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IN THE DISTRICT COURT OF THE FIFTH JUDICIAL DISTRICT
OF THE STATE OF IDAHO, IN AND FOR THE COUNTY OF TWIN FALLS

In Re SRBA	)	<i>Subcase No. 27-11375</i>
Case No. 39576	)	AFFIDAVIT OF WOLDEZION
	)	MESGHINNA IN SUPPORT OF
	)	SHOSHONE-BANNOCK TRIBES' AND
	)	UNITED STATES' MOTION FOR
	)	ENFORCEMENT OF THE FORT HALL
	)	INDIAN WATER RIGHTS CONSENT
	)	DECREE

I, Dr. Woldezion Mesghinna, after being duly sworn under oath, hereby declares and states:

1. I am the President of, and principal engineer in, Natural Resources Consulting Engineers, Inc. ("NRCE"), an international civil, environmental, and water resources consulting firm. Our main office is located in Fort Collins, Colorado, at 131 Lincoln Avenue, Suite 300. We also have offices in Eritrea (Africa) and California. I have close to 40 years of experience in civil, irrigation, and water resources engineering management work in the United States and overseas, including numerous water rights cases in the western U.S.

2. I completed my Doctorate in Irrigation and Drainage Engineering at Utah State University (1978), and I have a Masters in Civil Engineering (Hydrology and Hydraulics) from Cornell University (1973), as well as a Bachelor of Science in Civil Engineering from Cornell University (1972). I am a registered professional engineer in four states (California, Colorado, Wyoming, and Arizona).

3. I have extensive experience analyzing water resources issues and testifying about those issues for many diverse clients. I have been qualified as an expert witness in numerous court proceedings. The projects I have worked on, and cases in which I have been qualified as an expert witness, are detailed more fully in my attached Curriculum Vitae.

4. I formed NRCE in 1989. Our professional staff consists of 20 employees, three of whom have doctorates, and most of whom have various degrees and licenses in engineering fields. We specialize in water use issues. NRCE staff is licensed in the states of California, Colorado, Arizona, Wyoming, Utah, New Mexico, Nevada, and Idaho.

5. I have extensive (over 25 years) experience with the issues related to the Shoshone-Bannock Tribes' water rights, which are the subject matter of this Expert Witness Report. I was the lead technical expert working for the Tribes during water rights settlement negotiations from 1985 to 1990, culminating in the 1990 Fort Hall Indian Water Rights Agreement and subsequent Partial Final Decree. Since 1990, I have continued to provide water resources consulting services to the Tribes, including acting as the technical expert during Basin 27 negotiations. Factual statements made in this affidavit are based on my personal knowledge from my involvement in these issues. Opinions expressed in this affidavit are based on my professional expertise, including my professional training and experience in agricultural and irrigation engineering, and related fields.

6. 1990 Fort Hall Indian Water Rights Agreement. The Tribes, State of Idaho, U.S. government, and certain Idaho water users first started water rights negotiations in 1985. Resolution of the Tribes' water rights was sought through negotiation to avoid lengthy and costly litigation. The Tribes undertook studies to quantify their Federal reserved water rights. Through negotiations with the State of Idaho, the Federal government, and certain Idaho water users, a settlement was reached, entitled the 1990 Fort Hall Indian Water Rights Agreement (1990 Agreement). The Agreement was decreed by the SRBA court in 1995.

7. The Agreement included the following language under Water Right 27-11375, the Tribes' water right in the Blackfoot River:

The Tribes and the United States agree to exercise this water right in a manner that ensures persons diverting natural flow from the Blackfoot River prior to January 1, 1990, whose rights are decreed in the SRBA will continue to receive that full legal entitlement under state law. The parties will specifically enumerate all rights protected by this provision once the SRBA decree for this basin becomes final. These state created water rights are estimated to divert not more than 45,000 AFY of water from the Blackfoot River. In the event this estimate of the amount of existing diversions under state created water rights is exceeded as a result of the decree in the SRBA, the parties shall negotiate an equitable adjustment to the Tribal water rights to account for this change. (Section 7.1.18.x.d)

8. I was personally involved in the negotiation of this provision. My contemporaneous understanding is that the reasons for inclusion of this provision on the Tribal water right to the Blackfoot River were: (1) to protect the existing non-Indian water users diverting from the Blackfoot River, whose water right priority dates would be junior to the Tribal water right; and (2) to limit the extent of protection provided to the non-Indian water users such that the Tribes would still have a useable water right to the natural flows of the Blackfoot River. As stated in the 1990 Agreement, the protection provided to the non-Indians only applies to those water users diverting from the natural flows of the Blackfoot River and only to those users who were diverting prior to January 1, 1990. The provision in the 1990 Agreement states that the

volumetric limit of the non-Indian water users (45,000 acre-feet per year) will be measured by the state created water rights.

9. Development of 45,000 Acre-Feet per Year Estimate. At the time of the 1990 Agreement, the non-Indian Basin 27 water users were diverting an uncertain quantity of water from the Blackfoot River. In order to provide finite protection to these existing non-Indian water users, an estimate of the existing non-Indian Basin 27 diversions from the Blackfoot River was made as 45,000 acre-feet per year. This estimate was generated by the Idaho Department of Water Resources based on available diversion records and estimated diversions for any unmeasured water uses. The estimate represented the best information available at the time of the 1990 Agreement on actual irrigation diversions by non-Indian irrigators in Basin 27. Although the value of 45,000 acre-feet per year was developed as an *estimate* of existing non-Indian Basin 27 diversions at the time of the 1990 Agreement, it nevertheless acts as a *volumetric cap* on the non-Indian Basin 27 diversions unless the Tribes are provided an equitable adjustment to their water rights.

10. Efforts have been made in recent years to better quantify the cumulative non-Indian Basin 27 diversions from the Blackfoot River system, for comparison to the 45,000 acre-feet per year estimate. These efforts included field inspections of active irrigation in the Upper Basin and a more robust measurement program for the entire Blackfoot River Basin. Based on current water rights and measurement information, it is apparent that the non-Indian Basin 27 water users have historically diverted more than 45,000 acre-feet per year and would likely continue to do so in the future.

11. Meaning of Equitable Adjustment. Based upon my experience in the negotiations leading up to the 1990 Agreement, my understanding is that the term *equitable adjustment* under

Section 7.1.18.x.d of the 1990 Agreement means that the Tribes will be provided an additional water supply at their existing points of diversion along the Blackfoot River in an amount equal to what has been diverted by the non-Indian Basin 27 water users in excess of 45,000 acre-feet per year. This additional water supply should be of good quality and available without cost to the Tribes; just as direct diversion of Blackfoot River supplies would have been for the Tribes. The source of this additional water supply was left open for the State of Idaho and other non-Indian parties to decide. It should be understood that the Tribes are not opposed to non-Indian Basin 27 diversions exceeding 45,000 acre-feet per year; but if such excess diversions occur, the Tribes were promised in the 1990 Agreement an equivalent water supply to make up for the difference.

12. Volume Basis of Water Rights. The Tribes' water rights were negotiated and settled during the early stages of the SRBA process, at a time when both flow rate and volume limitations were elements placed upon individual water rights. The State of Idaho initiated the SRBA process with three basins (Basins 34, 36, and 57) whose Director's Reports were originally filed in 1992. The volumes placed on the water rights for these three basins were based on a 1991 IDWR memorandum¹ describing field headgate requirements for Idaho.

13. Subsequent to the 1990 Agreement, the State of Idaho modified its general procedures for defining elements for irrigation water rights from surface water sources. The current policy is only to define a flow rate limitation, and not to have mandatory volumetric limits on the water right². For Basin 27, IDWR has followed current statute and procedures of

¹ Memorandum dated December 18, 1991 from J. Peppersack entitled "Reference Maps for Consumptive Irrigation Requirement, Irrigation Field Headgate Requirement, and Irrigation Season of Use". This memorandum was followed by an IDWR report to the SRBA Court dated August 1, 1996 entitled "Report Regarding Development of Standards for Annual Volume of Irrigation Requirements at the Field Headgate"

² Based on statements made by David Tuthill, IDWR Director, during a settlement meeting on volume objections in Fort Hall, ID on October 11, 2006.

placing flow rate limitations on the individual non-Indian Basin 27 water rights (i.e., Idaho Statute 42-1411(2)(c) and Idaho Administrative Procedures Act 37.03.01-060-02.f.iv).

14. At the time of the 1990 Agreement, I believed that all non-Indian Basin 27 water rights would contain a volume limit when adjudicated. Based on this understanding, the foundation for implementing Section 7.1.18.x.d of the 1990 Agreement is to have volumes on the individual non-Indian Basin 27 water rights and to accumulate those water right volumes for comparison to the 45,000 acre-feet per year estimate provided in the 1990 Agreement. Thus, my original understanding was that water right volumes would be the basis for implementing Section 7.1.18.x.d of the 1990 Agreement.

15. Lack of Volume in Basin 27 Director's Report. A conflict started to arise between the Tribes and the State of Idaho, specifically IDWR, after the 1990 Agreement was signed into law. The conflict originally stemmed from the fact that the measured and reported diversions of the non-Indian water users in the Blackfoot River Basin were far greater than the agreed upon 45,000 acre-feet per year limit. Several investigations were completed by the Tribes and the U.S. Bureau of Indian Affairs which described the over-diversions. However, no formal change in operations by the Blackfoot River Watermaster resulted.

16. Starting in 2003, IDWR then began to investigate water right claims in Basin 27 under the SRBA. All non-Indian water users in the Blackfoot River Basin were requested to submit claims to IDWR describing their water rights. After an investigation of the validity of each claim, IDWR issued a Preliminary Director's Report in May 2005. In November 2005, after resolving objections to the Preliminary Director's Report, a Final Director's Report was issued by IDWR. This report was entitled the *Director's Report for Irrigation and Other Water Rights in Basin 27* (November 10, 2005).

17. The Tribes, and the Federal government on behalf of the Tribes, were persistent throughout IDWR's investigations in Basin 27 at informing IDWR of the language in the 1990 Agreement, and its implications for water rights issued in the Director's Report. Despite these forewarnings, the Director's Report did not contain volumetric limits on the water rights.

18. Tribal and Federal Objections to IDWR Recommended Water Rights. The Tribes and the United States have objected to water rights recommended in the Director's Report because the lack of volumetric limitations is seen as a clear departure from the terms of the 1990 Agreement. These objections were filed for individual water rights with the SRBA Court in March 2006. The objections for each individual water right depended upon the characteristics of the water right as recommended by IDWR, but included one or more of the following reasons:

- (1) Failure to include a volumetric limit on the water right,
- (2) Failure to limit the period of use end date to July 1,
- (3) Failure to include language dismissing the water right from protection language under the 1990 Agreement (Section 7.1.18.x.d),
- (4) Failure to exclude Tribal reservation lands from the place of use.

19. Since these objections were filed with the SRBA court, some activity has occurred to resolve the objections out of court. Regarding Objection #1, the State of Idaho has agreed to include volumetric limits on all water rights served from groundwater, following the policy established in other adjudicated basins³. Likewise, stockwater rights have a volumetric limit. Regarding Objection #2, the Tribes have agreed to drop this objection if a volumetric limitation is placed on the water right (i.e., if Objection #1 is fully resolved for surface water rights). The Tribes' concern with the period of use written on the water right is inherently tied to

³ Based on statements made by David Tuthill, IDWR Director, during a settlement meeting on volume objections in Fort Hall, ID on October 11, 2006.

the total diversion volume allowed by the water right. Objection #3 involves the administration of non-Indian water rights in Basin 27. Regarding Objection #4, the Tribes have concluded that the issue does not belong in the SRBA Court, and should be handled in a separate court jurisdiction. In the end, Objection #1, regarding the absence of volumetric limitations on the surface water rights, is the main Tribal objection to the Director's Report.

20. Negotiations and Meetings, 2003-2010. Since filing objections in March 2006, the Tribes and the United States have been willing and open to discuss settlement of the equitable adjustment issue out of the SRBA Court. Even before the Tribal and federal objections were filed, the Tribes and Federal government voluntarily approached IDWR as investigations into Basin 27 water rights were starting in 2003; to inform IDWR of the language of Section 7.1.18.x.d of the 1990 Agreement and its implications for the Basin 27 Director's Report. Table 1 shows that the Tribes have participated in numerous meetings and teleconferences to attempt to settle their objections outside of the SRBA Court.

Table 1: Efforts to Settle Tribal Objections

Year	In-Person Meetings	Conference Calls	Additional Notes
2003	1	--	Two letters to IDWR regarding Basin 27 volume issues
2004	1	--	Additional letter to IDWR regarding Basin 27 volume issues
2005	2	--	Director's Report Issued for Basin 27 in November
2006	3	--	Initial court hearing in July
2007	4	4	State of Idaho proposes conducting diversion measurements
2008	5	3	Estimates of total Basin 27 diversions developed in July
2009	2	6	Technical work on Blackfoot River Management Plan started in April
2010	3	5	Basin 27 water users present settlement proposal in January

Note: The tally of meetings and conference calls shown in this table is not meant to be a complete statement of all meetings and conference calls that took place amongst the negotiating parties. Last updated 10/25/2010.

21. The point of view of the Tribes and the U.S. government regarding the settlement negotiations has been consistent and clear since 2003. The Tribes have proposed that either the non-Indian Basin 27 diversions be limited to 45,000 acre-feet per year or that additional water supplies be provided to the Tribes to make up for any non-Indian Basin 27 diversions that exceed 45,000 acre-feet per year. The issue of whether volumes should be placed on individual non-Indian water rights in Basin 27 has to do with the chosen methodology on how to compare the non-Indian Basin 27 diversions to the 45,000 acre-feet per year estimate. I believe that water right volumes should be the basis for comparison. During negotiations, the State of Idaho has proposed using diversion measurements for comparison. This has been a central issue of the negotiations during the last five years.

22. Blackfoot River Water Management Plan. The 1990 Agreement calls for the development of a Blackfoot River Water Management Plan (BRWMP) to assist in the implementation of the 1990 Agreement, and to encourage the open sharing of data such that effective management of the Blackfoot River is possible. As part of the negotiation efforts, the parties have developed a draft BRWMP that is currently under final review. Development of the BRWMP has been possible based on the combined, good-faith, efforts of the negotiating parties since April 2009. The Tribes have been fully supportive and involved in the process of developing the draft BRWMP.

23. In brief, the BRWMP provides for the following: (1) a measurement program to provide the necessary data for accurate accounting of basin water supplies and diversions, (2) an accounting program that defines ownership of specific water supplies and allowable diversions by specific water users, and (3) a mechanism to implement the Sand Creek Exchange provisions of the 1990 Agreement (Section 7.1.1.x.d).

24. The water accounting aspects of the BRWMP mean that the plan is inherently linked to the equitable adjustment issue and the Tribes' objections in Basin 27. In order to define allowable diversions by the various water users in the basin, certain agreements have to be made regarding annual volumetric caps on the non-Indian Basin 27 water users (such as a cap of 45,000 acre-feet per year) and the administration of priority dates in Basin 27. Thus, while a significant amount of work has been done to date by all parties to develop a draft BRWMP, I believe that resolution of the equitable adjustment issue is vital to final adoption and implementation of the BRWMP.

25. Measured Basin 27 Diversions. Diversion measurements have been reported in Basin 27 for many years; however, it was only recently that these reported diversions were complete and accurate. In part due to the Tribes' objections and concerns, IDWR has undertaken significant investigations and efforts to improve its understanding of the diversions occurring throughout Basin 27. The IDWR measurement data clearly show that historical diversions by the Basin 27 water users have consistently exceeded the 45,000 acre-feet per year estimate that was provided in the 1990 Agreement. Thus, the Tribes concern about impacts to their decreed Blackfoot River water right is well-supported by measurement data.

26. Historical Records. Historical annual diversion records for Basin 27 were obtained for the period 1922 to 1996. More recent diversion records are excluded from this discussion because they represent a distinctly different dataset⁴. Historical diversion records discussed in this section were generated based on field measurements of diversions once every 15 days, according to a prior Watermaster for Basin 27. The accuracy of these historical

⁴ IDWR began collecting more detailed diversion information around 2004 in the Lower Basin, and around 2008 in the Upper Basin.

measurements has been questioned in the past, but nevertheless the IDWR historical records represent the only available long-term records on Basin 27 diversions.

27. The IDWR measurement records for the period 1922-1996 indicate an average non-Indian Basin 27 annual diversion volume of approximately 76,500 acre-feet per year. Table 2 shows the historical and recent diversion records for Basin 27. The non-Indian Basin 27 water users, whose diversions are shown in Table 2, do not include the non-Indian water users who are located within the Fort Hall Irrigation Project.

Table 2: Historical Diversion Records for Basin 27

Year	Lower Basin	Upper Basin	Total Basin	Year	Lower Basin	Upper Basin	Total Basin
1922	56,521	30,078	86,599	1967		16,617	
1923	62,878	30,097	92,975	1968			
1924	52,779	30,078	82,857..	1969			
1925	54,901	20,093	74,994	1970			
1926	56,073	15,472	71,545	1971			
1927	48,636	33,956	82,592	1972	89,736	16,677	106,413
1928	50,322	32,744	83,066	1973	84,824	16,677	101,501
1929	51,994	33,744	85,738	1974	71,088	16,677	87,765
1930	54,292	33,744	88,036	1975	60,763	16,677	77,440
1931	45,218	15,438	60,656	1976	72,990	16,677	89,667
1932	55,048	33,744	88,792	1977	72,990	16,677	89,667
1933	50,693	23,609	74,302	1978	76,680	17,718	94,398
1934	43,104	4,955	48,059	1979	77,469	19,948	97,417
1935	56,727	25,963	82,690	1980	69,568	18,878	88,446
1936	57,865	18,073	75,938	1981	72,298	19,929	92,227
1937	52,856	18,947	71,803	1982	70,305	20,863	91,168
1938	51,617	18,947	70,564	1983	73,520	21,356	94,876
1939	54,716	16,850	71,566	1984	69,299	19,552	88,851
1940	46,166	19,070	65,236	1985	86,488	19,552	106,040
1941	44,488	19,837	64,325	1986	70,462	18,055	88,517
1942	57,723	26,189	83,912	1987	71,958	17,529	89,487
1943	46,267	16,207	62,474	1988	71,360	17,926	89,286
1944	43,563	15,890	59,453	1989	69,492	16,706	86,198
1945	49,721	15,893	65,614	1990	63,495	15,863	79,358
1946	40,959	15,893	56,852	1991	55,185	14,168	69,353
1947	50,506	15,893	66,399	1992	41,535	2,776	44,311
1948	44,327	16,086	60,413	1993	47,530	2,449	49,979
1949	56,352	15,893	72,245	1994	52,194	2,776	54,970
1950	46,598	15,893	62,491	1995	45,683	4,223	49,906
1951	43,806	15,893	59,699	1996	52,203	4,503	56,706
1952	43,806	15,893	59,699	1997			
1953	45,497	15,893	61,390	1998			
1954	45,067	15,893	60,960	1999			
1955	47,393	15,893	63,286	2000			
1956	56,515	15,893	72,408	2001			
1957	49,753	16,042	65,795	2002			
1958	56,832	16,796	73,628	2003			
1959	62,773	18,274	81,047	2004	44,267		
1960	64,259	19,274	83,533	2005	42,376		
1961	57,863	18,362	76,225	2006	45,700		
1962	58,556	18,362	76,918	2007	45,889		
1963	66,529	17,827	84,356	2008	48,770	11,771	60,541
1964	69,911	17,856	87,767	2009	39,355	10,955	50,310
1965	72,339	17,866	90,205	2010			
1966	73,599	16,617	90,216				

28. Recent Efforts (2004-2010). Since 2004, IDWR has made consistent efforts to improve upon the diversion measurement program and practices for Basin 27. Prior to 2004, it is apparent that the Basin 27 measurements were based on incomplete measurements for all water users, especially in the Upper Basin, and infrequent measurements of all diversions in both the Lower and Upper Basins. Over the period 2004 to 2007, additional diversions were located in the Upper and Lower Basins and a more complete picture of the active water users was developed based on the efforts of all of the negotiating parties.

29. Significant efforts were made in 2008 to inventory all water users in the Upper Basin and describe the characteristics of use for each water right. These efforts culminated in a February 2008 report⁵, and a subsequent August 2008 report⁶, summarizing the parties' best estimates of total Basin 27 diversions. The August 2008 report estimated total annual non-Indian Basin 27 diversions to be 56,499 acre-feet per year in a year with average hydro-climatic conditions and under stricter administration. These two 2008 reports represent the first joint effort by the parties in recent years to fully quantify the annual diversion volume for all Basin 27 water users.

30. During the course of the investigations in 2008, it was found that many of the large irrigation ditches in the Lower Basin were diverting water at flow rates that exceeded what was written on their recommended water rights in the Basin 27 Director's Report. Interim administration of the Director's Report was not implemented in Basin 27 until 2009, such that prior to this year the Watermaster did not have the legal authority to regulate diversions according to the recommended water right elements. In the future, however, administration of water rights would follow the IDWR recommended water rights and unique Lower Basin

⁵ See Attachment 1

⁶ See Attachment 2

diversion estimates were developed by capping the measured diversions at the flow rate included on the pertinent water right(s), as if this water right administration were actively in place. Additional efforts were also undertaken by IDWR to understand and quantify the Upper Basin diversions. A memorandum was issued by IDWR in December 2008⁷ that provided the following information:

- Lower Basin measured diversions (based on 2004-2008 data): 42,376 to 48,770 AFY
- Lower Basin diversions if “capped” by water rights: 32,643 to 37,997 AFY
- Upper Basin diversions (based on 2007-2008 data and additional historical use investigations): 11,771 to 16,164 AFY
- Total Basin diversion estimates were developed based on a proposed inverse relationship wherein Upper Basin diversions are low when Lower Basin diversions are high, and vice-versa. This inverse relationship was generated based on a limited period of diversion data records and observation. The Total Basin diversions were thus estimated as roughly 50,000 acre-feet per year as follows:
 - Low Capped Lower Basin Diversions + High Upper Basin Diversions: $32,643 + 16,164 = 48,807$ AFY
 - High Capped Lower Basin Diversions + Low Upper Basin Diversions: $37,997 + 11,771 = 49,768$ AFY

31. The December 2008 estimate from IDWR was utilized in subsequent equitable adjustment settlement discussions focused on providing a supplemental source of 5,000 acre-feet per year for diversion by the Basin 27 water users. This 5,000 acre-feet per year was calculated

⁷ See Attachment 3

as the difference between 50,000 acre-feet per year of estimated diversion and the 45,000 acre-feet per year written in the 1990 Agreement. It should be noted that the 50,000 acre-feet per year estimate provided in December 2008 is based on several important assumptions: (1) a significant reduction from historical Lower Basin diversions as a result of administration according to the water rights recommended in the Basin 27 Director's Report; (2) a limited (one to two year) data period for Upper Basin diversion measurements; and (3) the assumption of an inverse relationship between Upper and Lower Basin diversions in any given year. Complete basin-wide diversion records that benefit from the recent efforts to more accurately quantify the non-Indian diversions are available for the years 2008 and 2009. These two years indicate that even under strict management and administration, the non-Indian Basin 27 water users would likely exceed the annual diversion limit of 45,000 acre-feet per year stated in the 1990 Agreement, such that an equitable adjustment to the Tribes water right would be necessary.

32. Potential for Increased Diversions. The historical diversion records, especially those for recent years that are believed to be more accurate, provide estimates of total diversion volume under historic use practices. Various investigations by both Tribal and Federal parties have indicated that the recommended water rights under the Basin 27 Director's Report allow for a potential future increase in the total non-Indian Basin 27 Blackfoot River diversions. This potential for increased future diversions can be explained by the following:

(1) Inactive Recommended Water Rights. There are several Basin 27 recommended water rights that are not currently diverting water for irrigation, such that use of these rights does not appear in recent estimates of total Basin 27 diversion volumes. These unused water rights are enrolled in a finite-term Conservation Reserve Program or are temporarily idle.

For whatever the reason, these currently un-accounted diversions could add to any recent estimates of the total non-Indian Basin 27 diversion volume.

(2) Irrigation Company Protections. Idaho Statute 42-223(7) provides for the protection of irrigation company water rights, regardless of actual beneficial use within the irrigation company boundaries (lack of forfeiture). There are several irrigation company water rights in the Lower Basin that are not currently utilized to the full extent possible under the water right. This is due to a variety of reasons including conversion of land to residences, use of groundwater instead of Blackfoot River water, or simply idle acreage. It is possible that greater use of the irrigation company water rights could occur in the future, in which case total non-Indian Basin 27 diversion volumes would increase relative to recent estimates.

(3) Overlap with Groundwater Rights. Several tracts of land in the Lower Basin have both a Blackfoot River surface water right and a groundwater right, because historical beneficial use was proven from both sources of supply. In most cases, these land tracts are currently utilizing their groundwater right for irrigation, and therefore water use by these actively irrigated land tracts are not included in recent estimates of Blackfoot River diversions. In the future, these lands may convert back to using their recommended Blackfoot River water rights instead of groundwater, in which case total non-Indian Basin 27 diversion volumes would increase.

33. The point to be made by these three examples is that the recent estimates of total non-Indian Basin 27 diversion volumes do not accurately reflect the potential diversion volumes that could be seen in the future under the recommended water rights of the Basin 27 Director's Report. For this reason, the Tribes and the United States have concerns about future impacts to their decreed Blackfoot River water right and the need for an equitable adjustment in the future.

34. Determination of Equitable Adjustment. After nearly five years of negotiations, it is my opinion that in order to fully meet its obligations under the 1990 Agreement and the 1995 Decree regarding the Tribes' Blackfoot River water right no. 27-11375, the State of Idaho should do the following three things. First, the State should specifically enumerate which non-Indian water rights in Basin 27 are included in the protection provided by the 1990 Agreement⁸. Second, the State should determine the cumulative volumetric diversion of these protected state created water rights. Third, the State should adjust the Tribes' water rights in a manner that is equitable to the impacts to the Tribes' water rights as a result of cumulative volumetric diversions being greater than the 45,000 acre-feet per year that was estimated in the 1990 Agreement.

35. Beyond quantification of a Basin 27 diversion volume, the State must uphold its other responsibilities under the 1990 Agreement as well. Those non-Indian water rights which will be allowed to continue to divert natural flows of the Blackfoot River, and thus be protected from the Tribes' senior water rights, are being identified by the State⁸. Once these rights are identified, the volumetric diversions associated with these identified rights can be summed to obtain the cumulative volumetric diversion of the non-Indians in Basin 27, to be compared to the 45,000 acre-feet per year limitation stated in the 1990 Agreement. Once this comparison has been made, an equitable adjustment, if necessary, can be applied to the Tribes' water rights. The State must uphold these responsibilities under the 1990 Agreement.

36. Determine Equitable Adjustment by Water Right Volumes (Option 1). I believe the original intent of the 1990 Agreement was to determine any necessary equitable adjustment using water right volumes. The State of Idaho, specifically IDWR, would recommend

⁸ The State of Idaho provided a list of water rights protected under the provisions of the 1990 Agreement on September 27, 2010. This water rights list is currently under review by the parties.

reasonable diversion volumes for each irrigation water right in Basin 27. Once individual water rights have been assigned an annual diversion volume, the following steps describe how an equitable adjustment might be calculated using these water right volumes:

- (1) Identify and enumerate those specific water rights that were using water prior to the 1990 Agreement and are afforded priority-date protection from the Tribes' senior Blackfoot River rights.
- (2) For those water rights described in step #1, sum up the individual water right volumes to obtain a total annual diversion volume (in units of acre-feet) for the protected non-Indian Basin 27 water users.
- (3) Make a direct comparison between the total annual diversion volume calculated in step #2 and the 45,000 acre-feet per year estimate provided in the 1990 Agreement. If the total annual diversion volume from step #2 is greater than 45,000 acre-feet per year, then the equitable adjustment to the Tribes' water rights is calculated as the difference. If the total annual diversion volume from step #2 is less than or equal to 45,000 acre-feet per year, then no equitable adjustment to the Tribes' water rights is necessary.

37. The result of using individual water right volumes is a fixed value of equitable adjustment. The 1990 Agreement provides that an equitable adjustment will be made to the Tribes' water rights, and therefore a fixed value of equitable adjustment is preferred since water rights are not variable year to year.

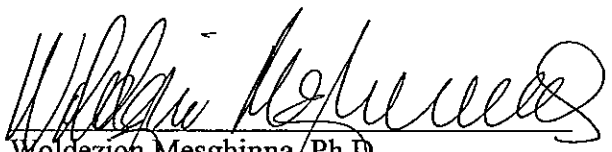
38. Determine Equitable Adjustment by Measured Diversions (Option 2). According to negotiation meetings that have taken place over the past several years, the State has expressed a desire to meet its obligations under the 1990 Agreement through the use of annual diversion measurements. The following actions would be taken in determining an equitable adjustment

using measured diversions. Volume limitations would not be placed on individual water rights in Basin 27, and the water rights would be decreed as recommended in the Basin 27 Director's Report. The Basin 27 water rights would only be limited by a maximum diversion flow rate and period of use. With these water rights in place, the following steps describe how an equitable adjustment might be calculated using diversion measurements:

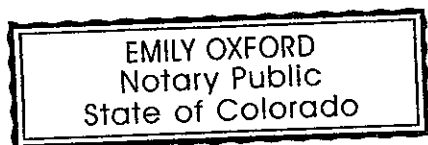
- (1) Identify and enumerate those specific water rights that were using water prior to the 1990 Agreement and are afforded priority-date protection from the Tribes' senior Blackfoot River rights.
- (2) The IDWR Watermaster for Basin 27 would operate a measurement program in Basin 27 to measure on a pre-defined schedule each and every diversion in the Blackfoot River system. Diversion measurements would be made through standard procedures.
- (3) On a regular basis, such as once per week, the individual diversion measurements within Basin 27 would be summed for those specific water rights identified in step #1 to obtain a total measured diversion volume (to date) for those identified water rights.
- (4) Make a direct comparison between the up-to-date annual diversion volume calculated in step #3 and the 45,000 acre-feet per year estimate provided in the 1990 Agreement. If Basin 27 diversions are not allowed to continue when the accumulated volume from step #3 has reached or exceeded 45,000 acre-feet per year limit, then no equitable adjustment to the Tribes' water rights is necessary. If Basin 27 water users are allowed to continue diverting even after the 45,000 acre-feet per year limitation has been reached, then some quantity of equitable adjustment will be due to the Tribes.
- (5) If an equitable adjustment is due to the Tribes, as determined in step #4, then the equitable adjustment should be calculated as the difference between the total measured

diversion volumes from step #3 and the 45,000 acre-feet per year estimate provided in the 1990 Agreement. This difference calculation could be undertaken on a recurring basis during the irrigation season or at one time at the end of the irrigation season.

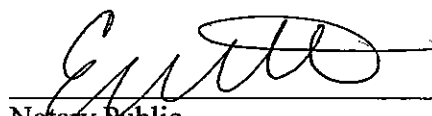
39. The result of using measured diversion volumes is a calculated equitable adjustment that varies each and every year. As a result, the Tribes' water rights cannot be adjusted equitably as called for in the 1990 Agreement because water rights represent fixed quantities. Instead, a supplemental water supply, that is equivalent to direct diversions of Blackfoot River flows by the Tribes, would be provided to the Tribes in addition to their decreed water rights under the 1990 Agreement, in an amount equal to the calculated equitable adjustment. The main problem, from the Tribes' perspective, of using measured diversion volumes is that the full extent of equitable adjustment is not known until after the irrigation diversions have taken place, and likewise after the negative impacts to the Tribes' ability to utilize their Blackfoot River natural flow rights have occurred.


Woldezion Mesghinna, Ph.D.

Subscribed and sworn to before me this 25th day of October, 2010.



My Commission Expires September 22, 2014


Notary Public
Residing at: 901A Camelot Ct. Fort Collins, CO 80525
My Commission Expires: 10/22/2014

Curriculum Vitae of Woldezion Mesghinna, Ph.D., P.E.



NATURAL RESOURCES CONSULTING ENGINEERS, INC.

Woldezion Mesghinna, Ph.D., P.E.

President and Principal Engineer

Special Skills and Expertise

Comprehensive water supply analysis, water supply quantification, determination of irrigable acreage and water requirements, irrigation return flow studies, water rights negotiations, and expert witness testimony.

Education

Ph.D., Irrigation & Drainage Engineering, Utah State University, Logan, Utah. 1979.

M.Eng., Civil Engineering (Hydrology & Hydraulics), Cornell University, Ithaca, New York.
May 1973

B.S., Civil Engineering, Cornell University, Ithaca, New York. May 1972

Professional Registrations

Professional Civil Engineer, California, #C-031962, 1980

Professional Civil Engineer, Colorado, #30081, 1994

Professional Civil Engineer, Wyoming, #PE6787, 1994

Professional Civil Engineer, Arizona, #28952, 1995

Experience

President and Principal Engineer
Natural Resources Consulting Engineers, Inc.

March 1989-Present
Fort Collins, Colorado

Dr. Mesghinna formed Natural Resources Consulting Engineers, Inc. (NRCE) in 1989.

Water Supply Studies

- Conducted comprehensive water supply analysis of several major rivers, including the Deschutes, Melotious, Crooked, Warm Springs, and Shitike Creeks in Oregon. The various impacts of upstream water users on these streams were determined, extensively for the Deschutes River. The results of this study helped the Warm Springs Tribes craft their negotiated settlement water claims and conduct actual negotiations with the State of Oregon and the U.S. government.
- Conducted a study of the water supply needs of the Sif Oidak District of the Tohono O'odham Nation in Arizona by determining irrigable acreage and water requirements, and non-agricultural water demands. Investigated the extent of past floods on reservation areas, and evaluated the impact of regional urbanization on flood frequency. Also determined the effects of groundwater pumping on the area's aquifers.

- Evaluated the impact of historic gold mining operations on water quantity and quality on the Fort Belknap Indian Reservation in Montana.
- Carried out operational management of the Little Bighorn River watershed in Wyoming, including an analysis of storage reservoirs, irrigation uses, and fishery water requirements.
- Quantified water requirements needed to restore and maintain historic wetland areas on the Duck Valley Indian Reservation in Idaho, including analyzing the various water supply sources and studying comprehensive water-use plans.
- Studied the irrigation return flow and depletion for the future lands of the Wind River Indian Reservation in Wyoming to quantify an in-stream flow water claim.
- Quantified present and future water uses for the Klamath Allottees Water Users Association and provided advice and counsel in matters relating to the adjudication/negotiation of water rights for the Association.
- Analyzed both surface water and groundwater resources within the Tule River Indian Reservation. This involved a study of the arability of Reservation lands, the determination of the available water supply in the Tule River, and the quantification of the water requirements for both agricultural and nonagricultural water uses.
- Provided technical direction and coordination of the Tribal Water Code development, and the performance of interim Tribal Water Engineer duties for the Fort Hall Indian Reservation.
- Completed an appraisal-level engineering design for a delivery and recharge facility, including cost of several alternatives for the San Xavier Groundwater Recharge Project.
- Assessed the natural flows of the Jemez River, including historic and undepleted surface flows; alluvial and deep groundwater, irrigability of lands; consumptive use of the adaptable crops in the area; and, based on engineering and economic feasibility of a comprehensive water development plan, calculated the amount of water the Tribe should claim under a negotiated settlement.

Irrigation/Agriculture

- Planned and designed the rehabilitation and reconfiguration of the conveyance distribution and drainage systems for the Wind River Indian Irrigation Project and determined the amount of water that could be saved, as well as estimating the associated capital costs.
- Completed extensive assessment of Imperial Irrigation District's (IID) Water use including water conservation history, agricultural water use and irrigation water efficiency, analysis and response to the opinions and assertions advanced in the expert declarations submitted by others. Dr. Mesghinna testified in front of the California water board on IID agricultural water use and irrigation efficiency.
- Assisted in the design of the Tohono O'odham Nation, Arizona 9B, and Avra Valley Irrigation Systems. Determined the suitability of these areas for different types of irrigation systems and analyzed the designs of the water conveyance and on-farm systems proposed for the 9B farm. Developed preliminary designs for the water conveyance and distribution systems associated with the irrigable acreage identified in the land classification of the Avra Valley site.

- Completed a comprehensive Aligidir Irrigation Project Development Plan to divert water from the Gash River near the city of Tessenei, Eritrea. The plan determined a sustained available water supply, the irrigability of lands, an environmental impact assessment, and determined economic feasibility. Sediment traps, a diversion structure, conveyance and distribution systems, and an off-stream dam and reservoir were also planned.
- Completed a scheme for stream flow and climatic network locations within Eritrea and installed and trained local personnel and Water Resources Department of Eritrea employees to operate and maintain the equipment.

Water Supply/Irrigation Projects

- Supervised the measurement of seepage losses on all selected reaches of major canals on the Wind River Indian Reservation. Assessed surface and subsurface conditions of various ditches and made a recommendation for minimizing and/or avoiding water-logging problems. Prepared a list of all irrigation structures in need of replacement or maintenance and suggested a plan of action.
- Completed an extensive analysis regarding the available water supply conditions, flood hazards, and land capability for irrigation purposes within the Fort Mojave and Colorado River Indian Reservations. Determined the ultimate number of practicably irrigable lands under conditions of the 1960's. Testified extensively in court to defend findings.
- Performed a multipurpose study of the Tekezze-Setit River Basin. This included the estimation of available water supply; the development of land classification specifications; the location of various dam and reservoir sites along the river; the assessment of proposed irrigable lands; the determination of the criteria for the environmental study; the review of the final study; and the overall coordination of economics, mapping, hydropower, and geotechnical, conveyance, and distribution systems.
- Prepared a comprehensive water development plan for the Navajo, Hopi, and San Juan Southern Paiute Indian Reservations in Arizona. The tasks included determination of the undepleted flow of the Little Colorado River; availability of groundwater within the Coconino and Navajo Aquifers; present and historical irrigation water use determination; future irrigation engineering studies (both appraisal and feasibility level); feasibility-level M&I and recreation water development design and plans; and drainage engineering services.
- Analyzed the available surface water supply of the Owyhee River in Nevada and Idaho. Specifically, determined the undepleted flow analysis based on Reservoir operation, determined the amount of depletion due to agricultural and non-agricultural water uses, return flows, etc. The study was conducted as part of an irrigation and drainage development plan for the Duck Valley Indian Reservation in Idaho and Nevada.
- Acted as a lead engineer for the planning, design, and construction management and supervision of a 230 foot high RCC dam. The project also includes a 15 km-long pipeline extending from the dam to the water treatment plant. The pipeline empties into a water treatment plant with a treated water capacity of 2000 m³ located in the outskirts of Asmara, Eritrea.

- Conducted a reconnaissance comprehensive water development plan for the eastern plains of Eritrea, including land classification for development of irrigation schemes; availability of surface and groundwater resources; investigation of suitable dams and reservoirs; and estimation of capital, operation, and maintenance costs.
- Evaluated the water resources of Rio Acoma in New Mexico, including groundwater and surface water supplies; present, historic, and future water uses for both agricultural and non-agricultural uses; and determination of natural flow of the River at a point near the Pueblo of Acoma.

Supervising Engineer
Stetson Engineers, Inc.

1978-1988
San Rafael, California

Dr. Mesghinna supervised hydrologic analysis and water supply investigations, determined agricultural water requirements, and designed irrigation systems.

Water Supply Studies

- Quantified the water resources and potential water requirements of the Fort Belknap Indian Reservation. This involved the development of a feasibility-level irrigation engineering study, the determination of water requirements, and the quantification of natural surface flow for reserved water rights litigation.
- Performed a water availability study of the Taos River and tributaries using the HEC-4 hydrologic model, including the simulation of monthly stream flows for missing flow records and ungaged locations as well as river and reservoir system operation studies.
- Analyzed the reservoir system operation for several operating scenarios on both the Eel and Russian Rivers of California using the HEC-3 hydrologic model.

Irrigation/Agriculture

- Participated in the adjudication of the Big Horn River Systems of Wyoming and the agricultural system development plan, including the design of a conceptual irrigation system and associated cost analysis for approximately 60,000 acres. Also determined future and historic irrigation water requirements for the Wind River Indian Reservation.
- Performed several studies for the Fort Hall Indian Reservation in Idaho in connection with the "President's Water Policy Implementation 10-Year Plan for Review of Indian Water Claims," involving water supply, irrigation water requirements, and related studies. Provided technical assistance to the Tribes for negotiations with the State of Idaho.

Water Supply/Irrigation Projects

- Conducted a surface water depletion study and engineered an agricultural development plan, including conceptual irrigation system design, for the Yakama Indian Reservation in Washington.

- Reviewed and commented on a comprehensive surface water hydrology study, including the determination of natural flow, water quality, and sedimentation, in connection with water rights litigation for the Jicarilla Indian Reservation and the San Ildefonso, Santa Clara, San Juan, and Taos Pueblos of New Mexico.
- Completed a comprehensive water resource analysis, including hydrological analysis of the various streams and agricultural engineering study as part of the comprehensive water development plan for the Nez Perce Indian Reservation in Idaho.
- Calculated the available water supply for the Jemez River Indian Reservation, including the determination of probable maximum flood and hydropower feasibility for the design of a reservoir and spillway.

Engineer

Woodward-Clyde Consultants

1973-1976

Clifton, New Jersey

- Worked on many projects requiring geotechnical and hydrological engineering evaluation and analysis.
- Analyzed the flooding potential of Sawmill River for the Yonkers City Urban Development Project.
- Investigated and evaluated groundwater resources for the development of groundwater in New Mexico.
- Designed a dewatering system for the installation of a subaqueous tunnel at the LNG Terminal of Cove Point, Maryland.
- Performed well testing and estimated groundwater characteristics for the cooling lake at Braidwood Nuclear Power Station in Illinois.
- Completed subsurface investigation, soil sampling, rock coring, and permeability testing for the Amos Dam of West Virginia.
- Reviewed and evaluated the timber pile foundation design and settlement for various structures located in the meadowlands of the New Jersey Sports Complex.
- Performed temperature-controlled creep load tests on steel pipe piles and designed piles for the Trans-Alaska Pipeline in Alaska.

International Experience

During the period from 1966 to 1970, Dr. Mesghinna was employed in Ethiopia as an engineer in the design, planning, and construction of various school buildings, clinics, and hospitals. These projects were sponsored by the Swedish International Development Authority (SIDA) and the United Nations High Commission for Refugees (UNHCR). He was first employed as a Site Supervisor for the construction of a school building, then as a District Engineer and Acting Regional Engineer in charge of three building sites. As such, he was responsible for the planning of all operations, supervision of construction, design and product development, contract development and construction agreements, the production of construction cost estimates, and the performance of site investigations and surveys.

Expert Witness Experience

Dr. Mesghinna successfully completed professional witness testimony on behalf of the Bureau of Indian Affairs and the U.S. Department of Justice (DOJ) in the adjudication of the Big Horn River System in Wyoming. His testimony concerned irrigation system design and associated water right claims for the Wind River Indian Reservation. Dr. Mesghinna provided a number of testimonies on

various topics during the years following the Big Horn River adjudication; including the conversion of irrigation consumptive use for instream flows, groundwater demands for non-agricultural water uses, and Walton right claims.

Dr. Mesghinna also completed testimony on behalf of the DOJ concerning the lower Colorado River, in which his task was to prove that the U.S. government had properly quantified the Indian reserved water rights in the early 1960's. More specifically, he provided testimony on flood analysis, land classification, and irrigation system selection/design.

Dr. Mesghinna testified in front of the California Water Resources Control Board regarding the beneficial use of water by the Imperial Irrigation District in southern California. Dr. Mesghinna has also testified regarding the water right claims of the Lummi Tribe in Washington.

Dr. Mesghinna is retained as an expert witness on behalf of the DOJ for general stream adjudications on the Silver Creek, Upper Salt River, and San Pedro Drainage Basins in Arizona; the Walker River Basin in Nevada; the Little Colorado River Basin; the Zuni River Basin in New Mexico; and the San Jacinto River Basin in Southern California.

Dr. Mesghinna has been instrumental in several water rights settlement negotiations in the western United States and has helped to settle water rights claims for several Tribes. Examples include the Fort Hall, Fort Peck, Warm Springs, Las Vegas Paiute, and Fort McDowell Indian Reservations.

Attachment 1: Preliminary Report, Equitable Adjustment Assessment

Submitted to the SRBA Court as Exhibit B to the Governmental Parties' Joint Status Report on
February 28, 2008

PRELIMINARY REPORT, EQUITABLE ADJUSTMENT ASSESSMENT
(Prepared by the federal, tribal, state technical team)

INTRODUCTION

On July 5, 1990, the Shoshone-Bannock Tribes, the State of Idaho, the United States, and the Committee of Nine (hereinafter, "the Parties"), entered into an Agreement to settle the water rights claimed by the United States for the benefit of the Shoshone-Bannock Tribes (Tribes). On August 2, 1995, the presiding judge of the Snake River Basin Adjudication (SRBA) entered an Order approving the Agreement and decreeing water rights to the United States for the benefit of the Tribes.

The decree recognizes the Tribes' federal reserved right to use direct flow water from the Blackfoot River, with a senior priority date of 1867, up to an annual diversion of 150,000 acre-feet per year. However, the Tribes and United States agreed to exercise this water right such that persons diverting direct flow from the Blackfoot River prior to January 1, 1990, whose rights are decreed in the SRBA, (hereinafter "North Side Users" or "NS Users"), will continue to receive their full entitlement under State law. The NS Users were estimated to divert not more than 45,000 acre-feet of water per year (AFY). If the NS Users are, in effect, diverting greater than 45,000 AFY, then the Parties agreed to negotiate an Equitable Adjustment to the Tribal water rights to account for this incremental increase in use.

The Idaho Department of Water Resources (IDWR), acting as the Blackfoot River watermaster, has carried out a water diversion measurement program for many of the NS Users from 2004 to 2007. Most of the major NS Users are located downstream of the USGS stream gaging station at Shelley, Idaho. In addition, IDWR, in 2005, submitted a Director's Report which recommended water rights to be decreed by the SRBA Court but did not include volume limits on surface water rights. A review of the recent diversion measurements plus the nature and extent of the recommended surface water rights resulted in the preliminary conclusion that present diversions are more than the 45,000 acre-feet estimate. Allowable additional diversions that are not currently exercised could further add to the volume difference. As such, an Equitable Adjustment assessment is required.

To assist in refining diversion estimates, the United States and State of Idaho funded an expanded ditch diversion measurement program for essentially the July to September period in the middle (Wolverine Creek to Blackfoot Dam) and upper (above Blackfoot Dam) Blackfoot River watersheds in water year 2007. This supplemental measurement program provides important additional information on water use throughout the basin. Unfortunately, water year 2007 was a low flow year but the new diversion records allow meaningful assessments to be completed relative to the nature and extent of actual diversions taking place on the ground.

A Technical Team (Team) of federal, state and tribal experts was established to facilitate the development of defensible estimates of recent diversions by the NS Users under dry and average year conditions. This Team was secondarily charged with addressing the effects of these diversions on water supplies available to be diverted from the North and Main Canals of the federal Fort Hall Irrigation Project. These results were to be compared to the 45,000 acre-feet Agreement base case assumptions. The Team was also responsible to identify key issues that must be further researched to facilitate final conclusions to be developed relative to the nature and extent of the Equitable Adjustment.

TECHNICAL APPROACH

Background Information

The 45,000 acre-foot diversion limit is for the entire Blackfoot River basin. However, for ease of assessment, the area of study was divided into a lower basin (downstream of the confluence of Wolverine Creek with the Blackfoot River to the mouth of the Blackfoot River) and the middle and upper basins. Historic diversions (2004 to 2007) are recorded for the majority of the lower basin while only limited diversion data are available for the middle and upper basins.

Currently irrigated acreage and ditch delivery information is available for the lower basin while new estimates of current, recent and long-term idle acreage and associated water delivery infrastructure had to be created for the middle and upper basins. The IDWR Directors Report and associated exhibits were of major assistance.

Evapotranspiration and net irrigation requirement estimates for key crops in the area of study are available from the State of Idaho website. These values are determined to be sufficient for use in the study.

Lower Basin

Representatives from the Team had previously developed exhibits of surface and groundwater service areas and associated delivery systems for the lower basin service area. A comprehensive work session was completed with IDWR on April 25, 2007 to review the accuracy of the detailed exhibits and to verify the locations of diversions, measurement points and return flow nodes. Slight modifications were made to the maps and it was concluded that all Northside Water User diversions below the USGS, at Shelley, gaging station provided essentially no return flow above the Fort Hall Irrigation Project North and Main Canal diversions. As such, it was concluded that diversions equal depletions in the lower basin study area.

The Team then analyzed the IDWR diversion measurement records from 2004 to 2007. The Team is in general agreement with the recorded diversion values. The measurement accuracy is felt to be improving over time. There are some questions on selected power record calculations for diversions but these values are associated with minor water users. There is also a question as to whether the Younnie Ditch diversions are fully accounted for. These values can be refined with additional study.

Middle and Upper Basins

Extensive work was required to identify lands that are currently or have been recently irrigated. Points of diversion and conveyance systems were also mapped. Long-term idle lands were also identified. These are tracts that currently have non-functional irrigation systems and appear to be abandoned. Unfortunately, many of these lands fall within IDWR recommended water rights places of use. As such, they needed to be documented.

The places of use relative to the state recommended water rights base were used to establish the initial study boundaries. Aerial photo coverage for the 1980, 1987, 1988, 1992, 2004, and 2006

time periods were used to photo-interpret the irrigated land base. Most of the noted photography was stereoscopic and observed under a 3X ocular Lietz, MS-27 stereoscope. This markedly improved the quality of irrigated land mapping. This range of aerial photo coverage represented dry and average year runoff time frames and coincided with work products used by IDWR to develop conclusions on recommended water rights. Members of the Team performed aerial over-flights of the entire study area in late June and late July of 1999. Notes from these observations were valuable in confirming the photo interpretation. Several on-ground field investigations were completed by Team members over the last decade that further assisted in refining the mapping results.

Preliminary mapping of the historically irrigated land base was submitted to IDWR to assist them in the 2007 diversion measurement program. IDWR developed a numerical code that tied each measured diversion to a specific water right and / or owner. Extensive irrigated land tracts were found that had no recommended water rights plus multiple areas where none or only a portion of the recommended water right service area was irrigated. Further, the IDWR measurement sites (due to time/budget constraints) provided only partial coverage of all identified diversions. As such, diversion quantity estimates had to be independently developed for a large number of sites. These volumes were established from similar diversions that were measured.

Therefore, 30 comprehensive irrigated land maps were developed for the middle and upper basin study areas. Historically irrigated lands were identified as being either actively irrigated or long-term idle. Active irrigation was further divided into two categories based on water availability. Use was made of IDWR diversion records and monthly stream flow measurements made by BIA for most of the tributaries to the Blackfoot River in the area of study to evaluate supply. IDWR had conducted limited interviews with several of the major water users and these inputs assisted in interpreting the diversion measurement data and aerial photo interpretation results. The first active irrigation category identifies those lands that would generally receive water during a dry year. The second category defined additional lands that appeared to be irrigated during average runoff periods. All of these irrigated land types were quantified.

A schematic accompanied each of the 30 irrigated land maps. For each primary point of diversion, summaries were presented relative to estimated active irrigation uses and associated recommended water right acreage, peak use rates and periods of use. The points of diversion were numbered so that they could be cross referenced to the IDWR diversion measurement program results for the 2007 irrigation season. Sources of supplies were documented so that the respective streams could be correlated to the monthly BIA stream-gaging results.

The Team then completed an assessment of diversion quantities for each drainage in the Upper and Middle Basins by point of diversion. The initial step was to develop estimates of diversion quantities for each point of diversion measured in dry year 2007. Unit diversions for estimated actively irrigated acreage were then established. These results were compared with calculated crop consumptive irrigation requirements for selected crops, periods of use and estimated ditch efficiencies. Cross checks were made against BIA monthly stream flow measurements in the drainage plus levels of water use identified on the aerial photographic coverage. The IDWR measured results seemed reasonable for a dry year. Using the same informational sources plus the results of the limited interviews with the water users in 2007, estimates were made of anticipated water diversions for estimated active irrigation in average years. Results were

reviewed for reasonableness. Those diversions which were not measured in 2007 were correlated to similar diversions and irrigation use levels that had been measured by IDWR.

Most of the unit diversions were less than 2.5 acre-feet per estimated actively irrigated acre. As such, diversions were projected to be fully depleted. For service areas with larger diversions, depletions were estimated based on the crop consumptive irrigation requirement (generally grass pasture) plus irrecoverable losses of one-third of the potential return flow. An analysis was undertaken to evaluate whether adjustments should be made to crop water requirements relative to elevation. Elevation was documented as having only minor differences in the values calculated in the middle and upper basins and adjustments were not implemented.

RESULTS

Lower Basin

As previously documented, diversions were estimated to be depletions. Water year 2007 was designated as a dry year and diversions / depletions were measured at about 41,800 acre-feet. Water year 2006 was identified as being representative of an average year with diversion / depletions measured at about 43,700 acre-feet. These values may be adjusted slightly upward due to accuracy issues with certain measurements.

Middle and Upper Basins

Based on dry year calculations, there are currently about 6400 acres of actively irrigated land that diverts about 12,100 acre-feet of water, of which 10,700 acre-feet are estimated to be depleted. Under average year conditions, there are an estimated 7800 irrigated acres with diversions and depletions of 16,800 acre-feet and 15,200 acre-feet, respectively. The actively irrigated acreage within the places of use of the recommended water rights, in an average year, is several thousand acres less than the IDWR recommended irrigated water rights acreage.

Total Basin

In the 1990 Agreement, the North Side Users were estimated to divert no more than 45,000 acre-feet per year. Based on the preliminary findings to date, the diversions in a dry year are 53,900 acre-feet and they increase to 60,500 acre-feet in an average year. These totals are based on an assessment of actively irrigated lands which was independent of the IDWR water right recommendations. Therefore, the totals include some irrigated lands that are outside the places of use for recommended water rights and exclude lands with recommended water rights found to not be actively irrigated.

These results establish the need to negotiate an Equitable Adjustment for the Tribal Water Right from the Blackfoot River. There are, unfortunately, a number of additional key issues that must be addressed by the Parties before the Equitable Adjustment calculation can be finalized. These elements are addressed in the following section.

UNRESOLVED ISSUES

The Team has identified a number of issues that must be resolved by the Parties before a final Equitable Adjustment quantity can be established. They are summarized below.

1. **Should irrigated acreage that extends outside recommended water rights boundaries be included?** There are extensive acres in the lower, middle and upper Blackfoot basins that are irrigated in dry or average years that are not included in a Director's recommended water right. Under the terms of the Agreement, we understand that these acres are not eligible for the benefit of the priority protection and should be excluded. IDWR should make every effort to contact these water users and let them know the consequences of their decision to not have a water right decreed for all their irrigated land in the SRBA. It is assumed that these owners will take the necessary steps to establish these water rights. If the acres are subsequently covered by a water right decreed in the SRBA and otherwise meet the terms of the Agreement, the acreage will need to be included. As previously noted, the diversions for these lands are presently included in the current Blackfoot River basin diversion totals.
2. **Should the significant acreage within the recommended water rights boundaries that shows no recent irrigation be included? If not, should the recommended water rights be reduced?** There are several thousand acres in the lower, middle and upper Blackfoot basins that are covered by recommended water rights that appear to have been idle for decades. It is assumed IDWR had ample evidence of an existing water right for these rights to be recommended to the SRBA court and to be eligible for the priority protection benefit of the Agreement. These acres should be monitored, preferably by IDWR, after entry of the partial decree and, at the end of 5 years of non-use, a forfeiture proceeding should be initiated to minimize the anticipated burden placed on water users to accomplish the Equitable Adjustment. If these tracts resume irrigation, then diversion quantities would increase and a modification must be made to the Equitable Adjustment.
3. **Should CRP lands in areas of firm water supplies be included or not?** There are several hundred acres of CRP lands in the lower, middle and upper Blackfoot River basins. These lands are included in the current diversion totals. It is recommended that these acres be extracted and a re-opener provision be included in the Equitable Adjustment to accommodate these lands should they go back into production.
4. **Should long-time idle acreage, within recommended water right service area boundaries, that are located along the Blackfoot River be included as recently irrigated since they can be put quickly back into active use?** There are several hundred acres of land that fall into this category. These tracts fall into Issue No 2 above. They should, however, be closely monitored by IDWR since they are associated with a firm water supply. The water rights associated with these lands are not eligible for transfer until they have been put fully back into use and the Equitable Adjustment volume modified.
5. **How should lands that have July 1 cutoff dates but divert water during the full irrigation season be addressed?** There are a few hundred acres in the middle and upper basins that have a season of use ending on July 1 but continue to divert water the full irrigation season. It is recommended that these water users be contacted by IDWR and be given the opportunity to provide proof that would permit their water rights to be decreed as full season water rights. If the water users fail to or are unable to provide such proof,

the water use must be cut back to be within the decreed parameters of the right and enforced accordingly. If a full season right is obtained, the Equitable Adjustment quantity must be modified.

6. **There are extensive groundwater irrigated tracts in the lower basin that have the right to convert back to surface water use. How should these lands be addressed?** There are several thousand acres in the lower Blackfoot basin currently being irrigated by ground water but have available a surface water right from the Blackfoot River that can be used if ground water is no longer utilized. These lands were not considered in the Agreement and are not protected. It is recommended that these acres not be included at this time but a re-opener provision be included in the Equitable Adjustment to accommodate these lands should they go back to using Blackfoot River water for irrigation instead of ground water.
7. **There is insufficient documentation as to how Snake River injected flows were addressed in the 1990 Agreement. However, all lower basin ditches have recommended rights from the Blackfoot River. Should this issue be dismissed?** It is recommended that this issue be dismissed because it either has no effect or minimal effect on the need for or the amount of Equitable Adjustment.

It is proposed that these areas of concern be immediately addressed by the respective Parties so that final Equitable Adjustment values can be established. The Team recommends a meeting with IDWR to go over our findings and then a joint meeting of the Parties to establish that there is a clear understanding of these key seven (7) issues need resolution. A work plan can then be established to finalize the work product.

Attachment 2: Preliminary Report, Equitable Adjustment Assessment

Submitted to the SRBA Court as Exhibit B to the Governmental Parties' Joint Status Report on
August 27, 2008.

PRELIMINARY REPORT, EQUITABLE ADJUSTMENT ASSESSMENT

(Prepared by the federal, tribal, state technical team)

Updated in Italic in Preparation for the July 30, 2008 Status Conference

INTRODUCTION

On July 5, 1990, the Shoshonè-Bannock Tribes, the State of Idaho, the United States, and the Committee of Nine, (the Parties,) entered into an Agreement to settle the water rights claimed by the United States for the benefit of the Shoshone-Bannock Tribes (Tribes). On August 2, 1995, the presiding judge of the Snake River Basin Adjudication (SRBA) entered an Order approving the Agreement and decreeing water rights to the United States for the benefit of the Tribes.

The decree recognizes the Tribes' federal reserved right to use direct flow water from the Blackfoot River, with a senior priority date of 1867, up to an annual diversion of 150,000 acre-feet per year. However, the Tribes and United States agreed to exercise this water right such that persons diverting direct flow from the Blackfoot River prior to January 1, 1990, whose rights are decreed in the SRBA, hereinafter North Side Users or NS Users, will continue to receive their full entitlement under State law. The NS Users were estimated to divert not more than 45,000 acre-feet of water per year (AFY). If the NS Users are, in effect, diverting greater than 45,000 AFY, then the Parties agreed to negotiate an Equitable Adjustment to the Tribal water rights to account for this incremental increase in use.

The Idaho Department of Water Resources (IDWR), acting as the Blackfoot River watermaster, has carried out a water diversion measurement program for many of the NS Users from 2004 to 2008. Most of the major NS Users are located downstream of the USGS Blackfoot River stream gaging station at Shelley, Idaho. In addition, IDWR, in 2005, submitted a Director's Report which recommended water rights to be decreed by the SRBA Court but did not include volume limits on surface water rights. A review of the recent diversion measurements plus the nature and extent of the recommended surface water rights resulted in the preliminary conclusion that present diversions are more than the 45,000 acre-feet estimate. Allowable additional diversions that are not currently exercised could further add to the volume difference. As such, an Equitable Adjustment assessment is required.

To assist in refining diversion estimates, the United States and State of Idaho funded an expanded ditch diversion measurement program for essentially the July to September period in the middle (Wolverine Creek to Blackfoot Dam) and upper (above Blackfoot Dam) Blackfoot River watersheds in water year 2007. This supplemental measurement program provides important additional information on water use throughout the basin. Unfortunately, water year 2007 was a low flow year but the new diversion records allow meaningful assessments to be completed relative to the nature and extent of actual diversions taking place on the ground.

In 2008 IDWR continued its effort to improve data collection and interview water users to expand the understanding of water use by the NS Users in the Blackfoot River basin. Once again, 2008 was not a normal year and the cool late spring minimized the need to divert water for irrigation in the middle and upper Blackfoot River watersheds until later in the year and some water users with water rights whose season of use ends July 1 may not have diverted at all in 2008. In spite of the unusual conditions, the additional data and knowledge gained by IDWR make it possible to further refine the annual diversion volume of the NS Users.

A Technical Team (Team) of federal, state and tribal experts was established to facilitate the development of defensible estimates of recent diversions by the NS Users under dry and average year conditions. This Team was secondarily charged with addressing the effects of these diversions on water supplies available to be diverted from the North and Main Canals of the federal Fort Hall Irrigation Project. These results were to be compared to the 45,000 acre-feet Agreement base case assumptions. The Team was also responsible to identify key issues that must be further researched to facilitate final conclusions to be developed relative to the nature and extent of the Equitable Adjustment.

TECHNICAL APPROACH

Background Information

The 45,000 acre-foot diversion limit is for the entire Blackfoot River basin. However, for ease of assessment, the area of study was divided into a lower basin (downstream of the confluence of Wolverine Creek with the Blackfoot River to the mouth of the Blackfoot River) and the middle and upper basins. Historic diversions (2004 to 2008) are recorded for the majority of the lower basin while only limited diversion data are available for the middle and upper basins.

Currently irrigated acreage and ditch delivery information is available for the lower basin and additional information from 2008 is available to aid with estimates of current, recent and long-term idle acreage and associated water delivery infrastructure for the middle and upper basins. The IDWR Directors Report and associated exhibits were of major assistance.

Evapotranspiration and net irrigation requirement estimates for key crops in the area of study are available from the State of Idaho website. These values are determined to be sufficient for use in the study.

Lower Basin

Representatives from the Team had previously developed exhibits of surface and groundwater service areas and associated delivery systems for the lower basin service area. Several work sessions have been completed among the Team members and with IDWR to review the accuracy of the detailed exhibits and to verify the locations of diversions, measurement points and return flow nodes. Improvements have been made to maps and estimates of water diversions. The Team concluded that all Northside Water User diversions below the USGS, at Shelley, gaging station provided essentially no return flow above the Fort Hall Irrigation Project North and Main Canal diversions. As such, it was concluded that diversions equal depletions in the lower basin study area.

The Team then analyzed the IDWR diversion measurement records from 2004 to 2008. The Team is in general agreement with the recorded diversion values. The measurement accuracy is felt to be improving over time. There are some questions on selected power record calculations for diversions but these values are associated with minor water users. There is also a question as to whether the Younnie Ditch diversions are fully accounted for. These values can be refined with additional study.

Middle and Upper Basins

Extensive work was required to identify lands that are currently or have been recently irrigated. Points of diversion and conveyance systems were also mapped. Long-term idle lands were also identified. These are tracts that currently have non-functional irrigation systems and appear to be abandoned. Some of these lands fall within IDWR recommended water rights places of use. As such, they needed to be documented.

The places of use relative to the state recommended water rights base were used to establish the initial study boundaries. Aerial photo coverage for the 1980, 1987, 1988, 1992, 2004, and 2006 time periods were used to photo-interpret the irrigated land base. Most of the noted photography was stereoscopic and observed under a 3X ocular Lietz, MS-27 stereoscope. This markedly improved the quality of irrigated land mapping. This range of aerial photo coverage represented dry and average year runoff time frames and coincided with work products used by IDWR to develop conclusions on recommended water rights. Members of the Team performed aerial over-flights of the entire study area in late June and late July of 1999. Notes from these observations were valuable in confirming the photo interpretation. Several on-ground field investigations were completed by Team members over the last decade that further assisted in refining the mapping results.

Preliminary mapping of the historically irrigated land base was submitted to IDWR to assist them in the 2007 diversion measurement program. IDWR developed a numerical code that tied each measured diversion to a specific water right and/or owner. Extensive irrigated land tracts were found that had no recommended water rights plus multiple areas where none or only a portion of the recommended water right service area was irrigated. Further, the IDWR measurement sites (due to time/budget constraints) provided only partial coverage of all identified diversions. As such, diversion quantity estimates had to be independently developed for a large number of sites. These volumes were established from similar diversions that were measured.

Therefore, 30 comprehensive irrigated land maps were developed for the middle and upper basin study areas. Historically irrigated lands were identified as being either actively irrigated or long-term idle. Active irrigation was further divided into two categories based on water availability. Use was made of IDWR diversion records and monthly stream flow measurements made by BIA for most of the tributaries to the Blackfoot River in the area of study to evaluate supply. IDWR's interviews with several of the major water users and these inputs assisted in interpreting the diversion measurement data and aerial photo interpretation results. The first active irrigation category identifies those lands that would generally receive water during a dry year. The second category defined additional lands that appeared to be irrigated during average runoff periods. All of these irrigated land types were quantified.

A schematic accompanied each of the 30 irrigated land maps. For each primary point of diversion, summaries were presented relative to estimated active irrigation uses and associated recommended water right acreage, peak use rates and periods of use. The points of diversion were numbered so that they could be cross referenced to the IDWR diversion measurement program results for the 2007 irrigation season. Sources of supplies were documented so that the respective streams could be correlated to the monthly BIA stream gaging results.

An additional set of maps has been prepared reducing the number of categories mapped. The revised maps show land identified as being irrigated with a recommended water right, land identified as being irrigated without a recommended water right, and land identified as not recently irrigated with a recommended water right. This change in approach was, in part, an attempt to develop a single annual diversion amount rather than an average year amount and a dry year amount.

The Team then completed an assessment of diversion quantities for each drainage in the Upper and Middle Basins by point of diversion. The initial step was to develop estimates of diversion quantities for each point of diversion measured in dry year 2007. Unit diversions for estimated actively irrigated acreage were then established. These results were compared with calculated crop consumptive irrigation requirements for selected crops, periods of use and estimated ditch efficiencies. Cross checks were made against BIA monthly stream flow measurements in the drainage plus levels of water use identified on the aerial photographic coverage. The IDWR measured results seemed reasonable for a dry year. Using the same informational sources plus the results of the limited interviews with the water users in 2007, estimates were made of anticipated water diversions for estimated active irrigation in average years. Results were reviewed for reasonableness. Those diversions which were not measured in 2007 were correlated to similar diversions and irrigation use levels that had been measured by IDWR.

Most of the unit diversions were less than 2.5 acre-feet per estimated actively irrigated acre. As such, diversions were projected to be fully depleted. For service areas with larger diversions, depletions were estimated based on the crop consumptive irrigation requirement (generally grass pasture) plus irrecoverable losses of one-third of the potential return flow. An analysis was undertaken to evaluate whether adjustments should be made to crop water requirements relative to elevation. Elevation was documented as having only minor differences in the values calculated in the middle and upper basins and adjustments were not implemented.

RESULTS

Lower Basin

As previously documented, diversions were estimated to be depletions. Water year 2007 was designated as a dry year and diversions/depletions were measured at about 41,800 acre-feet. Water year 2006 was identified as being representative of an average year with diversion/depletions measured at about 43,700 acre-feet. These values may be adjusted slightly upward due to accuracy issues with certain measurements.

Diversions and uses are better understood and the team and IDWR have some confidence all diversions in the lower basin have been identified and accounted for. The diversion amounts noted above were actual diversions without regard to limitations due to diversion limits within the underlying water rights. The five year average diversions in the lower basin for 2004 through 2008, when capped by the water right diversion rate¹, is 39,092 acre-feet per year.

¹ The diversion rate cap was applied by multiplying the water right(s) diversion rate by a 153 day season of use to determine the maximum annual diversion volume. If this amount was less than the actual diversion the cap amount was used to determine the 5 year average instead of the actual diversions. Actual diversions will be regulated by the Watermaster in the future to limit the diversion of Blackfoot River natural flow to the amount of the water right.

Middle and Upper Basins

Based on dry year calculations, there are currently about 6,400 acres of actively irrigated land that diverts about 12,100 acre-feet of water, of which 10,700 acre-feet are estimated to be depleted. Under average year conditions, there are an estimated 7,800 irrigated acres with diversions and depletions of 16,800 acre-feet and 15,200 acre-feet, respectively. The actively irrigated acreage within the places of use of the recommended water rights, in an average year, is several thousand acres less than the IDWR recommended irrigated water rights acreage.

These estimates have been refined to an annual diversion amount of 17,407 acre-feet per year for currently irrigated acreage. This diversion volume is for existing irrigated acres with currently recommended water rights and those irrigated lands for which the owner is actively pursuing establishing the water right.

Total Basin

In the 1990 Agreement, the North Side Users were estimated to divert no more than 45,000 acre-feet per year. Based on the preliminary findings to date, the diversions in a dry year are 53,900 acre-feet and they increase to 60,500 acre-feet in an average year. These totals are based on an assessment of actively irrigated lands which was independent of the IDWR water right recommendations. Therefore, the totals include some irrigated lands that are outside the places of use for recommended water rights and exclude lands with recommended water rights found to not be actively irrigated.

As noted above, the annual diversion volume for the basin has been revised to 56,499 acre-feet per year.

These results establish the need to negotiate an Equitable Adjustment for the Tribal Water Right from the Blackfoot River. There are a number of additional key issues, most of which have been addressed by the Parties such that the Equitable Adjustment calculation can be finalized. These elements and their proposed resolution are addressed in the following section.

UNRESOLVED ISSUES

The Team has identified a number of issues that must be resolved by the Parties before a final Equitable Adjustment quantity can be established. They are summarized below.

- 1. Should irrigated acreage that extends outside recommended water rights boundaries be included?** There are extensive acres in the lower, middle and upper Blackfoot basins that are irrigated in dry or average years that are not included in a Director's recommended water right. Under the terms of the Agreement, we understand that these acres are not eligible for the benefit of the priority protection and should be excluded. IDWR should make every effort to contact these water users and let them know the consequences of their decision to not have a water right decreed for all their irrigated land in the SRBA. It is assumed that these owners will take the necessary steps to establish these water rights. If the acres are subsequently covered by a water right decreed in the SRBA and otherwise meet the terms of the Agreement, the acreage will

need to be included. As previously noted, the diversions for these lands are presently included in the current Blackfoot River basin diversion totals.

The irrigated acres in this category have been discussed with IDWR and many of the land owners were contacted. A few owners are taking active measures to have their water rights corrected to include the acreage shown to be irrigated. The diversion amounts for these acres are included in the annual total diversion volume. Those acres that the owners are not taking active measures to include in a valid water right are not included in the annual volume. The Watermaster will be responsible for ensuring lands without valid water rights will not be irrigated in the future.

2. **Should the significant acreage within the recommended water rights boundaries that shows no recent irrigation be included? If not, should the recommended water rights be reduced?** There are several thousand acres in the lower, middle and upper Blackfoot basins that are covered by recommended water rights that appear to have been idle for decades. It is assumed IDWR had ample evidence of an existing water right for these rights to be recommended to the SRBA court and to be eligible for the priority protection benefit of the Agreement. These acres should be monitored, preferably by IDWR, after entry of the partial decree and, at the end of 5 years of non-use, a forfeiture proceeding should be initiated to minimize the anticipated burden placed on water users to accomplish the Equitable Adjustment. If these tracts resume irrigation, then diversion quantities would increase and a modification must be made to the Equitable Adjustment.

There are an estimated 1,900 acres of land with a recommended water right that are not currently being irrigated noted as "Inactive Recommended Right" on accompanying maps. The proposal is to verify this acreage and estimate a water duty per acre that will be added to the annual diversion volume should any of these lands become actively irrigated. Irrigation of any of these acres in the future should not result in reinitiation of a formal procedure but rather the application of the previously established water duty to the number of acres brought into irrigation.

3. **Should CRP lands in areas of firm water supplies be included or not?** There are *several* hundred acres of CRP lands in the lower, middle and upper Blackfoot River basins. These lands are included in the current diversion totals. It is recommended that these acres be extracted and a re-opener provision be included in the Equitable Adjustment to accommodate these lands should they go back into production.

The recommendation for these rights remains the same. Some, if not all, of these water rights are in the water supply bank and some action with IDWR will be required to put them back to use. The team anticipates the water duties anticipated in Item 2. may be applicable to these lands as well.

4. **Should long-time idle acreage, within recommended water right service area boundaries, that are located along the Blackfoot River be included as recently irrigated since they can be put quickly back into active use?** There are several hundred acres of land that fall into this category. These tracts fall into Issue No 2 above. They should, however, be closely monitored by IDWR since they are associated with a firm water supply. The water rights associated with these lands are not eligible for

transfer until they have been put fully back into use and the Equitable Adjustment volume modified.

See also Item 2. above.

5. **How should lands that have July 1 cutoff dates but divert water during the full irrigation season be addressed?** There are a few hundred acres in the middle and upper basins that have a season of use ending on July 1 but continue to divert water the full irrigation season. It is recommended that these water users be contacted by IDWR and be given the opportunity to provide proof that would permit their water rights to be decreed as full season water rights. If the water users fail to or are unable to provide such proof, the water use must be cut back to be within the decreed parameters of the right and enforced accordingly. If a full season right is obtained, the Equitable Adjustment quantity must be modified.

Water rights with the July 1 cutoff date will be regulated to that season of use. If claimants are successful in obtaining a longer season of use for any of their rights the Equitable Adjustment quantity must be modified.

6. **There are extensive groundwater irrigated tracts in the lower basin that have the right to convert back to surface water use. How should these lands be addressed?** There are several thousand acres in the lower Blackfoot basin currently being irrigated by ground water but have available a surface water right from the Blackfoot River that can be used if ground water is no longer utilized. These lands were not considered in the Agreement and are not protected. It is recommended that these acres not be included at this time but a re-opener provision be included in the Equitable Adjustment to accommodate these lands should they go back to using Blackfoot River water for irrigation instead of ground water.

This recommendation remains the same. Most of the lands are covered by surface water rights whose annual diversion is presently limited by the diversion rate of their respective water rights. If additional acres are to be served under these water rights no additional diversion volume would be available under the water right. At least two water users presently using ground water have their own surface water rights, one from Sand Creek and the other from the Blackfoot River, and could increase diversions in the lower basin if they reverted from ground water back to surface water.

7. **There is insufficient documentation as to how Snake River injected flows were addressed in the 1990 Agreement. However, all lower basin ditches have recommended rights from the Blackfoot River. Should this issue be dismissed?** It is recommended that this issue be dismissed because it either has no effect or minimal effect on the need for or the amount of Equitable Adjustment.

This recommendation remains the same with the additional provision that the Watermaster will need to account for Snake River water diverted by the various canals. Since a number of canals will be limited by the diversion rate of their Blackfoot River water right, any additional diversion of Snake River water will require the Watermaster be certain Snake River water is actually being provided from the Snake River.

It is proposed that these areas of concern be immediately addressed by the respective Parties so that final Equitable Adjustment values can be established. The Team recommends a meeting with IDWR to go over our findings and then a joint meeting of the Parties to establish that there is a clear understanding of these key seven (7) issues need resolution. A work plan can then be established to finalize the work product.

This report is being updated with the benefit of input from IDWR and is intended to aid the Parties prepare for the July 30, 2008 Status Conference. The technical team does propose to make one final revision to the annual diversion quantities when the final 2008 diversion quantities are available. Any adjustment is not anticipated to be large but would improve the confidence in the final total annual diversion volume quantity. Additionally, there are currently efforts by some claimants to modify their recommendations that may be completed in the next few months. The revised report could include any changes in the annual diversion volume based upon successful modifications to recommended rights that are completed over the next few months.

Attachment 3: Memo: Basin 27 – Estimated Total Annual Diversion

Submitted via email to the Blackfoot River Technical Team on December 4, 2008.

MEMO

TO: Blackfoot River Technical Team
FROM: James Cefalo, Water District 27
DATE: December 3, 2008
RE: Basin 27 - Estimated Total Annual Diversion

I decided to review and update my annual diversion calculations one last time, incorporating recent changes to the underlying data. I finally found time to review and confirm the Basin 27 recommended water rights. In doing so, I found a few items that needed to be adjusted (periods of use, combined diversion rate limits). I updated the Basin 27 Summary accordingly. An updated copy of the Basin 27 Summary is attached. In addition, the 2008 Accounting was finalized. In most cases, the actual 2008 diversions ended up higher than projected. These changes were also incorporated into my diversion calculations.

The changes had little effect on my estimated totals. In fact, the changes brought my calculations more closely in line with the estimates from NRCE. My calculations show an estimated total annual diversion from ~~49,000 AF~~ to ~~50,000 AF~~. I believe this confirms the totals that were agreed upon at our September meeting.

I have attached the worksheets containing my underlying calculations. I am doing so simply to maintain a complete record. At this point, there is no need to perform a detailed review of these documents. They are fundamentally unchanged. The Technical Team has agreed on the general method used to determine the total annual diversion and agrees on the general range of the current diversion. Although there is some variance in the way each of us processed the data, I agree with Brett -- there is little value in tracking down every little difference. The remainder of this Memo summarizes the process used to reach my estimate.

I. Lower Region (w/o Pumps)

A. Total Diversions 2004 – 2008 (w/o Pumps)

~~"2004-2008 Excess Use"~~

Total Diversion 2004 = 40,952 AF
2005 = 39,537 AF
2006 = 42,773 AF
2007 = 42,336 AF
2008 = 44,828 AF

B. Reductions 2004 – 2008

1. Diversion Beyond Rights ~~“2004-2008 Excess Use”~~ and ~~“Blackfoot Summary”~~

Excess (beyond rights): 2004 = 6,100 AF
2005 = 6,152 AF
2006 = 10,169 AF
2007 = 7,647 AF
2008 = 10,729 AF

2. Diversion Beyond Available Natural Flow ~~“Available Flow Overuse”~~

Excess (beyond available natural flow): 2004 = 170 AF
2005 = 0
2006 = 0
2007 = 5,599 AF
2008 = 56 AF

C. Total Adjusted Diversions 2004 – 2008 (w/o Pumps)

Total Adjusted Diversion 2004 = 34,682 AF
2005 = 33,385 AF
2006 = 32,604 AF
2007 = 29,090 AF
2008 = 34,043 AF

II. Lower Region Pumps

A. Discussion of Work

The Bryce Fielding Pump has been incorporated into this section. It is not included in the Middle/Upper figures below.

Some of the pumpers occasionally exceed their water rights. Because it seems to occur infrequently, however, I disregarded any water right excess use by the pumps. Reduction related to natural flow is already incorporated in Section I.B.2 above.

The accounting for the pumps prior to 2008 is not entirely reliable. Totals reported in the annual accounting were often estimates based on pump sizes. The 2008 accounting is more reliable because it is largely based on actual measurements. Fortunately, we have some power meter data from 2005-2007. Using the 2005-2007 power meter readings and actual measurements from 2008, I was able to assemble a record for the 2004-2008 pump diversions.

B. Total Pumps 2004-2008

"Pumps 2005-2007" and "Blackfoot Acctg 2008"

Total Est. Pumps	2004 = 3,315 AF (average of 2005-2008)
	2005 = 2,839 AF
	2006 = 2,927 AF
	2007 = 3,553 AF
	2008 = 3,942 AF (2008 Accounting)

III. Lower Region Totals (Ditches + Pumps)

A. Total Diversions

Adding the values from Section I.C and Section II.B:

Total Lower Diversions 2004	= 37,997 AF (High)
2005	= 36,224 AF
2006	= 35,531 AF
2007	= 32,643 AF (Low)
2008	= 37,985 AF
Average	= 36,076 AF

IV. Middle/Upper Active Diversions

A. General Discussion

The worksheet titled "Middle-Upper Summary" is the product of countless meetings and discussions by the Technical Team. The process began by analyzing maps created by HKM. The Technical Team discussed every area identified on the maps as potentially irrigated. Assumptions were made regarding old ditches, neighboring properties, consumption rates, and available water supplies. The Technical Team also looked at actual measurements from recent years, historical irrigated acreage, and possible expansions of use. There is not room in this short memo to lay out the process used for arriving at every individual number. It is sufficient to say that every value shown in the Middle-Upper Summary was carefully considered by the Technical Team.

The Middle-Upper Summary was meant to be an estimate of the highest possible diversion by water rights that are currently active. Conversely, I believe that the 2008 Accounting represents the lowest possible diversion by the water rights that are currently active. The spring of 2008 was cold and wet, causing many of the water users to divert less than usual. Using these assumptions, the Middle/Upper Estimates become:

Middle/Upper (High)	= 16,164 AF
Middle/Upper (Low)	= 11,771 AF

"Middle-Upper Summary"
"Blackfoot Acctg 2008"

V. Inactive Diversions / Water Bank

In addition to calculating the estimated current diversion rate in the Upper and Middle Regions, the Technical Team made a summary of the water rights that are inactive or that are protected from forfeiture in the Idaho Water Bank. The Technical Team estimates that an additional 1,200 AF could be diverted in the Upper and Middle Regions if the inactive rights began to divert water. The Technical Team estimates that the water rights in the Idaho Water Bank (Munns and Lewis Brothers Inc.) could divert 2,200 AF per year if they resumed diversion. These numbers are not incorporated into the totals shown below.

VI. Total Basin Diversions (Active)

I believe an inverse relationship exists between the Upper and Lower Regions. In dry/early spring/poor snowpack years, the Upper diversions divert more before July 1. In those years, however, the natural flow is more likely to decline, limiting the Lower diversions. In wet/late spring/good snowpack years, there is plenty of natural flow available to the Lower diversions throughout the entire irrigation season. However, in wet years, the Upper diversions are limited in the amount of water they are able to divert before July 1. It seems logical that the "High" estimate for the Upper Region should be paired with the "Low" estimate for the Lower Region and visa versa. This results in an Estimated Total Annual Diversion of ~~49,000 to 50,000 AF~~.

Lower Region	Middle/Upper Region	Total Diversion
37,997 (High)	11,771 (Low)	49,768 AF
32,643 (Low)	16,164 (High)	48,807 AF