaded by Lady Bird Johnson, provided the impetus for this design. The underground method of power transmission originally devised by Reclamation was utilized at the Yellowtail Unit. Transmission cables in pipes filled with oil are insulated within a tunnel in the canyon. The tunnel extends from the powerplant through the right abutment of the dam and canyon wall and ends in the ground level switchyard.<sup>35</sup>

### **Post-Construction History**

Six months after completion of the Yellowtail Unit, a major flood occurred, and the water surface of Yellowtail Reservoir peaked at 3656.4 feet. A high flood release of roughly 24,700 cubic feet per second flowed through the spillway tunnel. Afterward, Reclamation found large cavities in the lining of the spillway tunnel due to suction from the swiftly moving water. This cavitation damage to the spillway tunnel lining called for replacement lining, as well as

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33. United States Department of the Interior, Bureau of Reclamation. *Future Generations: A New Era of Power, Performance, and Progress*, (Denver: Government Printing Office, 1994), GP-U2.

34. *Project Data*, 1016.

35. "No Power Cables in Sight," *Reclamation Era*, (August 1967): 61.

installation of an aeration slot as a preventative step in 1968. This measure marks the only major modification at the Yellowtail Unit since its original construction.<sup>36</sup>

Another notable issue that has required maintenance since Yellowtail Unit's original construction is the continually active landslides that are adjacent to the dam and lie inside the reservoir basin. The slides affect access roads and pose safety problems. Therefore, the slides must be monitored constantly, particularly after heavy rains. The slides do not impact the safety of the dam. The largest landslide in the reservoir basin, the Big Bull Elk slide, requires constant monitoring, even though the possibility of the slide's movement into the water is considered to be low.<sup>37</sup>

As the reservoir rose in level, springs developed downstream from the dam on the left canyon wall. In 1969, workers applied high-pressure grouting to the foundation on the left abutment to correct this problem. Construction deficiencies on the main unit turbines were also solved that year. Ice jams caused flooding of the Bighorn River that winter, and de-icing systems had to be put into place in order to protect the upstream side of the dam and gates.<sup>38</sup>

Because of its isolated location, Reclamation had a difficult time keeping the Yellowtail Unit staffed. Then in the 1970's, the Yellowtail Native American Apprenticeship Program was established to help solve the problem. The program acted in concert with Big Horn College to offer technical training courses to local Crow Indians who were interested in working at the Yellowtail site. The program has proven to be a success, and the Yellowtail employees turnover rate is now a thing of the past.<sup>39</sup>

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A 10-Year core report for concrete performance in Yellowtail Dam was written in 1975.

36. *Technical Record of Design and Construction*, 640-2.

37. United States Department of the Interior, Bureau of Reclamation, "SEED Report: Yellowtail Dam," (Dam Safety Office, September 1989), 5-7.

38. "Project History, Yellowtail Unit" 1967, Vol. X, 7.

39. Mike Ferguson, interview by author, July 31, 2001, Denver.

The overall quality of the concrete in the cores from Yellowtail Dam was assessed as well-designed, properly placed and cured, and durable enough to have a long service life.<sup>40</sup>

By 1989, the safety evaluation analysis deemed the Yellowtail Dam's safety rating as fair. Failure potential from overtopping during a probable maximum flood was classified as low. However, the reservoir water release capability of the outlet works, spillways, drain systems, and tunnels was characterized as far from adequate. It was recommended that foundation drainage tunnels should be maintained and kept operational. When considering Yellowtail Dam's structural issues, the failure potential of the dam during the maximum credible earthquake was found to be low. Overall, the dam was recorded as performing satisfactorily.<sup>41</sup>

Yellowtail Afterbay Dam had different issues after its initial construction. The 1989 safety analysis identified low-strength, soft clay beneath the embankment dikes and Reclamation found the presence of these weak seams to be less than adequate for the safety of the embankment. One of the major safety deficiencies of the Yellowtail Afterbay Dam included inadequate control of flood flows from Yellowtail Dam. In 1983, the sluiceway stilling basin was examined by divers; considerable erosion of the concrete had occurred. Furthermore, the sluiceway outlet-works gates used to hold the downstream water elevation were not originally designed to move at required three minute intervals, and extensive maintenance was required as a result. Therefore, floods greater than twenty-five percent of the probable maximum flood would overtop the Yellowtail Afterbay Dam.<sup>42</sup>

In the event of a maximum credible earthquake, extensive cracking could possibly occur

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40. United States Department of the Interior, Bureau of Reclamation. *Concrete Performance in Yellowtail Dam, Montana: 10-Year Core Report*, (Denver: Government Printing Office, 1975), 2.

41. United States Department of the Interior, Bureau of Reclamation, "SEED Report: Yellowtail Dam," (Dam Safety Office, September 1989), 2-9.

42. United States Department of the Interior, Bureau of Reclamation, "SEED Report: Yellowtail Dam," (Dam Safety Office, December 1990), 1-8.

to all walls and piers. Consequently, the second major safety deficiency for the Yellowtail Afterbay Dam in 1990 was its inadequate ability to withstand an earthquake. The classification of the afterbay dam's safety in 1990 was considered conditionally poor.<sup>43</sup> In 1990, recommendations to improve deficiencies in the Yellowtail Afterbay Dam included reassessment of the inflow design flood, seismotectonic studies to reevaluate the Yellowtail Afterbay Dam's seismic design, examinations of the overflow crest and sluiceway stilling basins, and monitoring of seepage at left abutment.<sup>44</sup>

### **Settlement of the Project**

Since the Yellowtail Unit has been constructed in the Bighorn Canyon, settlement has not changed much in the immediate region. There are a couple of reasons for this. First, the Crow Indian Reservation spreads over roughly 3,500 square miles, encompassing the dam site and a large portion of the reservoir area. Therefore, the Crow Indians have maintained settlement patterns adjacent to the Yellowtail Unit, and have control over settlement decisions.<sup>45</sup>

Secondly, the irrigation plans included in the Yellowtail Unit have not yet come to fruition for the Hardin Unit. If the need for irrigation is promoted in the region, the Yellowtail Unit can acceptably accommodate this need, but the government has not yet deemed irrigation to be necessary.<sup>46</sup> These two factors have precluded much new settlement of the Yellowtail Unit. The area instead serves as more of a tourist attraction due to the reservoir and fishing options.

### **Project Benefits and Uses of Project Water**

The Yellowtail Unit has offered much to south-central Montana. One of the most

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43. United States Department of the Interior, Bureau of Reclamation, "SEED Report: Yellowtail Dam," (Dam Safety Office, December 1990), 4-8.

44. United States Department of the Interior, Bureau of Reclamation, "SEED Report: Yellowtail Dam," (Dam Safety Office, December 1990), Appendix, 1-3.

45. "Project History, Yellowtail Unit," 1946, 1960, Vol. I, 27.

46. *Project Data*, 1015.



obvious benefits is the power generated by the Yellowtail Powerplant, which started operation in August of 1966. Remotely operated, it generated over 700,000,000 kWh in 2000. The plant produces and distributes electric power at the lowest possible rate to thousands of homes in rural and urban areas via local utilities.<sup>47</sup>

The project's other crucial advantage is its flood control capability. The flow of the Bighorn River is manipulated in order to prevent flooding in the region. Originally, the Army Corps of Engineers estimated flood control benefits for the project during the project's planning phases, and then determined flood control storage requirements. Yellowtail Reservoir has a total flood capacity of 311,160 acre-feet. According to estimates, the reservoir has prevented roughly ninety million dollars worth of flood damage since its completion in 1966.<sup>48</sup>

Bighorn Reservoir and the surrounding Bighorn Canyon National Recreation Area have remarkable scenic character and offer many new recreational options. Because of sediment retention in the reservoir, colder water than would be the case without the dam, and elimination of flood crests and periods of low flow, have improved fish habitat in the river below the dam. Fishery values have increased as a consequence. The reservoir is primarily valuable to waterfowl.<sup>49</sup>

For the Crow Indians, use of Yellowtail Unit's reservoir water and powerplant has been both a boon and a disappointment. The Crow sought exclusive use of the power generated at the Yellowtail Unit. Congress originally denied this request on the grounds that it contradicted laws that grant public municipalities priority over power usage. In 1987, the Crow tried to obtain

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47. "No Power Cables in Sight," *Reclamation Era*, (August 1967): 61.

48. United States Department of the Interior, Bureau of Reclamation, "PSMBP-Lower Bighorn Division-Yellowtail Unit-Montana and Wyoming." *Dataweb*. Internet, <http://www.dataweb.usbr.gov/html/ucwbsprjdata.htm>, accessed 5/31/01.

49. National Archives and Records Administration, Rocky Mountain Region, Records of the Bureau of Reclamation, Record Group 115, "United States Department of the Interior, Fish and Wildlife Service: Yellowtail Unit-Montana and Wyoming, Fish and Wildlife Resources, (United States Government Printing Office, 1962), 2-6.

power from the Yellowtail Unit once more. A compromise was discussed, and a powerplant at the afterbay dam site was proposed for Crow usage. But lack of public support for the measure left the idea unrealized.<sup>50</sup> Furthermore, the project has created a loss of big game in the region, a food source used by the Crow people.<sup>51</sup>

On a brighter note, the tribe was named master concessionaire of the Bighorn Canyon National Recreation Area, despite the National Park Service's management of the site. Tourist facilities in the recreational area include a motel, restaurant, and cultural center, which provide the Crow people with additional revenue. The Crow dictate access to 191 miles of shoreline surrounding the reservoir.<sup>52</sup>

### **Conclusion**

The Yellowtail Unit's irrigation potential has not yet been utilized, but it has been beneficial to south-central Montana in other important ways. The project's tremendously large dam, important reservoir, and productive powerplant have proven to be noteworthy contributions to Montana.

### **About the Author**

Carolyn Hartl attended Indiana University, where she obtained a BA in Education. She taught in inner-city Chicago for six years, and simultaneously volunteered at the Chicago Historical Society. Having relocated to Colorado, she worked for the Denver Art Museum and volunteered at the Colorado History Museum. She is currently pursuing a Masters in History at Colorado State University.

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50. Linenberger and Glaser, 173.

51. National Archives and Records Administration, Rocky Mountain Region, Records of the Bureau of Reclamation, Record Group 115, "United States Department of the Interior, Fish and Wildlife Service: Yellowtail Unit-Montana and Wyoming, Fish and Wildlife Resources, (United States Government Printing Office, 1962), 4.

52. McGinnis and Sharrock, 92.

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