PAYETTE RIVER WATER SUPPLY BANK
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July 25, 1994

R. Keith Higginson
Attn: Bob Sutter
Department of Water Resources
1301 N Orchard, Statehouse Mail
Boise, ID 83720-9000

Re: Payette River

Dear Wateruser:

Water accounting and operating procedures are now in their second year. Several corrections were needed to finish the 1994 season.

By letter dated July 6, 1994, Payette Lake 1993 carryover irrigation water needs to be credited in their Cascade storage account for the 1994 season. All last to fill water needs to be proportionately divided by last to fill space holders, not total storage of Cascade Reservoir. (Payette River Flow accounting-October 31, 1993, June 29, 1994).

Flood Control Operation and Standard Operating Procedures for Cascade and Deadwood Reservoirs needs to be re-evaluated. An update of the flood control program and a revision of the rule curve for operation should be considered.

Control of the flow over Black Canyon Dam cannot be accomplished under the present procedure. By letter dated, June 16, 1994, Jerrold Gregg recommended the Watermaster is in control of the Payette River flows. Watermaster, Helen Bivins, ordered water flows reduced July 6, 1994, by 100 cfs. The Bureau of Reclamation raised the flow 100 cfs.

By telephone Rick Wells reported 100 cfs of water would be released from Cascade and Deadwood for fish augmentation. The flows have varied above and below 1000 cfs. As of this date there has been no confirmation in writing. This is the way irrigators lost their water in 1993 and they are not going to let it happen again. This needs immediate attention.

Flood control releases of 24,000 acre feet in November, 1993 needs to be put in carryover last to fill, with irrigators receiving their share of the water. If necessary, the water needs to be subtracted from the Bureau of Reclamation account.

Bureau of Reclamation shrink and transfer losses are charged

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against all space holders before the storage delivery season starts. Over charges should be credited back to space holders at the end of the irrigating season.

The State of Idaho's Payette River operational flow at Letha of 35 cfs and 100 cfs should be charged against all storage users on the Payette River. All flows under 135 cfs needs to be credited back to storage space users at the end of the irrigating season. Under no circumstances can operating flow be charged to natural flow.

A meeting is to be held July 29, 1994 with the Bureau of Reclamation and Department of Water Resources and we are hopeful that some of these issues will be resolved.

Sincerely,

Robert Henggeler, Chairman

Robert Henggeler

cc: David Tuthill, Jr.
Jerrold Gregg
Scott Campbell
Terry Scanlan
Sherl Chapman

SCANLAN ENGINEERING
Groundwater and Environmental Engineering

July 8, 1994

Ms. Helen Bivins
Payette River Water Users Association, Inc.
102 North Main Street
Payette, ID 83661

Subject: Preliminary Evaluation of Payette River System Accounting

Dear Helen:

Keith Anderson and I have completed a preliminary investigation of recent water accounting on the Payette River system, as conducted by the Idaho Department of Water Resources and Bureau of Reclamation. The investigation has focused on accounting of storage charges and water diversions.

WORK COMPLETED TO DATE

The investigation to date has included two meetings with you and other members of the Payette River Water Users Association, meetings and discussions with Bob Sutter and Alan Robertson of the Idaho Department of Water Resources and with Jerry Gregg and Rick Wells of the Bureau of Reclamation, and preliminary evaluations of (1) flood control rule curves and Standard Operating Procedures for Deadwood Dam and Cascade Dam, (2) storage contracts for irrigators, (3) stream flow and storage records, (4) diversion records, and (5) the 1993 and 1994 accounting program.

Summaries of historical storage and flood control space, and the 1993-94 irrigation diversion measurements are attached for your information.

PRELIMINARY FINDINGS

1. **Idaho Department of Water Resources is accounting for all irrigation diversions from the river, and charging storage accounts for diversions in excess of water rights or natural flow.** Diversion rates in excess of adjudicated water rights are charged to storage. As a result, excess diversions during high water periods when storage is a component of flow (i.e., flow augmentation periods) are charged to storage, even if all of the excess water returns to the river as return flow. Therefore, irrigators must be careful to limit their diversions to no more than their adjudicated water rights in order to avoid storage charges. Diversion at rates in excess of adjudicated claims (whether real or simply assumed for the model) resulted in storage accounts being charge for a substantial amount of unnecessary storage.

   Random examples are listed below.

   - Gill Slough: The water rights for Gill Slough total 18.55 cfs. Diversion rates were measured at 79.37 cfs on 8/5/93, 10.44 cfs on 8/17/93, 2 cfs on 9/2/93, 1(±) cfs on

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9/23/93, and 0.5(±) cfs on 10/13/93. Based upon these data, Idaho Department of Water Resources assessed Gill Slough for 61 cfs storage flow from August 5 through August 16, which resulted in a storage charge of 1452 AF for this period. Idaho Department of Water Resources also estimated a flow of 20 cfs (1.45 cfs above the water rights) for the period of 7/18 through 8/4, resulting in a charge of 66 AF.

- Seven-Mile Slough: Diversions to 7-Mile Slough were a key contributor to the accounting problems in 1993. The 7- Mile Slough functions in many ways as a second channel of the river. However, for accounting purposes, the 7-Mile Slough diversion is assumed to be an actual river diversion, and even though excess diversions return directly back to the river, these excess flows are charged to storage. We understand that the diversions to 7-Mile have been reduced for 1994, and that Idaho Department of Water Resources is allowing for a 35 cfs operating flow, which maintains sufficient flow for proper operations of slough diversions.

In the Letha to Payette reach, where there is plenty of return flow to satisfy existing water rights, excess diversions resulted in storage accounting of 2836 AF in 1993. However, these charges were erased at the end of the irrigation season because they were filled by natural flow. In the event that Snake River flows fall below the minimum flow at Weiser, storage charges could occur in the Letha to Payette reach.

2. **Actual diversion measurements are scarce and Idaho Department of Water Resources is basing their diversion accounting primarily on estimates of diversions.** Many of the diversion estimates are based on 1977 or 1950-52 diversion measurements. Bob Sutter says that the estimates were purposely made on the high side in order to be conservative and to urge the Water District to collect actual diversion measurement data. It is certain that some irrigators are benefiting while others are being penalized for the lack of measurements. More frequent measurements are needed for proper accounting. Over estimation (or under estimation) of diversions also impacts return flow calculations. Therefore, senior water right holders may benefit if diversion rates are overestimated because it will indicate more natural flow in the river.

Evaluation of 1994 diversion rates demonstrates that irrigators have reduced their diversion rates in comparison to 1993. This is probably due to (1) more measurements, (2) drought consciousness, and (3) depleted storage accounts.

3. **Irrigators without storage contracts are using storage water.** Irrigators without storage rights were diverting flows in 1993 when there was not sufficient natural flow to fill their rights, or were diverting flows in excess of natural flow rights. Examples include all of the diversions above Horseshoe Bend. Therefore, it is important that irrigators without storage rights be limited to their natural flow rights if they don't rent storage. As of June 24, 1994 we understand that there had been no requests for rental pool water.

Estimated 1993 storage use by irrigators without storage rights, or with insufficient storage rights, totaled approximately 18,568 AF. The Bureau charged all irrigation storage contract holders for this storage use.

4. **Diverted storage flows that ends up back in the river as return flows can be rediverted and charged as storage.** For instance, if a water users with 50 cfs

of water rights diverts 100 cfs, and 50 cfs of this water returns to the river where it is rediverted by another water user at more than the adjudicated right, both users would be charge for storage. In other words, a double charge for the water. The way that the State administers water rights, return flow is natural flow available for appropriation by downstream water right holders in their order of priority. But if they divert more than their right, they will be charged for storage.

5. **The 1993 accounting had several problems that warranted refinement.** The accounting model is difficult to follow, due to some inherent complexities of the various reaches and some of the model subroutines utilized to increase accuracy. However, the mathematics of the model appear to be correct.

The accounting had some problems related to data collection and accuracy. Some of the improvements that have or will be made are listed below.

- The Department includes a 35 cfs operational flow at Seven-Mile that was not included in 1993 accounting. This reduces the diversion charged to Seven-Mile water users by 35 cfs. Note that the 35 cfs for Seven-Mile and an additional 100 cfs for operational flow past Letha is taken from the storage accounts of all contract holders in the Emmett to Letha reaches.

- Installation of the stream gage at Letha will provide additional data which will help refine diversion and return flow estimates

- The Bureau of Reclamation is planning on installing an evaporation pan at Cascade to get a better measurement of evaporation from the reservoir. Current evaporation measurements are based on the evaporation pan at Parma, multiplied by a correction factor for the cooler temperatures at Cascade.

6. **The Bureau of Reclamation has admitted releasing too much water, after the end of the flow augmentation period, in the late summer of 1993.** The Bureau of Reclamation's stated purpose for the large release was to help Black Canyon Irrigation District avoid power demand and wheeling charges. At the same time they thought they could reduce Cascade storage to meet their November 1 target storage level for flood control. The total amount of water released under this program was about 24,000 AF. However, irrigation water demand in September and October was higher than the Bureau of Reclamation anticipated and as a result Cascade storage on November 1 was about 25,000 AF below the target level. The Bureau of Reclamation attributes this to (1) their attempt to help out Black Canyon (which they will not repeat) and to (2) larger than necessary water orders by the irrigators.

Regardless of the reason and the blame for this excess release, the result was that the reservoir storage on April 1 fell 6,000 AF short of the target level. This April 1 1994 deficit is the net result of the excess September/October 1993 releases. The reservoir system filled to within about 65,000 AF of full in 1994. This 65,000 AF is divided among all contracts (irrigation and Bureau of Reclamation uncontracted) which released water out of basin in 1993 for the flow augmentation. The 1993 flow augmentation water totaled 130,000 AF, of which the first 95,000 AF was from the Bureau of Reclamation uncontracted storage and the second 35,000 AF came from rental by irrigators. It appears that approximately half of the rental pool storage used for flow augmentation did not refill.

However, irrigators with rental pool water that did not refill in 1994 received compensation through the double payment provision in the rental contract. The double payment provision provides for double payment (i.e., $5.40 per AF rather than $2.70 per AF) for rented water if the storage space for that water does not refill during the following spring. As a result, there was some compensation provided for those irrigators whose storage did not refill.

A wrinkle in the refill of the flow augmentation is that allocation of late fill it is proportionate to the total storage held by each contractor. In other words, although only 73 percent of the flow augmentation was Bureau of Reclamation uncontracted storage, they have received 85 percent of the Cascade last to fill and 91 percent of the combined Deadwood and Cascade last to fill. This preferential refill rate is because the Bureau of Reclamation has more total storage than the irrigators that rented storage to water bank in 1993. As a result, the irrigators received only about 6,000 AF of the last to fill while the Bureau of Reclamation received 58,000 AF of the last to fill.

Another point of concern related to flood storage releases is that the water is taken proportionately taken from the accounts of the Bureau of Reclamation and the irrigators. In most situations, proportionating flood releases from all accounts is not a problem because a flood release usually means that the system will fill. However, if the system does not fill, then irrigators can be impacted. In the case of the fall 1993 release, the last to fill irrigators were impacted. Perhaps flood storage releases should come entirely from Bureau of Reclamation uncontract storage, and be filled after the flow augmentation releases.

7. **Flood control operations warrant some change due to the increased demand for water in the Payette basin.** In the review of existing contracts between water users and the Bureau of Reclamation, attorney Scott Campbell could find no references or provisions dealing with flood control operations at either Cascade or Deadwood Reservoirs. Virtually all contracts, however, did have a requirement that the Bureau of Reclamation operate Cascade Dam and Reservoir "so as to store under existing storage rights all available water". The only flows required to be released in the non-irrigation season are 200 cfs at Cascade Reservoir (for Idaho Power Co. generation) and 50 cfs at Deadwood Reservoir for maintenance of minimum downstream flows. The latter is provided for by an allocation of 30,000 AF of the Bureau of Reclamation uncontracted storage space in Deadwood Reservoir.

The Bureau of Reclamation has, however, operated both reservoirs on an informal basis to provide flood control, with a goal of limiting flows of the river at Horseshoe Bend to no more than 12,000 cfs. Since the two reservoirs control only about 35 percent of the Payette River watershed, it has not always been possible to achieve this goal. Flows at Horseshoe Bend have exceeded 12,000 cfs on a number of occasions (a maximum of 27,000 cfs in December 1964). A portion of the annual operation and maintenance costs for both reservoirs is allocated to flood control, currently 39% at Cascade and 39.2% at Deadwood.

Flood control operations, as stated in the Bureau of Reclamation "Standard Operating Procedures" for both reservoirs, is based on a "rule curve" developed in late 1974. This rule curve provides for a total minimum available winter flood space of 280,000 AF for the period November 1 through March 31 and a varying total amount of flood space

beginning April 1--depending upon the forecast of inflows to each reservoir and of the runoff expected at Horseshoe Bend. These forecasts are made by the Bureau of Reclamation using empirical formulas that consider precipitation, snow survey, and runoff data--with the coefficients used in the formulas supposed to be updated annually. These forecasts are similar to, but not necessarily in exact agreement with, those made beginning on January 1 of each year by the Soil Conservation Service.

From a standpoint solely of dam safety, however, this flood control procedure is not required. At Cascade Dam and Reservoir, for example, the inflow design flood was considered to result from a maximum probable rainflood occurring near the peak of a major snowmelt flood--concurrent with an assumed failure of both Payette Lake Dam and Lake Fork Dam upstream from Cascade! This flood event could be routed through Cascade Reservoir even assuming that the reservoir water surface at the beginning of the flood was at the top of the spillway gates (a full conservation pool of 653,000 AF or total reservoir contents of 703,000 AF). During such an occurrence, however, the flow below the dam would reach a maximum of over 21,000 cfs.

The flood control rule curve assumes that 80% of the required available winter storage space (224,000 AF) would be provided in Cascade Reservoir and 20% (56,000 AF) would be in Deadwood Reservoir. This allocation means that the storage on November 1 (or at the very latest by March 31) should not exceed a total of 479,000 AF (or 429,000 AF active storage) at Cascade Reservoir, and should not exceed 106,000 AF at Deadwood Reservoir.

In actual practice, since 1957 when Cascade Reservoir first filled, the goal of having 280,000 AF of combined active space available for flood control has been realized on November 1 in all but six years, and on March 31 in all but five years.

It would seem appropriate, however, for the Bureau of Reclamation to re-evaluate and update their flood control program and perhaps revise the rule curve for operations. The first reliable forecasts for reservoir inflows and runoff become available on about January 1, with increasing reliability through mid- to late-March. It would seem possible in most years to keep at least the November-December reservoir releases to the required minimums (200 cfs at Cascade and 50 cfs at Deadwood) until the first forecasts become available.

In most years, both reservoirs fill completely, or nearly so. In the period 1957-1993, the reservoirs have filled to at least 90% or more of capacity in all but about six years. In some years, however, Cascade Reservoir has not filled completely as a result of releasing more than the required flows (or in other words not storing "all available water") in November and December. Examples would be in the years 1962, 1967, 1979, and 1983. The added releases for power production in the fall of 1993, coupled with increased irrigation demand, also resulted in the failure to fill in 1994.

8. **Minimum operating pool for Cascade is 250,000 AF.** This tremendous amount of storage is reserved for fishery and wildlife maintenance. However, given the competing demands for water in the basin, some changes to the Standard Operating Procedure should be considered. Most important would be to allow a lower minimum operating pool during drought years to guarantee that irrigators will get their storage

water. In other words, put the irrigation storage at the bottom of the stack, and have the 250,000 AF for minimum pool available as a second priority to irrigation.

9. **Comparison of Storage Use in 1993 to 1977.** Irrigation diversion volumes were generally less in 1977 than in 1993, probably due to drought consciousness of the water users. For instance, Black Canyon diverted at total of 211,206 AF in June-September 1977. In 1993, Black Canyon diverted 254,045 AF during the June-September period. This 42,839 AF difference is a significant portion of the high storage volumes used in 1993. More pronounced is the June-September diversions by the Noble canal, which more than doubled from 1977 to 1993, from 36,570 AF in 1977 to 74,030 AF in 1993. Conversely, Emmett Irrigation District diverted a total of 94,400 AF in June-September 1977, but in 1993 diverted only 91,844 AF.

In 1977, the irrigators started using storage in mid June, and used a total of 32,944 AF in June, 111,802 AF in July, 110,432 AF in August, and 43,312 AF in September. In 1993, the irrigators started using storage in mid July and used approximately 9,162 AF in July, 59,054 AF in August, 68,106 AF in September, and 15,897 in October.

10. **Calls for and Control of Flow Over Black Canyon Dam.** Better communication is needed between the watermaster and Bureau of Reclamation in order to keep flows over Black Canyon as steady as possible. This now appears to be happening. Perhaps more responsibility should be put on the Bureau of Reclamation for maintaining a specified flow over Black Canyon. This may involve specified flow requests each day by Black Canyon, Emmett, and the Watermaster. These requests should be made 4 days in advance. The Bureau of Reclamation would be responsible for delivery of this water. Any time flow is greater than this request, it should be taken out of Bureau of Reclamation uncontracted storage account.

RECOMMENDATIONS

1. **Measure All Diversions.** All diversions from the river should be measured in order to determine the actual diversion of natural and storage flows by each user. Measuring diversions and then charging storage for over diversion will reduce water use. Weirs and rated canal sections are suggested in order to simplify diversion measurements.

2. **Irrigators Without Storage Contracts Should Rent Storage Water.** Irrigators without storage contracts should be sure to place their rental orders with the water bank if they want to have late season supplies. Those irrigators that do not have storage contracts or water bank rentals should not be allowed to divert stored flows from the River.

3. **Request that the Bureau of Reclamation Change Reservoir Operating Procedures.** This would involve (1) changes to the flood rule curves and other flood control operations, and (2) revision of the 250,000 AF minimum operating pool level in Cascade to free up uncontracted space for irrigation during years that reservoir does not fill.

4. **Propose Charging Operational Flows to Uncontracted Storage.** Since the operational flows of 100 cfs for Letha and 35 cfs for the Seven-Mile Slough provide some fish and wildlife benefits, the water users should petition the Bureau of Reclamation to

draw those flows from uncontracted storage. During a year when storage begins in early June, this could save 30,000 to 40,000 AF.

5. **Reserve Rental Pool Storage Water For In-Basin Irrigation.** Irrigators should consider reserving rental pool storage water for in-basin irrigation use. This would provide storage water to the large number of irrigators without storage account. Note that because of the last to fill provisions, irrigators take a chance when renting water to the water bank for out-of-basin use. For Letha to Payette diverters, this may be an acceptable risk. For upstream diverters, the risks are more significant.

6. **Put More Responsibility on the Bureau of Reclamation to Maintain Requested Flows Over Black Canyon.** Provided that irrigators make their requests in a timely manner (four days in advance), the Bureau of Reclamation should be held responsible to see that the requested flows over Black Canyon are maintained. When flows exceed the request, they should be deducted from uncontracted storage.

7. **Continue to Monitor Idaho Department of Water Resources Storage Accounting.** The storage accounting should be continually monitored by the Payette River Water Users Association to verify that the accounting is being done correctly.

SUMMARY

The most positive result of this investigation is that the Bureau of Reclamation knows that the irrigators are paying close attention to water releases and the Idaho Department of Water Resources knows that the irrigators are watching the accounting. Similarly, the irrigators are learning that uncontrolled diversions in excess of water rights will be detrimental to their storage accounts. The increased demand on the water resources within the basin has set the stage to implement improvements in the allocation of storage water.

Please contact Keith Anderson (336-2718) or me (383-4140) with any questions or to discuss these preliminary findings. We would like to continue to look into the water accounting, but would appreciate your input before proceeding further.

Sincerely,

Terry M. Scanlan, P.E.

cc: Bob Henggeler
Scott Campbell
Keith Anderson