

IDAHO STATE HISTORICAL SOCIETY

REFERENCE SERIES

DEER FLAT AND ARROWROCK

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When the United States Reclamation Service was established in 1902, a national search for appropriate projects was expanded.

Each of the sixteen reclamation states had attractive possibilities. Some potential projects were designed to surmount failures of existing developments to realize anything like their expected potential. (For a time, though, the Reclamation Service hesitated over getting into this kind of complicated enterprise.)

Others were planned to bring water to lands in an entirely new area. The latter kind of project had the advantage of simplicity: no complex arrangements had to be worked out with existing landowners or irrigators, and no previous canals or water rights would have to be incorporated into the proposed system. But partially developed projects had a greater urgency.

Farmers struggling to get started in areas developed with only partial success often needed help in the worst way, while in entirely new areas, no one had to obtain help to avoid ruin that so often accompanied failure or delay of existing projects.

In 1902, Idaho had a possibility of each kind. In the Twin Falls area, the nation's major Carey Act project was getting underway. A proposed Reclamation Service Minidoka project could be developed upstream from the Twin Falls project upon land no one had begun to reclaim. Without excessive complications from dealing with existing landowners and canal companies, the new federal agency contemplated initiating a Minidoka project quickly. (Several thousand dollars had been invested there in a preliminary survey and planning for a Carey Act project, but the Reclamation Service blocked that enterprise by having all the land there withdrawn for their federal project only.) Early success in such a venture would give the newly established Reclamation Service a good example for promotion of future developments. Farther west, Boise Valley offered an opportunity for the Reclamation Service to take over and expand a complex group of existing canals which needed enlargement to cover an area where irrigation had been planned and promised for twenty years. Dealing with existing water users might complicate and delay a reclamation project, but the need to bring in additional water could not be denied. To answer problems that farmers there had to face each season, the potential Boise project had an urgency unmatched in other parts of the state. So preliminary planning got underway for both projects in the early stages of

the new Reclamation Service operations.

In anticipation of congressional adoption of the reclamation act, Idaho's state engineer had joined the U.S. Geological Survey in a thorough search for water storage sites in the upper Boise drainage in the spring of 1902. In support of this search, all the major Boise Valley canal companies formed the Boise Valley Irrigation Association, June 6, 1902. (The Reclamation Act got through Congress a week later, so the water companies had more than one option for obtaining storage reservoirs.) Representatives of the landowner interests thus were prepared to cooperate with any funding agency--state (under the Carey Act) or federal (Reclamation Act)--which might help solve the storage problem. In addition, the associated companies commenced action on August 20, to adjudicate a highly complex tangle of Boise River water rights. By this time, the various canals needed more water than the natural flow of the river provided. So the companies arranged to determine priorities for existing water and to investigate storage possibilities. Both of these actions served to support a potential Boise Valley reclamation project.

Surveyors looking for good, inexpensive reservoir sites in the rough country and deep canyons of the upper Boise had a hard time in August of 1902. Most of the possible reservoir sites offered little in the way of potential storage if low dams were constructed in the higher country. Stream courses were too steep to provide the kind of modest reservoirs desired at that time. (In 1902 the sites for later major dams did not merit any consideration because small, relatively low dams that could be afforded then could not be built to any advantage at the major reservoir locations.) One possibility on the south fork a few miles below Anderson Ranch might have provided in excess of 110,000 acre feet, but a 600-foot wide dam would have had to rise 180 feet to accomplish that. 180 feet seemed entirely too high for anyone to afford when the survey began in April of 1902. Some other slightly more modest storage facilities might have been built at Alexander Flat or on Little Smokey. The latter, with a hundred-foot dam (400 feet wide) still would contribute only about 10,000 acre feet of water. All of these might have been rejected in preference for storage in the valley below Boise. But they appeared to be the only feasible small reservoir possibilities in the upper river drainage. If they were beyond the resources of the community before the Reclamation Act was approved on June 17, 1902, anything else in the way of upstream storage would be still more difficult to manage.

When the summer search for storage sites showed that more water would be needed, the irrigation association, which had helped complete the upper river reservoir survey, backed additional surveys that fall. All possibilities were investigated. Two locations at Deer Flat, in Boise Valley, were examined in November, 1902. Modest embankments would provide more storage than any of the upper sites, aside from the

prohibitively high possibility below Anderson Ranch. At that time, an upper earth embankment (55 feet high and 3,000 feet long) would store 45,000 acre feet, and a lower embankment (25 feet high and 2,600 feet long) would hold an additional 22,908 acre feet. Five other small valley sites would be investigated that fall; all ten feasible dams (the three upper south fork possibilities as well as the valley sites) would impound 232,946 acre feet, with the 180-foot high south fork dam contributing about half the total. Assuming that natural flow of the river would take care of 75,000 acres of the 310,000 acres regarded as available for Boise Valley irrigation, all ten sites (if eventually utilized) could take care of all but 40,000 to 50,000 acres in need of water. Water from the Payette (assuming that a canal could be constructed for that purpose) might provide for the remainder. Late in November, 1902, an additional survey showed the possibility for building a canal from Black Canyon on the Payette to serve the lower Boise Valley.

From A. D. Foote's previous design of a Boise Valley canal system and from storage and Payette diversion investigations that D. W. Ross worked out as state reclamation engineer in 1902, a general outline for the Boise project had emerged within a few months after passage of the reclamation act. On March 1, 1903, Ross became a U.S. Reclamation Service engineer directing project investigation in Idaho, and four days later the Secretary of the Interior withdrew Boise Valley lands for entry under the reclamation act. That way, other projects or enterprises would not compete with a Reclamation Service Boise project should Ross show that his basic plan was feasible. In order to determine the issue, the Reclamation Service authorized a preliminary Payette-Boise survey on April 23, 1903.

Satisfactory results were obtained that summer. So in December, a series of meetings was held to interest established Boise Valley farmers in joining in a Reclamation Service project.

Most of them needed supplemental water to extend their irrigation season. Expansion of the valley irrigation system appealed to almost everyone, and an assembly of delegates from valley communities met in Nampa, January 10, 1904, with F. H. Newell, manager of the Reclamation Service. They learned that to deal with his agency, they would have to organize a water user's association. In reply to suggestions for two associations--one for Boise Valley, and the other for Payette--Newell asked that all the farmers combine into one. This procedure, developed in Arizona with establishment of the Salt River Valley Water Users' Association, February 19, 1903, met conditions imposed by the Secretary of the Interior under the reclamation act for organization of an acceptable project. Their Boise Valley Irrigation Association--an agency of canal companies more than of individual farmers--would not do. Yet providing the necessary water user's association posed no particular problem. Two others had followed the original Arizona model, and Boise Valley could

easily provide a fourth. D. W. Ross and J. H. Lowell got a Nampa meeting, February 1, 1904, to divide the area into fourteen districts, with two committee representatives from each district appointed to pursue the matter. Lowell continued to assemble support for the irrigation venture.

He got formal endorsements from the city councils of Boise, Nampa, Caldwell, Emmett, Meridian, and Parma. Then in Roswell on February 29, the Riverside Irrigation District asked to have the project funded. In Caldwell, the Pioneer District, and in Meridian, the Nampa-Meridian District followed. Next, the State Land Board endorsed the project, bringing 60,000 acres of state land into the venture. When this strongly-supported irrigators movement emerged as the Payette-Boise Water Users' Association, organized formally in D. W. Ross' reclamation office in Boise on March 4, 1904, some 1,200 land owners, representing 94,664 acres of irrigated land, were committed to cooperating in the project.

Before Boise Valley farmers could get organized, they had a setback in getting their federal project underway. Their problem was funding. Each state had federal land sale revenues available for reclamation, and Idaho's fund amounted to \$2,600,000 at that time. This would not get too far in building the Boise project, let alone take care of the rest of the state's reclamation needs.

The Reclamation Service had some interest in a potential Minidoka project also, and another possibility could be found around Mud Lake west of Dubois. Compared with their valley, Minidoka had little urgency, the way Boise project supporters like Rees Davis looked at the situation:

Stretching forth in all directions from Minedoka [sic] is a vast sage brush plain inhabited by jackrabbits, coyotes, gophers and sage hens. Nothing more. We believe it is safe to say that none of those inhabitants is in immediate pressing need of water for irrigation purposes. Indeed, they seem to prosper abundantly on dry farming. Nevertheless the flower of the Hydrographic Survey of these United States has been profoundly engaged for months past evolving engineering schemes for which the waters of the Snake River can be conveyed to the jackrabbits, coyotes, gophers and sage hens on Minidoka plains. Now, we have no desire to work injustice on the inhabitants of Minidoka plain. They deserve the fostering care of the Great Father at Washington, D.C. They are part and parcel of the aborigines. Their forefathers dwelled in the land long before the advent of the pale face. No doubt the Reclamation Act was meant for them as much as any other of the inhabitants of the arid west. But Mr. Secretary, they don't really need water. Moreover, they droop and perish before the civilizing progress of your Hydrographic Survey.

A civil engineer in hunting jacket and spectacles alarms them. They don't know what to make of it, and many are

contemplating going away. We don't see any use in forcing irrigation upon a class of arid inhabitants that does not want it, and is getting along first rate without it, especially when there is another and quite considerable class that actually needs it. Now, it has occurred to us that you might let the jackrabbits, coyotes, gophers and sage hens of Minidoka plain go for a while--let 'em bide until their need is more pressing--and put the business end of your Hydrographic Survey at work in some locality where it will be appreciated, say on Pennsylvania Avenue. Then select some hard headed arid west man to take charge of things out here and instruct him to see what can be done toward supplying water to those who actually need it.

Yet in spite of hostility from already settled regions in dire need for reclamation development capital, Minidoka has some attractions. Only a year would be needed, A. B. Davis expected, to get water to much of the land. A rival Carey Act project there might have provided the newly organized Reclamation Service a good excuse to stay out. (In other parts of the country, the Reclamation Service backed out of areas where other investment capital could be found: generally the Service preferred to work in places that had no other alternative.) Rivalry between Reclamation Service and Carey Act projects, though, developed over the years. In any case more compelling reasons encouraged development of a Minidoka project. Surveys in February of 1904 had showed that a Minidoka canal system (with electricity for pumping supplied by water going past Minidoka for the Twin Falls project) would irrigate an important section of arid land. Funding Minidoka, though, would preclude construction of a Boise project for a few years at least.

While the Boise project had engineering feasibility, "the vested rights [of prior irrigators] and present condition of irrigation development necessitate a very careful study of the situation. (That, anyway, was how Boise prospects looked to the national Reclamation Service.) Although adjudication of Boise River water rights already had commenced, the Reclamation Service could not enter the valley until all prior rights had been established. That would require several years. Meanwhile, the Minidoka project could be constructed. So the Minidoka engineering board which met in Boise to review the situation, March 16 to 22, 1904, recommended that Idaho's entire reclamation fund be allocated to that project. (Then, when Boise Valley was ready to go, new funds would be available.) So most reclamation surveying in 1904 went into design of the Minidoka canal system.

But Boise Valley farmers had enough influence to arrange on April 2 for careful 1904 surveys for their project also. So even though the national Reclamation Service office designated the entire Idaho fund for Minidoka on April 23, planning for southwestern Idaho went right on. D. W. Ross, in charge of the

Idaho operations office, preferred to develop his Black Canyon scheme to meet Boise Valley's irrigation needs, and that helped keep the project going.

Since the Payette diversion scheme appeared practical, the state engineer approved a claim for 2,400 second feet of water for this purpose June 19. Under this proposal, 47,000 acres (18,000 on the Payette) would receive water through a major canal from Black Canyon to a tunnel that would reach Boise Valley at Graveyard Gulch. Some of the best land for irrigation in the Pacific Northwest would be made available for farming through a proposed Black Canyon canal. Landowners there were eager to pay \$30 an acre for water provided through such a canal, and when surveying came to a conclusion in November, Ross went ahead with an ambitious plan to take care of the needs of the entire Boise Valley, using Payette River water to cover areas that limited storage possibilities could not provide for without this essential supplement.

After the Payette-Boise Water Users' Association was incorporated September 9, 1904, under arrangements acceptable to the Reclamation Service, and after careful surveys of canal and reservoir sites were completed in November, the entire reclamation project faced only two major hurdles. Adjudication of established water rights still had to be completed. (That required more than another year of hearings and investigation.) And funding still had to be obtained. Great economic advantages were promised to justify federal investment in the enterprise. For a projected outlay of \$9,876,800 (at a rate of \$26.55 an acre) a 375,000-acre system could be constructed and operated during a projected three-year repayment period. This would include 18,000 acres on the Payette (out of 72,000 acres served by a Black Canyon canal) and 29,000 acres on Snake River near later Homedale. Some of the best irrigable land in the Pacific Northwest would rise to \$150 per acre on value if water was available, and a lot of other good potential farm land would be provided for, with an overall anticipated average value of \$100 an acre. From not much more than nominal original worth as desert land, the entire project would reach \$37,000,000 upon completion. Out of 101,000 irrigated acres in Boise Valley, 72,000 would become part of the project. Since that part of the 342,000 project acreage already had water, around \$7,200,000 of this total land value appreciation already had been realized: purchase costs for existing canals to serve the entire project had been figured at \$660,000. But even a \$29,800,000 gain from a \$9,867,800 investment suggested a pretty favorable cost ratio.

To obtain water for this additional land in Boise Valley, considerable storage would be needed. The existing 101,000 acres required the entire natural flow of the river and then some. (Supplemental water was needed already for use late in the irrigation season, and part of the merit of the reclamation project would come from providing for a longer season. Existing

lands thus would gain value from availability of additional water.) For a total possible 383,000 irrigable acreage in Boise Valley, new water would be needed for 202,000 acres. Storage to accommodate 156,000 acre feet could be provided in the Boise drainage. That left at least 8,000 to come through a projected Black Canyon canal from the Payette. But more than 200,000 acre feet could be stored at Payette Lake. So availability of water for transfer posed no problem.

Storage possibilities for the upper Boise watershed changed considerably with more thorough surveys conducted in 1904. Alexander Flat, with 25,000 acre feet behind a 135-foot \$395,450 dam, was retained. Both south fork sites--below Anderson Ranch and Little Smokey--were rejected. Another \$830,540 south fork site, above Featherville near Dutch Flat, proved eligible for a 155-foot dam, storing 54,020 acre feet of water. Barber Flat on the north fork was assigned 34,000 acre feet above a 140-foot \$475,000 dam. Upstream storage capability now amounted to 113,020 acre feet. Including Deer Flat and six other small sites out in the valley, an additional 148,270 acre feet could be stored at a cost of \$887,900. Inexpensive valley storage could be obtained for six dollars an acre foot, mostly at Deer Flat that required only five dollars an acre foot. Upstream sites ranged from \$14 to \$16 per acre foot.

An additional, relatively inexpensive source for water was available across the Sawtooth range near the head of Stanley Basin. Alturas Lake, with a modest \$160,000 embankment, could offer 145,000 acre feet of storage space. A 31,000-foot tunnel through the Sawtooth mountain range would deliver this water to the middle fork of the Boise River for \$124,000 with help from a \$1,400,000 canal. This entire diversion of surplus Stanley Basin water could be accomplished for less than ten dollars an acre foot.

Additional storage to be delivered from Payette Lake through a Black Canyon canal would cost sixty-nine cents an acre foot for a 100,000 acre foot capacity, and sixty-seven cents for 200,000 acre feet. Modification of the lake outlet would require \$69,000 for the smaller storage area, and \$133,400 for the larger. Or the project could be increased to provide 250,000 acre feet by installing a dam 300 feet long designed to raise the lake 30 feet. Also incorporated into this arrangement, a 400-foot tunnel and 1,300 foot cut would lower the lake by 22 feet. All this would change the appearance of the lake quite a lot. But this kind of storage possibility offered substantial attraction to hydraulic engineers of that era. Jackson Lake was enlarged for the Minidoka project, and large lakes in Yellowstone National Park were regarded as desirable storage sources (complete with canals across the Continental Divide) for a proposed reclamation Service project west of Dubois. Property owners along these lakes were to be compensated for flooding. Otherwise, project designers did not worry excessively over how their storage

facilities might alter important lakes.

Promotion of this ambitious project, as modified by surveys in 1904, had been easy. J. H. Lowell had little trouble selling the plan to farmers who would benefit with reduced costs, compared with their outlay to get the water they needed through more expensive Carey Act or private investment sources. Under a Reclamation Service project, benefits would go to the greatest possible number of small farmers. Land monopolists and non-resident owners would be excluded, and the entire system would wind up in community ownership. Arrangements to provide for cooperation among water users had been perfected in 1902, and even those who felt reluctant to go into a community-owned project got reconciled to the inevitable. Loan holders had hesitated to endorse a Reclamation Service project because they would have to relinquish possibilities of foreclosure from which landholders would have to be protected. In only ten weeks 1,509 land owners (454 in Ada County and 1,055 in Canyon and Owyhee counties) had signed up. They held 125,736 acres. Absentee owners whom he could not solicit were about all who had not been contracted to work through his water users' association. This impressive demonstration of support greatly strengthened his Payette-Boise project proposal.

When the Boise project engineering review board considered the report offered by D. W. Ross and the support marshaled by J. H. Lowell, February 13 to 16, 1905, they had only to find out how fast the project could go. Arrangements had been made to shift half of the \$2,600,000 Minidoka allotment of 1904 to get part of this new one started. (Bids for the Minidoka Dam had been opened on July 2, 1904, and that project was underway. So the entire amount could not be transferred.) When they tried to go beyond the \$1,300,000 that could be obtained from Minidoka, though, their efforts were blocked in Washington, D.C. So they decided to start the Deer Flat reservoir stage of the project, along with a diversion dam for the New York Canal and an enlarged canal system to accommodate additional water required for this increased level of operation. Acting on this proposal, the director of the U.S. Geological Survey recommended approval of a 372,000-acre project including 300,000 acres in desert land on March 24. Construction would begin, though, at the \$1,300,000 level agreed to by the engineering board. Three days later the Secretary of the Interior authorized the Boise-Payette project.

Construction plans for the Payette-Boise project were prepared quickly after funding became available. By 1906 all essential steps had been taken to get development underway. Adjudication of all water rights prior to April 1, 1904, was completed in a court decree on January 18, 1906. Under the arrangement that was adopted, water right priorities were established with provision for reduced water delivery, dependent upon earlier appropriation and use, favorable to earlier users but providing for later ones during times of shortage. (These

original pre-1904 water rights required 304,000 acre feet during the flood season and 288,000 during the low water period: in an average season that would leave about 946,000 acre feet of unusable flood water that might be stored in reclamation reservoirs.) An agreement, February 12, with the water users establishing the value of existing canals and improvements incorporated into the federal project gave them credit at \$14 an acre for their earlier investment. So just at the time that construction of Diversion Dam, enlargement of the New York Canal, and preparation of the Deer Flat embankments were about to begin, these necessary steps had been accomplished.

When bids were opened for Diversion Dam, canal enlargement and Deer Flat construction, February 1, 1906, most of them ran disappointingly high. Improvements of the Idaho-Iowa lateral from Indian Creek to Deer Flat came in at an acceptable level, and bids for three New York canal segments, opened on April 16, were better revised specifications. Then the lower Deer Flat embankment was rebid so that a contract for \$256,550 could be let June 6. In the meantime, the Reclamation Service began proceedings to purchase two Atlantic steam shovels, four locomotives, sixty-dump cars, and all the rest of the equipment necessary to allow the Reclamation Service to construct the larger upper Deer Flat embankment. All this work finally was completed by the Reclamation Service, which also had to take over one of the New York canal segments when the contractor proved incapable of doing the work. With construction underway that summer, another \$190,000 was allocated to the project, July 12, and additional funding became available as needed. By 1909, when these contracts were completed, \$2,500,000 had been allocated to the project.

Since the Reclamation Service was enlarging the New York canal, provision had to be made to take over its operation. On March 3, 1906, the federal project contracted to manage, as well as enlarge, the canal and to provide the canal company with 277.86 second feet of water in the bigger ditch. Contracts followed with the water users' association, April 14, the Riverside irrigation district, July 16, and the Nampa-Meridian district, October 12. The New York Canal Company did not need to come into the project for expanded operations, but each of the others received the \$14 an acre credit for value of prior investment contributed to the federal project. These contracts remained in force until after provision for upstream storage led to their replacement a decade later.

When the time came in 1908 to construct all the smaller canals that did not require major contracts, established Reclamation Service policy was followed. Reclamation engineers did the planning, and farmers to be served by the project did the actual work. Their compensation took the form of certificates that credited them for part of the payments they would have otherwise had to make to obtain water. Except for a few major

components, farmers to be served by the project built the irrigation works that they needed. In 1909, when water was turned from Diversion Dam through the New York canal to Deer Flat reservoir (where the lower embankment had been completed), incidental construction of an initial set of lateral ditches and other necessary works was largely completed by farmers compensated by water certificates. Their work proved entirely adequate and accelerated the repayment schedule for the project.

From a small start in 1906 when the Reclamation Service took over the New York canal, lands actually served by federal project began to increase, especially after 1909. About ten thousand acres got water from the project in 1907, with fifteen thousand in 1908, and eighteen thousand in 1909 and 1910. Around four thousand additional acres had rental water in 1909, a figure that increased to twelve thousand in 1910. A substantial increase had to wait for storage facilities, commencing with Deer Flat on a modest scale in 1909. With the original, relatively inexpensive stage about finished, another source for storage would have to be developed.

Of the possibilities for upstream storage, Payette Lake offered by far the least expensive option. But canal construction from Black Canyon would more than offset economy in upstream storage. When all factors were considered, water from the Payette would cost \$_____, compared with \$_____. And in any event, title litigation over lands needed for Black Canyon reservoir had delayed any prospect of development there. (J. H. Lowell had achieved early success in purchasing Deer Flat reservoir lands--a bit of fortune that advanced that part of the project substantially.) Then, after D. W. Ross left the project July 1, 1908, Black Canyon lacked a strong proponent. Ross had worked out the plan in the first place, although as his years of service went on, he knew that Black Canyon would be subject to delay. And his successor lacked the confidence, determination, and financial resources essential to bring a Black Canyon canal from Payette River to Boise Valley. So, in spite of considerable dissatisfaction from farmers in the Black Canyon part of the project, that enterprise was dropped entirely by 1910. Senator Borah did what he could to keep Black Canyon an active proposition, and the national management of the Reclamation Service felt embarrassed to have to back out and abandon a lot of water users (or potential water users), only a few of whom could find half way suitable alternatives. Some of the Riverside Canal farmers could substitute wells and pumping for Black Canyon water, but that solution did not begin to meet their entire problem.

With funding becoming available, after completion of the initial stage of project construction, for additional Boise River storage, all of the 1904 proposals for modest upstream claims were rejected. By the summer of 1910, \$6,767,000 was in sight for major development. (A loan fund act of Congress of June 25,

1910, contributed two million, and an expected 1911 allotment would complete the total.) A really large storage dam could be built with this amount, and F. E. Weymouth already had found a suitable site at Arrowrock for a 150,000-acre foot reservoir. Although the cost of the project would rise substantially with investment necessary for so high a dam, A. P. Davis advised, December 14, 1910, that Arrowrock be enlarged to provide still more storage. Cost estimates for the entire project rose to \$12,800,000 the next summer, with \$4,677,000 already expended. Of the new total, the distribution system would require \$4,480,000; a drainage system added \$390,000; Deer Flat reservoir (completed March 24, 1911) finally cost \$930,000; and Arrowrock was projected for \$7,000,000. Construction at this major damsite got underway immediately, although the height of the dam was increased some more after construction began. Most of the general design of the dam had been worked out by February 2, 1912, but final plans were not completed until July 20. By that time, Arrowrock had become the highest dam in the world, and the project was assured _____ acre feet of storage.

This greatly enlarged arrangement for Boise River storage eliminated the necessity for diversion from Black Canyon to serve the original project, and even though another Black Canyon scheme was advanced in 1912, the Reclamation Service lost interest in the Payette division. Senator Borah proposed legislation for another large reclamation loan (\$30,000,000 to supplement the earlier 1910 advance) to take care of Black Canyon and a lot of smaller projects, but Black Canyon had a long wait for funding. On February 13, 1913, the Secretary of the Interior released the affected Riverside district lands from their stock subscription in the project--a fair enough action considering they were not going to receive any water. Compared with Minidoka, though, the Boise project had fared pretty well, with Black Canyon the only major early fiasco.

With prospects for a major addition in upstream storage once Arrowrock water became available--and for a major increase in project cost to supply the additional water--new repayment contracts had to be negotiated with the irrigation districts which would benefit. So on February 28, 1913, a new Pioneer district agreement supplanted the earlier one of April 3, 1905. The district agreed to purchase Arrowrock storage to the extent of \$560,000. Cancellation of the \$14 an acre credit for previous improvement came with an arrangement for the Reclamation Service to install a drainage system not to exceed \$350,000 in cost. Before the year was over, electric dredges were at work on the drainage system. Similar contracts followed with Nampa-Meridian and Riverside districts. In addition, the New York canal applied for 8,537 acre feet of Arrowrock storage in the spring of 1915. This small amount disappointed the Reclamation Service, but surplus Arrowrock water could be disposed of without undue difficulty.

Arrowrock, however, turned out to hold more surplus than the Reclamation Service had anticipated. When the spillway finally overflowed on June 18, 1916, and Arrowrock water was on hand for a full irrigation system, engineers there found that the reservoir held about 284,000 acre feet--forty thousand more than the 244,000 contemplated originally. As a result, the Boise project could undergo substantial enlargement. Even before Arrowrock came into service, Deer Flat water had begun to increase irrigated acreage in the project. From only 90,000 acres in 1910, the total had risen to 120,000 in 1911 and 200,000 in 1912. At that point, the Boise project had begun to have a real impact upon irrigated farming in the valley. Very little additional acreage could be served until 1916. But with the unexpected additional storage, even much of the Black Canyon land (which had been taken up in 1904 when D. W. Ross had expected the Payette division to be developed ahead of the New York Canal) could be irrigated. Since Arrowrock had cost only \$4,725,000 (compared with the \$700,000,000 originally estimated), funding was available to build additional canals to serve the new lands.

To help dispose of extra storage, a contract to provide supplemental water for late season use by farmers with early, high priority water rights came into effect on August 25, 1916. (These irrigators had avoided expensive investment in Arrowrock water because they could get by most of the year on the river's natural flow as allocated then by the court decree of January 18, 1906. But a modest amount of more costly Arrowrock water would help them greatly at the end of the season.) A great wartime national agricultural expansion came just after Arrowrock's completion, and Boise Valley profited far more than if additional lands had come into production at a less favored interval.

At the end of a full season of irrigation using Arrowrock water in 1916, the project could accommodate 1,167 new farms of 67,454 acres still in public land. Of the 223,866 irrigable acres at that stage, the remaining 151,212 acres, representing 2,635 farms, already were watered. Of these, 71,156 acres depended entirely upon the project for full storage, and would have had to cover high costs incurred in building Arrowrock. (Farmers in these lands soon were to complain about this situation.) That left 80,056 acres served partly by the project and partly through prior, inexpensive water rights established in 1906 by court decree. Of those lands, 34,400 in the Pioneer district and 24,158 in the Nampa-Meridian district (which also included other lands) had new contracts and were released from the Water Users' Association by January 6, 1916. That left 21,498 New York Canal Company lands in need of some kind of supplemental water arrangement.

Except for the New York Canal and the early new contracts with the water users' association, the various irrigation districts had come into effect without undue difficulty. Unlike the others, the New York Canal still lacked irrigation district

organization. Anticipating problems unless the New York Canal farmers converted their organization from a cooperative company to an irrigation district, Boise project officials tried in 1915 to get a district established. Their efforts failed. Large and small landholders in the New York Canal Company had conflicting interests. Large owners controlled the company, and with an 80-acre limit for irrigated farms served by the project, had an incentive not to go into a district that would get water mostly for small farmers. When Boise project staff tried to get the small farmers to arrange to establish a district anyway, large holders in the company management took over the campaign to organize the district, but quietly shelved the proposal.

In any event, unless the company farmers wanted late season supplemental water, they had little need to revise their original contract. They already had their enlarged canal maintained by the Boise project in return for allowing the Reclamation Service to deliver water through it to additional users and to Deer Flat reservoir. They preferred to arrange to let each farmer buy needed supplemental water from the Reclamation Service. (Demand for supplemental water varied with priority of water rights, and with each farmer's individual needs.) But the Reclamation Service declined to consider any such deal. Then the New York Canal Company wanted to pay for less total water than the Reclamation Service computed as necessary for farms served entirely from Arrowrock water. An incidental result of expanded irrigation in the valley, drainage water kept up the flow of the river beyond the level that would have been available without irrigation water from Arrowrock. Valley farmers with old water rights used this kind of surplus water and the Reclamation Service wanted to charge the New York Canal irrigators for it. Since the high priority users could get by later in the season with drainage water from the Boise project, their decreed water right no longer cut off water deliveries to late comers along the New York Canal. That way, the New York Canal farmers' season lasted longer, and they did not need supplemental water from Arrowrock so soon. So, in effect, Boise project drainage return used by high priority farmers down the valley actually gave more water to farmers on the New York Canal and the Reclamation Service wanted to charge the latter for this indirect water source. As viewed by Reclamation Service engineers, through this means and by estimating their needs more conservatively, the original farmers on the New York Canal wanted to irrigate more than 20,000 acres while paying only enough to irrigate 14,000 acres. After Arrowrock had been completed, any attempt to irrigate part of the valley independently from the Boise project and the rest through the Reclamation Service--while potentially an unearned benefit to the prior users--only would create difficulty.

With new contracts favorable to early water users of the Pioneer, Nampa-Meridian, and Riverside districts, those fortunate

farmers were released from the obligations of the water users' association. As a result, the association management changed greatly. After the district farmers were released from the old contracts, they no longer participated in the association. A new element took over when their conservative influence was withdrawn. And the remainder of the water users had financial interests directly in conflict with the district users. The less that Pioneer and other district farmers were charged for Arrowrock storage repayments, the greater the burden would be for those who were left. Any arrangement helpful to the old New York Canal farmers would transfer Arrowrock costs to the remaining water users who were left. These less-favored water users started a campaign in 1915 to limit Arrowrock repayments to \$28 (instead of \$35) an acre. This kind of conflict among various classes of water users--each trying to shift more of the charges to the other--created great difficulty for the project.

Unable to work out final repayment arrangements in 1916, the Reclamation Service had an unsatisfactory temporary water rental agreement that season with the New York Canal Company. After a settlement was reached with the Farmers' Union Canal Company (a similar cooperative body), the New York group wanted equally favorable terms. Considerable pressure was applied to the Reclamation Service in 1916, and a lot of unflattering publicity resulted from this campaign. Their complaints increased when the Reclamation Service, unable to peddle all their Arrowrock water too easily, decided to reserve the extra 40,000 feet of storage for contingency during dry seasons. Finally, after long and complicated negotiations, the Reclamation Service established the conditions for future water delivery to farmers without contracts, July 2, 1917. These terms did not satisfy the New York Canal farmers, but repayment arrangements could not be postponed any longer. Because of greater ease, and legal advantage, in dealing with irrigation districts, individual New York Canal farmers wanting to deal with the Boise project had to pay \$35 an acre, compared with \$27 should the group organize as a district. Water no longer could be acquired through rental, as before, and the company had to go to the expense of a district election.

In the proposed district for the New York Canal, a substantial number of farmers (with about 18,000 acres of land intermingled with the holdings of the original claimants) were included. This almost matched the 21,000 acre holdings of the old company farmers. Since the new farmers, like the new farmers elsewhere on the project, would have to pay for all their water at the higher rate for Arrowrock storage, their interest conflicted with the needs of the company farmers. In the referendum, only 66 percent voted for organizing the necessary district. A two-thirds majority was required, so the unhappy new farmers beat down the proposition by the narrowest of margins. At that point, after long, difficult negotiations, the company

was given an option of getting a water contract at the district rate or letting individual farmers come in at the higher rate. Enough held out so that the latter form was used in the final contract of July 2, 1919. But as the proposition of farmers entering the agreement rose, their rate would approach the district rate.

While the New York Canal contract was being completed, litigation from the water users' association annoyed the Reclamation Service. Under the old agreement, the Boise project collected assessment for the water users' association, which existed to assure project repayments. Now, with new management representing the interests of more recent farmers, funds were being collected to send lobbyists to Congress to upset the repayment schedule. Next, an attorney was hired to bring litigation designed to overthrow the Pioneer, Nampa-Meridian, and Riverside contracts that the new settlers disliked. Court action did not get the new water users too far, but the Reclamation Service soon tired of forcing all the farmers still outside the districts to contribute attorney's fees to be used to battle against the Reclamation Service. On May 4, 1918, the Boise project no longer required members of the water users' association to pay assessments in order to obtain water.

During the time of this complicated repayment squabble--arising from conflicting interests of the Reclamation Service (which had to get Arrowrock paid for) and various groups of farmers with different water rights and varying contractual commitments--farmers in the Boise Valley gained a great economic advantage from exceptionally high wartime crop prices. If they had been smart, and could have foreseen their next difficulties, they might have wanted an accelerated repayment program. But the long hassle over which farmers should assume what part of the obligation delayed repayment at a time when conditions were favorable. Over-expansion in expensive farm lands--their values increased greatly in the same inflation that gave farmers high prices for their crops--absorbed much of the wartime farm price profits. Investments in farm machinery, necessary to increased production, also consumed a substantial part of this increased farm income. By 1919, farmers had gone into debt to increase their operating income with apparently good prospects to recover on their investments. Somehow they did not figure on a next-to-complete price collapse after the end of World War I. Idaho corn which went at \$1.65 a bushel in 1919 fell to 50 cents in 1921; Idaho potatoes that brought \$1.51 in 1919 sank to 31 cents in 1922. This kind of disaster brought on a twenty-year depression for the farmers. After 1940, another great war restored prices sufficiently to permit repayment of some of the wartime debts incurred just after Arrowrock was constructed. Boise Valley, which had grown remarkably until 1920, went through a tough decade of little or no growth. Unlike other segments of the national economy, farming did not participate too

successfully in the prosperity that preceded the stock market collapse of 1929.

There was little change in the population of the Boise Project area in the early 1920's. The 1920 project history reported 2,652 farms, with 2,020 of them farmed by their owners and 632 farmed by tenants. By 1924 the number of farms had increased by only 50, to 2,702; however, the number of tenant farmers had increased considerably from 632 to 1,147. Nearly all the farms were reported as being run by "experienced farmers"; and most by farmers experienced in irrigation farming. Presumably a good deal of that experience had been gained on the Boise project during its early years.

There were several changes in crops during those years. The number of acres of clover hay, for example, was cut nearly in half, and that of alfalfa cut over ten percent. Barley and Indian corn, on the other hand, nearly doubled in acreage; while beans quadrupled. The number of beef cattle and sheep remained stable, although the number of dairy cattle increased by about a quarter. Although the value of farm lands themselves did not increase very much, the value of farm equipment much more than doubled--from \$893,937 in 1920 to \$1,989,910 in 1924. The crop and population statistics reflect the stability of the project itself. The miles of canals operated increased from 1920 to 1924 only from 1,002 to 1,019, and the number of acres actually irrigated decreased.

However, 1924 was a bad year for comparisons as it was a low-water year, with the river running approximately 61 percent below normal during the summer. Also, the agricultural depression of the 1920's was beginning to be felt--livestock prices declined in the area because a number of farmers and tenants were moving away and selling their livestock rather than having to pay to move them.

The next major construction work on the project came in these years, too, when the Black Canyon Dam--first segment of the Payette Division except for the Notus Canal (1919-1920) was authorized in 1922. The site had been surveyed in 1915, provoking a rush of settlers to the Emmett area who had no possibility of "new" water until the dam was built. The dam is primarily a diversion dam (replacing a small one built earlier at the site, some five miles above Emmett on the Payette River, to supply water to the orchards of the Emmett Valley), but there is also a power plant producing about 8,000 kilowatts used for pumping in the Emmett and Payette irrigation districts. Although the dam was finished in 1924, the canals to distribute the water collected behind it were not built--or even begun--for over ten years. The first of these, the Black Canyon Canal, was built between 1936 and 1940 to carry 1,300 cubic feet per second some twenty-nine miles west from the dam. The next two, the A line and D line canals, divert from the main canal, the former some fifteen miles from the dam for thirty-three miles west to the

Snake, and the latter from nearly the same point thirty-nine miles south and then west. Two other canals were later also built off the system, the C line east and the C line west between 1946 and 1948.

Quite aside from the new construction (which, because of lack of canals, had little immediate practical value), the outlook improved in 1925. Drains were constructed in several locations, thereby solving some seepage problems, farm prices rose, and the percentage of tenant farmers dropped. The most significant action on the project taken during the year was the formation of a "board of survey and adjustments," which first met in March of 1925. The board represented settlers, the Bureau of Reclamation, the Idaho Department of Reclamation, and economists as well as the project supervisor. It drafted contracts with the various irrigation districts and in 1926, in effect turned itself into the Boise Project Board of Control, which continues to manage the Boise project. The stability which this produced involved also a rearrangement of the way in which settlers could pay off their share of construction costs, contingent on the value of their crops from year to year. The Bureau of Reclamation retained control of the more complex segments of the project--Arrowrock Reservoir, the Diversion Dam, the headworks of the New York Canal, and the first half-mile of that canal. Otherwise, operation and maintenance of the system came under the Board as representative of the five irrigation districts under the project. In many ways, the evolution of this system of control may be as significant as the construction of any single part of the whole project.

The 1927 season showed an improved market for crops and an increased number of prospective farm buyers. There was no increase in land under irrigation, no additions to the system, and thus no additional farms. One interesting statistical commentary is an increase in automobiles during 1927 from 131 to 180 in the project region. During 1928, nearly all the farms which had been foreclosed on in the preceding years were sold again into private hands and land values had increased with an improved national economy. Though faced with problems of perishability and only one railroad line, a good market for dairy products developed in the Los Angeles area. Because of the high cost of shipping bulky low value milk, concentration was implemented with expansion of dairy processing. The Caldwell-based cooperative creamery with a 1929 membership of 2,400 shipped most of its output to Southern California. Another dairy cooperative in Ada County was begun in 1929 to ship to the same market.

In 1929 and 1930 there were test plot experiments in the western end of the valley for green peas and beans. By 1931, the project's history of enthusiasm for such new ventures had lessened considerably. This reflected the depression and loss of markets rather than crop adaptability. In the 1932 report,

bartering was noted as a partial solution to the lack of market for farm produce, and it was noted that crops were left unharvested. Although the acreage planted was almost identical with that of 1930, the crop value had dropped by two-thirds, and a moratorium was declared on both water tolls and seed loans, in an effort to keep farms functioning. By 1933, although dairying was increasing, the plight of some farmers was described as "desperate." And 1934 was a short-water year, which did not help. However, farm produce prices improved as did the morale of the settlers. By 1935 land values seemed to be increasing slightly. Completion of the U.S. 95 route south to Winnemucca for connections to California via U.S. 40 was planned and it was to make possible the shipment of goods by motor freight to California. Also in 1935 three Civilian Conservation Corps camps were established on the project, providing a new market and a new source of labor on the project works. The camps and WPA projects were welcomed in the valley.

By 1936, more farmers, including new immigrants from the drought stricken middle west were looking at the Payette division lands, where work had begun on the first canal. There was some concern that the new farmers who were unfamiliar with the region or irrigation agriculture might not be able to survive. A beet-sugar factories being planned in Nyssa, Oregon, in 1936 and another was possible for the Boise Valley (it was later built in Nampa). As a result, sugar beet production increased as did other truck and seed crops. Alfalfa--long the principal crop--was on the decline on the older lands, and apples, as well as other fruit crops, also declined.

Noteworthy project changes for 1937 included the raising of Arrowrock Dam by five feet, increased educational programs for farmers, government agencies and private farmer control of noxious weeds, and the increased use of commercial fertilizers. Expansion of sugar beets and truck crops meant more imported season labor and the arrival of Mexican and Philippine migrant laborers in the valley. With new economic gains, the farmers themselves urged an end to the project-cost repayment moratorium.

By 1938, the Bureau of Reclamation was looking for additional water storage facilities. Test drilling was conducted at the Twin Springs site, some twenty-five miles above Arrowrock, and a final report was submitted in early 1939. In November, 1939, a topographic survey was conducted at the Anderson Ranch site on the South Fork of the Boise River, and it was this site which was later selected to provide additional storage. Meanwhile, farmers actually grew crops on the Payette division in 1939, and new settlers were moving in rapidly. Though the new highway route to California still was not completed, some distant marketing improved with the coming of regular air freight service at the new Boise airport.

Work started on the Anderson Ranch dams site in 1941 with a completion date set for August 24, 1946. Wartime produced new

priorities on both men and materials. Work continued on the dam at a greatly reduced scale. By December of 1945, water was being stored; and by the end of 1950, the dam was regarded as complete--with an active storage capacity of 423,200-acre feet. Like Diversion Dam and Black Canyon Dam, it has power-generating facilities with a capacity of 27,000 kilowatts and space for another 13,500 kilowatt generator. Anderson Ranch is a noteworthy example of what delays in construction can cost in a time of inflation. Its original expected cost was under \$10,000,000 but its final cost (slightly less than half was assigned to water users) was \$26,122,800. Power sales were expected to repay a fourth of the cost of the dam.

Anderson Ranch Dam was not the only factor encouraging project farmers. A commitment had been made for a new sugary factor at Nampa, and 1941 crop values were some forty percent over 1940. The main regional economic impact during 1941 came from the completion of the U.S. 95-U.S. 40 connection to California. Wartime labor shortages resulted in some dairy herds being broken up, and during peak labor demand periods local white-collar workers and school children headed for the fields. During the war years there was high demand for the onion and potato products of the Simplot dehydrating plant in Caldwell. Corporate farming also was appearing on leased land at several spots in the valley.

Two other major construction projects--one actually under the Bureau of Reclamation, the other closely related to Bureau projects--took place soon after the war. The first of these was Cascade Reservoir, on the North Fork of the Payette River, which was built between 1946 and 1948. Its purpose is storage for the Payette division, and it holds back the largest reservoir in the system: an active capacity of 653,200 acre feet. The original preliminary work--relocating a railway--had begun in the year before the war but was halted in the summer of 1942. The other dam was Lucky Peak, ten miles above Boise on the Boise River. Lucky Peak is an Army Corps of Engineers project, exclusively for flood control with neither power nor diversion facilities; but its value as a storage facility, supplementing Arrowrock and making the dam even more useful, has been great. The dam was begun in 1949 and completed in 1955, at a cost of \$19,900,000 well under the original estimate of \$22,000,000.