2/15/93

Pump Mitigation Proposal
BLR Pumpers

Development of Specific Mitigation Parameters

An essential element of the mitigation plan proposed by the Big Lost River Pumpers Association is the determination of a depletion factor to use in determination of the quantity of water depleted from Big Lost River streamflows due to pumping activities. Because of lack of many essential data elements it is impossible at the present time to make a precise determination of the depletion factor for any individual well or even for any group of wells. The best that can be done with current information is an estimate of the depletions on an annual basis for all of the wells operating in the Big Lost River Valley.

The recently published report commonly referred to as the "Ralston Report" documents statistical (not cause and effect) relationships between annual streamflows and annual pumping volumes for periods of similar water conditions. From these relationships and the best available information on surface water deliveries to canal headings (from watermaster reports), this report indicates a "depletion" relationship in which depletions due to pumping, expanded irrigation acreage, and conversion of irrigation practices are lumped together.

During January and February of 1993 Dr. James H. Milligan and Mr. David Shaw worked on a procedure for separating the depletion effects of pumping from other depletion effects to establish a depletion factor useful as a starting point in determining amounts of water needed for mitigation of impacts on surface water streamflows due to pumping. The procedures used and the final depletion factor are described below.

Shortly after the time of construction of the Mackay Reservoir various study efforts established that there were about 10,000 irrigated acres above the reservoir and about 24,000 irrigated acres below the reservoir, or a total of about 34,000 irrigated acres served by the Big Lost River. As these reported acreages were determined during the 1930's we assumed that all of these acres were at the time being served solely from surface water flows (i.e., no groundwater pumping to service these acreages).

Again, various reports have established that the volumes of water necessary to meet the consumptive use requirements of crop production average about 2.0 acre-feet per acre, based on the crop rotations typical in the Big Lost River Valley. Assuming a water conveyance efficiency of 70% (documented in some studies) and an irrigation efficiency of 40% (typical for surface irrigation practices of earlier years), the diversion requirement to serve the estimated 34,000 irrigated acres amounts to about 7 acre-feet per acre or 238,000 acre-feet. The actual depletion due to consumptive

pumped water for these acres irrigated from groundwater would also represent about 51% of the surface water depletions due to expanded irrigation acreage (the remaining 49% of the depletion being credited to the expanded acres irrigated from the surface water resource).

Using the depletion relationship developed and shown in the "Ralston Report" as

$$Depletion = [0.575\ Q_{pump} - 14{,}000] \qquad (1)$$

Where Depletion = total depletion of streamflows annually from all sources
Q_{pump} = the annual volume of water pumped

the depletion assignable to pumping becomes

$$Depletion_{pump} = 0.295(Q_{pump}) - 7188 \qquad (2)$$

However, this equation was derived in part from the regression equation relating pumpage to flow. The regression needs to be revised with 1998-2003 data and will need to be non-linear. (See graph in Ralston paper).

Applying this depletion relationship to the volume of water reportedly pumped in an average year during recent years, or about 47,000 acre-feet, the calculated surface water depletion due to pumping would be about 6687 acre feet, or about 14% of the volume pumped. Different depletion volumes and percentages are calculated for different years due to different volumes pumped. It was agreed that an appropriate depletion percentage (or depletion factor) to use until further information was developed to refine the estimate would be 13%.

In the pumping mitigation plan, the depletion factor would be used only to determine the volume of mitigation water to be committed to the watermaster at the beginning of each irrigation season. The mitigation volume committed would be based on the total estimated volume of pumped water to be used by the members of the Big Lost River Pumpers Association prior to the beginning of the irrigation season.

The actual amount of water used in the mitigation plan would depend, however, on the call of the senior water rights holders and would be prorated over the irrigation season in such a manner that the amount of mitigation water actually committed on a daily basis early in the irrigation season would be reduced in proportion to that actually committed in the latter part of the irrigation season. Thus, if the irrigation season were shortened due to a

This was an attempt to consolidate the two plans. Gary

2005 Consolidated Bain-Wide Mitigation Plan[1] for Basin 34 Water Users

Revised – February 10, 2005

DRAFT Submitted - _____, 2005 DRAFT

This mitigation plan is proposed pursuant to Rule 50 of the Water District 34 Water Distribution Rules (IDAPA 37.03.12) for those junior ground water users whose ground water rights are administered conjunctively as part of the Big Lost River and tributaries. These rules provide that junior ground water users can continue to divert ground water when mitigation is provided to senior water rights pursuant to Rule 50.04. This plan is intended to meet those requirements by providing 6,110 ac-ft[2] of water to augment the natural flow of the Big Lost River.

Basin 34 Water Users understand the purpose of mitigation is to augment the natural flow of the Big Lost River downstream from Mackay Dam. Mitigation does not guarantee any particular water right will receive a full water supply in any year. Basin 34 Water Users also understand the administration of this plan will be implemented by the Watermaster of Water District 34 under the supervision of the Director of IDWR. Basin 34 Water Users also understand all mitigation supplies provided for within this plan must be made available to senior water right holders as river augmentation prior to a futile call determination as described in Rule 20.04, and mitigation supplies are not required to be released when no water can be delivered due to a futile call determination in the reach of the river where the water rights held by the person calling for mitigation are diverted (except as provided for at the commencement of the irrigation season as described in Rule 40.02.).

Basin 34 Water Users propose to use various water supplies such as replacement credits from managed aquifer recharge, storage allocation from the Mackay Reservoir, natural flow and impounded natural flow rotation credits, and/or ground water pumpage as mitigation supplies as described and allowed for in Rule 50.04.c.iii. These supplies are listed hereinafter in preference of acquisition, but not necessarily in preference of use as explained in some detail below. Each of these supplies (with the exception of managed recharge) does not currently have a descriptive beneficial use element as "mitigation". However, each proposed water supply to be used as river augmentation does have "irrigation" listed as a beneficial use. The use of these proposed water supplies for "mitigation" purposes is incidental, and the primary beneficial use will remain as "irrigation". Each proposed water supply will be described by water right number and quantity (to the extent possible) when pledged and/or offered to the Water District. Approval of this proposed consolidated basin-wide mitigation plan by the Director will constitute formal IDWR approval for such supplies to be used as "mitigation/irrigation". Once this plan is approved, any supply used to augment the flows of the Big Lost River will be treated as natural flow for regulatory purposes.

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[1] This mitigation plan is a consolidation of the Basin 34 Water Users Plan dated January 7, 2005 and the Participants Universal Mitigation Plan dated December 14, 2005, and recent updated versions of these two plans. This consolidated plan is prepared under the direction of this group for the benefit of their respective members but with the objective of making the consolidated plan acceptable and accessible to all ground water users whose rights are conjunctively managed in the basin.

[2] Water users within Basin 34 understand the Director of IDWR is willing to accept a mitigation supply of 6,110 ac-ft for the 2005 irrigation season if such a supply were incorporated into a single basin-wide plan that is available for participation in by all ground water users in general. Water users also understand individual mitigation plan(s) may be proposed offering supplies of water based upon their actual 2002 through 2004 pumpage quantities. These individual mitigation supplies will be subtracted from the 6,110 ac-ft proposed in this consolidated plan.

If the Director approves this consolidated plan, it is proposed the plan will be presented to the water users at the annual water district meeting scheduled in March 2005. It is also proposed and anticipated a resolution will be presented at this annual meeting allowing water users to vote on the water district's adoption and sponsorship of this consolidated plan for all water users within the water district. If adopted, water users who wish to receive the protective benefits of this mitigation plan will be allowed to continue the diverting of their ground water rights upon the payment of their annual water district assessments as described in Rule 50.04.d, or in lieu of this "pooling participation", by direct pledge and acceptance of water supplies from valid water rights as described hereinafter. Water users who do not wish to participate in this consolidated plan may "opt-out" by giving written notice to IDWR of their intent as allowed for in Rule 50.04.e.

The Watermaster of Water District 34 will administer and provide the accounting necessary to ensure the total mitigation burden (6110 ac-ft) will be satisfied pursuant to this plan. All ground water users within Water District 34 may participate in this plan. Each ground water user who chooses to be covered under this plan will pay an administrative assessment fee to the water district to cover the administration of the mitigation plan. The "total mitigation burden" is defined as the total amount of water (6110 ac-ft) ground water users are required to provide as river augmentation for mitigation purposes. The portion of this total mitigation burden each ground water user is required to provide is defined as the "individual's mitigation burden" which is based on the individual ground water user's proportionate share of the 2004 year actual pumpage[3]. Ground water users will have the option of pledging their own mitigation water supplies directly to the Water District and/or participating in the "willing buyer-willing seller" mitigation acquisition pool to the extent needed to satisfy their respective individual mitigation burden. These acquisition assessment revenues will then be used and integrated into the annual water district budget for the purpose of acquiring water supplies on a "willing buyer-willing seller" basis, and at fair market prices negotiated by the parties.

Collecting mitigation water supplies that will be used for reducing the total mitigation burden within Water District 34 will be done in the following manner (with the exception relating to CREP individual credits):

1.) Recharge - Managed Aquifer Recharge supplies will be the first preferred option for providing mitigation to whatever extent such supplies are available. Recharge conducted by the water district's recharge committee, in compliance with the plan of operation incorporated into and made part of water rights nos. 34-7571 and 34-7573, will be considered as replacement credit supplies for quantities of pumped ground water. Managed recharge supplies will be credited towards mitigation at a rate equal to the depletion factor described in Rule 50.04.c or higher as may be determined by future studies. Additionally, future studies may indicate managed aquifer recharge supplies should be credited towards the total mitigation burden of subsequent years. When recharge supplies[4] are of great enough quantities, the entire mitigation burden could be satisfied with such supplies.

2.) CREP - Irrigated lands within Basin 34 may have an opportunity to be enrolled in CREP. Although the emphasis of this program appears to be on reducing ground water withdrawals, some of these same lands may also be associated with surface water rights. At the time of submitting this plan, the details of this CREP program regarding water rights has not been fully determined and disseminated to the public. If allowed by CREP, these un-diverted surface water rights may be used

[3] IDWR administrators have prepared a preliminary summary of 2004 pumpage, dated 1/21/2005, from individual well records. This document, or a final version of this summary, will be used for determining individual's proportionate mitigation requirements. Ground water users may substitute actual in-line water flow meter readings that are certified by licensed engineers or verified by local deputy water masters.

[4] During the years of 1995 to 1999 managed recharge in Basin 34 ranged from 33,766 ac-ft to 89,319 ac-ft as reported to IDWR during the developing stage of the two recharge water rights permits.

to satisfy individual mitigation burdens of program participants, and to the extent additional credit is available, this credit will be used to satisfy or reduce the total mitigation burden of the water district. No monetary compensation from the water district for these credits will be allowed.

3.) Donated Water – Water users in the Big Lost River drainage may elect to donate their water supplies (i.e. storage allocations, natural flow and/or rotation credits) towards mitigation burdens. When such water supplies are donated, they will be used to reduce the total mitigation burden rather than any particular individual mitigation burden.

Any mitigation supplies collected from the sources described above will be subtracted from the total mitigation burden, which will result in a reduction of the individual(s) mitigation burden. The remaining mitigation burden will be provided from individual ground water users proportionately as described hereafter. Individual ground water users will be required to contact the water district and declare how they intend to satisfy their portion of the remaining mitigation burden prior to April 1, 2005. Individual ground water users may pledge water supplies owned by themselves or may purchase water supplies from other water users to be used to satisfy their individual mitigation burden. Additionally, the Watermaster will be authorized pursuant to Rule 50.04.d. to acquire mitigation supplies from water right holders who wish to rent/lease their natural flow surface water, rotation credit water, or storage allocations to create an acquisition pool. Any ground water user who wishes to purchase mitigation water from the acquisition pool, to satisfy their individual mitigation burden as outlined above, may buy such water supplies acquired by the Watermaster to the extent those water supplies are available.

Ground water users who are participating in this mitigation plan may satisfy their individual mitigation burden in the following manner:

1.) Natural Flow (Decreed) Water – Water supplies from natural flow rights and/or rotation credits from those water rights held by any water user within the water district may be pledged or acquired to the extent such water rights provide actual water supplies in their respective priorities. Ground water users will indicate to the Watermaster which natural flow water rights will be used as mitigation and during approximately what time period so the volume of water not diverted for irrigation purposes can be credited as mitigation. Unless the natural flow water right is dedicated to mitigation for the entire irrigation season, ground water users who choose to contribute a portion of a natural flow water right to satisfy their individual mitigation burden must demonstrate to the satisfaction of IDWR they will forgo a beneficial use of that contributed water supply. If any natural flow water right (in part or in it's entirety) is pledged or offered by a ground water user, an approved IDWR temporary transfer must accompany that pledge or offer prior to that supply actually being accepted and used for river augmentation. The use and exercise of any such water right will not be deemed to be a forfeiture or loss of priority when used for mitigation purposes. Natural flow water rights pledged to or acquired by the water district for mitigation will be credited based upon the actual quantity/volume of water made available under such rights.

Natural flow water supplies from tributaries to the Big Lost River may also be used for mitigation. Some tributaries may not come into direct contact with the river but can be introduced directly into canals or laterals. When mitigation water is provided in this manner the Watermaster will reduce diversions from the Big Lost River into that canal or lateral by the same measured amount of mitigation water the tributary water right provides. Thus, tributary water can augment the Big Lost River without physically being delivered to the river. Permission must be obtained from the owner of the canal or lateral to place water into the canal or lateral.

Natural flow water supplies upstream from the Mackay Reservoir may also be used for mitigation if such supplies actually reach the reservoir. These designated supplies are natural flow rights and will be deducted from stored and/or impounded augmentation supplies released from the Mackay Dam.

2.) Stored Water - Storage Allocations from water rights nos. 34-00818, 34-00811, 34-00810, 34-10935, 34-00817B, and 34-10873, 34-00012, 34-02507 that are issued to the patrons of the Big Lost River Irrigation District may be pledged by individual(s) as mitigation and/or acquired by the water district after a temporary transfer has been approved by IDWR. The Watermaster will communicate this information to the Big Lost River Irrigation District so they can properly note the change in use and charge/credit the appropriate water user's account.

3.) Ground Water – Ground water may be used for mitigation. However, the water district will only accept ground water for mitigation purposes under the following conditions:

- No other remaining source of mitigation supply is available to the individual ground water user.
- The mitigation water supply is directly injected into the river or a physical exchange of water can be made to the Big Lost River as provided for in Rule 50.04.c.iii. These introduced supplies will be deducted from other needed mitigation supplies being released to augment river flows at the constant release flow rate described below.
- The river reach, canal, or lateral receiving these supplies is not dry.
- The mitigation water supplies can be put to beneficial use.
- The mitigation water supply from the well must be measured.
- No new water rights will be acquired or allowed. However, existing ground water rights may be used and/or transferred for the operation of existing wells that are properly located as described above, pursuant to an approved IDWR transfer.
- Water supplies diverted from any such mitigation well(s) will require approved transfers from IDWR, the same as other potential mitigation supplies.
- Anyone who uses ground water to satisfy their individual mitigation burden is responsible for the entire cost (i.e. power costs) associated with this source of mitigation.
- Ground water users may combine, collaborate, and consolidate their individual mitigation burdens and mitigation remedies in a cooperative effort.
- Proponents of this consolidated plan reiterate the position of using ground water supplies as a supply of last resort, both for economic and social preference reasons.

Any water supplies described above, when used for the augmentation of the natural flow of the Big Lost River, will be treated as if it were natural flow and will be distributed and subject to the elements of those benefiting natural flow water rights. Full participation by the ground water user in this plan will be required before the water right(s) held that ground water user is covered and protected from curtailment. All transfers, pledges, offerings, collections, and acquisitions of mitigation supplies must be summarized in a supplemental [5] report to IDWR by November 15, 2005. This report will be compiled and submitted to IDWR by the Watermaster of Water District 34.

Release and timing patterns of mitigation supplies will be as follows:
The release and timing patterns of these mitigation supplies will comply with Rule 50.04 as nearly as practicable. Some flexibility in release patterns will be needed to accommodate the actual conditions of river flow, responses to extemporaneous administrative actions, and for the utilization of all the various accepted and acquired mitigation supplies. The intent of this consolidated plan is to provide the entire 6,110 ac-ft of mitigation supplies as river augmentation during the irrigation season when

[5] These supplemental report(s) will include any necessary information required by the Director of IDWR (i.e. current water right element description, proposed new use description, transfer of use application(s), 2005 ground water pumpage records, and quantity portions of any water right used for mitigation, etc.).

water rights having a 1905 or earlier priority are not satisfied that have requested mitigation. The following is a description of how that flexibility will be used for that stated purpose.

As described by Rule 50.04 one third of the required mitigation supply[6] (2,034 ac-ft) will be made available to the Watermaster for purposes of augmenting the natural flows of the Big Lost River during the first half of the irrigation season (May 1 through July 23, or 84 days) at a constant flow release rate. Water supplies[7] used to "flush" the river system at the commencement of the irrigation season as described in Rule 40.02.d.iii,g,h will be considered as mitigation and deducted from the 2,034 ac-ft. The residual balance of the mitigation supply would then be released at a constant release flow rate during the remaining days of the first half season period. If water rights with 1905 and earlier priorities are satisfied during any period of days within this first half of the irrigation season from natural river flows without the use of augmenting supplies, no mitigation supplies will be released for those days. The sum acre-feet of water not released during those days will then be "carried-over" and become part of the second half of the irrigation season's mitigation supply not to exceed a total of 4,067 ac-ft.

Two thirds of the required mitigation supply (4,067 ac-ft) will be made available to the Watermaster for the second half of the irrigation season (July 24 through October 15, or 84 days) for purposes of augmenting the natural flow of the Big Lost River at a constant flow release rate. If water rights with 1905 and earlier priorities are satisfied during any period of days within this second half of the irrigation season from natural flows without the use of augmenting supplies, no mitigation supplies will be released for those days. Once water rights with 1905 or earlier priorities are unable to be satisfied by natural river flows, a calculation of remaining days in the irrigation season will be determined and/or the number of days remaining before the Director were to declare a futile river as described in Rule 20.04 would be determined. Using the fewer number of days from those two calculations, an augmenting constant release flow rate will then be established by dividing the fewer number of days into the 4,067 ac-ft. If it becomes apparent a futile river declaration is likely to occur before the previously calculated date, all remaining mitigation supplies will be released (as nearly as practicable) prior to the actual futile declaration. In every instance of releasing mitigation supplies for the purpose of augmenting river flows, care and flexibility must be exercised to provide for the entire utilization of the 6,110 ac-ft in an efficient and effective manner.

Water users understand acceptance of this mitigation plan includes distribution of the mitigation water by the Watermaster as illustrated in the above example. This plan does not preclude individual ground water users or other groups of ground water users from offering their own mitigation plans. The mitigation requirement of 6110 ac-ft for this plan will be reduced by the amount of mitigation water required from any/all other mitigation plans combined which are approved by the director prior to the beginning of the irrigation season. This mitigation plan will commence and be implemented once the call for mitigation has been requested by a valid senior surface right holder, approved by IDWR, and the criteria for conjunctive management has been satisfied. The call for mitigation must be made prior to, or at the time of, the initial deliver call for irrigation water (rotation into credit is considered a delivery call for water) and prior to "river flush" releases.

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[6] This example assumes no managed aquifer charge has occurred during the current year. Managed recharge replacement credits, CREP contributions, donated water, or any other total mitigation burden reduction supply would be subtracted from the 6,110 ac-ft and any remaining balance would then be divided as described.

[7] Whenever storage water or storage allocations, and whenever natural flows or rotation credits, or any combinations of these water supplies are used to "flush" the river system as described in Rule 40, the entire volume of water will be credited as a mitigation supply.

Any ground water user who "opts-out" of participating in this consolidated basin-wide mitigation plan and then declares their intention to be covered under this mitigation plan after April 1, 2005 will be required to mitigate with money (by purchasing water from the water district's acquisition pool) and will be charge a late fee of $200 or a 15% additionally penalty based upon their individual mitigation burden acquisition costs, whichever is greater. These late fee and penalty monies will be used to buy mitigation water in the following year and will be applied towards the total mitigation burden.

Water users within Water District 34 expect IDWR and the Watermaster to administer ground water rights in such a manner that those individuals holding ground water rights that are described by partial decree to be conjunctively administered which are not participating in this consolidated plan or participating in another approved mitigation plan shall not be allowed to divert during the 2005 irrigation season. Water users within Water District 34 also expect IDWR and the Watermaster to properly administer and regulate all surface water rights as described in partial decree and rule.

Basin 34 Water Users reserve the right to modify this plan prior to its approval by the Director. This plan can also be modified after approval is granted by submitting an amended mitigation plan to the Director for approval. While the principles and concepts incorporated into and made part of the mitigation plan may be utilized in future plans, no legal precedent can be asserted or claimed from the implementation of this plan except those expressed in rule or partial decree.

Respectfully submitted,
Proponents of a single "Consolidated Basin-Wide Mitigation Plan for Basin 34 Water Users"

killing frost or due to a different crop mix, the total volume of mitigation water used would be less than that initially committed.

Shaw and Milligan both recognize that many assumptions have been made in arriving at a depletion factor to be used in the mitigation plan and that better information in the future will likely require modification of the factor used and even of the mitigation procedures. We encourage the water users to become involved in providing the necessary support for this better information.

Some Examples of What Mitigation Means

Example No. 1 - Irrigation completely by pumping

This example is intended to show the extreme case example where all irrigation water for a field is being supplied by pumping (assumed irrigation period is 160 days).

Acreage irrigated: 640 acres
Irrigation requirement:

640 Ac x 4.0 AF/Ac. = 2,560 AF or 1,290 cfs-days or 400 inches for 160 days

Mitigation requirement:

0.13 x 2560 AF = 333 AF or 168 cfs-days or 52 inches for 160 days

Example No. 2 - Pumping for supplemental irrigation

This example is intended to show the mitigation impacts when pumping is only a supplemental irrigation operation.

Acreage irrigated: 640 acres
Irrigation requirement:

640 Ac. x 4.0 AF/Ac. = 2,560 AF or 1,290 cfs-days or 400 inches for 160 days

Surface water available = 1,500 AF
Pumping requirement = 2,560 - 1,500 = 1,060 AF or 534 cfs-days or 167 inches for 160 days

Mitigation requirement:

0.13 x 1,060 AF = 138 af or 69.6 cfs-days or 21.7 inches for 160 days

use for the same irrigated acreage would be 2.0 acre-feet per acre or 68,000 acre-feet, leaving about 170,000 acre-feet of the diverted water to return to the system.

A recent survey completed by Dan Holden of the U.S.D.A. Soil Conservation Service (SCS) shows that in the Big Lost River Valley there are now (1991) a total of 63,109 acres of irrigated lands of which 15,115 acres are surface irrigated and 47,994 acres are sprinkler irrigated. These numbers show an increase of 29,109 acres over the "original" 34,000 acres irrigated and conversion or expansion of 47,994 acres to sprinkler irrigation. Due to the expansion and conversion effects, the original 68,000 acre-feet of depletion is no longer valid.

By assuming that the irrigation efficiency for sprinkler irrigation is about 70%, the diversion requirement for irrigating 47,994 acres of sprinkler-irrigated lands is about 215,973 acre-feet. Again using the diversion requirement of 7.0 acre-feet per acre for present surface irrigated acres totalling 15,115 acres, the diversion requirement for these acres is 105,800 acre-feet. Thus the total irrigation diversion requirement is now about 321,778 acre-feet. Likewise the total depletions for the total consumptive use on 63,109 acres is about 126,220 acre-feet, or a total increase in depletions of 58,220 acre-feet.

Of the original 34,000 acres irrigated by surface water methods, only 15,115 acres are now irrigated by this method, indicating a conversion of 18,885 acres to sprinkler irrigation. Due to increased efficiency of irrigation by sprinklers, this conversion represents a water savings of about 56,655 acre-feet. Assuming that this "extra" water is applied to new acres by sprinkler methods, this water could be applied to an additional or expanded area of 14,163 acres. These are new acres served by the surface water resource (the river) due to differences in irrigation efficiencies between surface application methods and sprinkling. Thus the total acreage serviceable by the original water used on 34,000 can now irrigate 34,000 plus 14,163 or about 48,163 acres.

Since the SCS estimates that the total irrigated acreage is now 63,109 acres, the difference between this area and that which could be served by the same amount of water originally diverted from completely allocated surface water sources must now be irrigated by pumping from groundwater. This difference is about 14,945 acres.

The 14,163 new acres serviced from surface water sources and the 14,945 acres serviced from groundwater represent a total expanded acreage of about 29,108 acres. The new acres irrigated from groundwater represent about 51% of the total new acres. The