

7-1596B (9-89)  
Bureau of Reclamation



# United States Department of the Interior

**BUREAU OF RECLAMATION**  
Great Plains Region  
Nebraska-Kansas Area Office  
P.O. Box 1607  
Grand Island, Nebraska 68802-1607

IN REPLY REFER TO

NK-100  
WTR-4.11 *ref*

**MAR 03 2005**

Upper Republican Natural Resources District  
PO Box 1140  
Imperial, NE 69033

Subject: Written Testimony, Upper Republican Natural Resources District (URNRD) Hearing

Dear Sir:

Enclosed is the written testimony of the Bureau of Reclamation, Nebraska-Kansas Area Office submitted for the public hearing records as conducted by the URNRD regarding the adoption of an Integrated Management Plan and Amendments to Rules and Regulations pertaining to Groundwater Control in the Upper Republican Natural Resources District.

Thank you for the opportunity to provide testimony and comments to your proposed rules and regulations. If you have any questions, please contact me at the above address or telephone 308-389-4622, extension 202.

Sincerely,

**ALICE E. JOHNS**

Alice E. Johns  
Area Manager

Enclosure

cc: Roger Patterson, Director  
Nebraska Department of Natural Resources  
P.O. Box 94676  
Lincoln, NE 68509-4676

Kenneth Nelson, Chairman  
Irrigation Project Reauthorization Council  
P.O. Box 165  
Courtland, KS 66939-0165

OFFICIAL FILE COPY		
DATE	SURNAME	CODE
3/2	<i>Johns</i>	Steve
3/2	<i>A. Johns</i>	Alice
Classification		
Project		
Control No.		
Folder I.D.		
Public		

*027*

Lee Orton, Attorney at Law  
1233 Lincoln Mall, Suite 201  
Lincoln, NE 68508

Mike Delka, Manager  
Bostwick Irrigation District in Nebraska  
P.O. Box 446  
Red Cloud, NE 68970-0446

Roy Patterson, Superintendent  
Frenchman-Cambridge Irrigation District  
P.O. Box 116  
Cambridge, NE 69022

Don Felker, Manager  
Frenchman-Valley and H&RW Irrigation Districts  
P.O. Box 297  
Culbertson, NE 69024  
(all w/enclosure)

bc: GP-1000 (Jaralyn Beek)  
GP-4500 (Gordon Aycock)  
GP-1270 (Donna Hirning)  
NK-100 (O'Sullivan)  
NK-300 (Kube)  
NK-400 (Swanda)  
(all w/enclosure)

WBR:AEJohns:treichert:3/2/05:308-389-4622  
Written Testimony – URNRD WTR-4.11



**Testimony of Alice E. Johns  
Area Manager**

**Regarding the Draft Integrated Management Plan Jointly Developed by the  
Department of Natural Resources and the Upper Republican Natural Resources  
District**

**March 3, 2005**

**History**

The devastating effects of a severe drought (Dust Bowl Years) in much of the western United States during the 1930s, and the Great Depression, were major contributors to the states' strong interest in seeking Federally-assisted water development in the Basin. In 1935, right in the midst of this extreme drought, the Republican River went on a rampage causing extreme flood damage as well as significant loss of life, and increasing the devastation to the economies within the Basin. The Flood of 1935 was the worst flood of record in the Basin. Rains as much as 18-24 inches fell in a short time in the upper Basin in eastern Colorado and runoff from these rainfall events combined with large inflows from tributaries along the way caused flooding throughout the Basin. These events and attendant impacts underlined the need to seek Federal assistance in the development of both water supply and flood control projects in the Basin.

**Compact**

Although the United States was not one of the original parties to the Republican River Compact (Compact), Reclamation was actively involved in the negotiating process. While Reclamation and the Corps of Engineers (Corps) were initially investigating water projects in the Republican River Basin, Reclamation requested that Kansas, Nebraska, and Colorado negotiate a compact allocating water equitably between the states. During the initial investigation of the Basin, Reclamation stated in a 1940 Reconnaissance Report on the Republican River Basin (Project Investigations Report No. 41): "To avoid expensive litigation as a result of possible conflicting uses of water in the various states, further developments for irrigation should be preceded by a three-state compact or similar agreement on use of water." The negotiations for this compact were entered into by the three states and the Compact was signed by the states and the representative of the United States on December 31, 1942. Ratification of the Compact by the States and the U.S. Congress followed in 1943. Reclamation assisted in the Compact negotiations by preparing hydrology investigations for the Basin. Reclamation anticipated that the individual states would protect the water rights associated with the Federal projects.

## **Project Development**

Once the Compact was finalized, the resulting water allocations laid the framework for planning and designing a system of reservoir and irrigation projects that could assist each of the states in developing their allocated share of the Republican River. Between the late 1940s and 1960s nine Federal dams and reservoirs were constructed in the Republican River Basin (Basin), seven of these were Reclamation projects and two were Corps projects. Six irrigation projects were also developed and irrigation districts were organized and formed to manage each of these projects. Each of these irrigation districts presently receive irrigation water from one or more of the Federal reservoirs in the Basin. The total project acreage served by these Federal projects is approximately 137,000 acres. The City of Norton, Kansas also receives municipal and industrial water from Keith Sebelius Lake, a Reclamation reservoir in Kansas. These reservoirs also provide significant recreation, fish and wildlife, and flood control benefits to the area. The projects that were constructed are now an integral part of the river system and the allocation of water for each state.

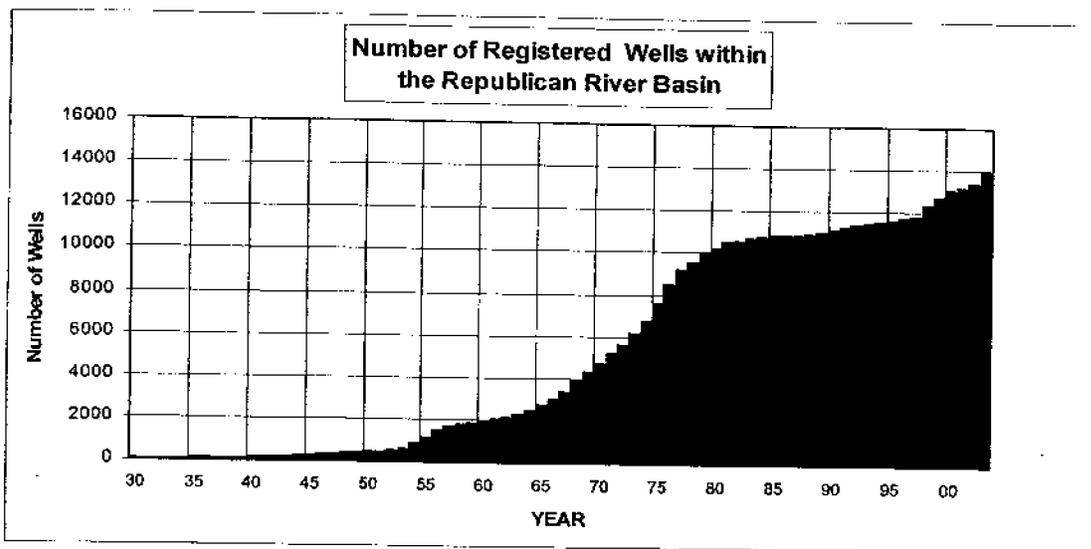
## **Cost of Projects and Repayment of Costs**

Construction costs associated with the Republican River Basin Reclamation projects totaled more than \$233,000,000. Construction costs assigned to the irrigation function were over \$139,000,000. Irrigation districts are responsible for repaying a portion of the irrigation construction costs, based on the ability of each irrigation district to repay these costs. Irrigation construction costs not repaid by irrigation districts are repaid by users of Federal hydropower generated on the Missouri River. This is known as "aid-to-irrigation". Of the approximate \$139,000,000 irrigation construction costs, about \$39,000,000 will have been repaid by districts, leaving approximately \$100,000,000 to be repaid by Federal power users.

The remaining construction costs were assigned to purposes such as flood control, recreation and fish and wildlife. These costs are not repaid to the Treasury and thus are borne by the Federal taxpayers.

## **Well Development**

An increase in groundwater wells in the Basin, for irrigation development, became particularly evident around 1960. Between 1960 and 1980 over 8,000 new irrigation wells were developed within 12 miles of a major stream in the Republican River Basin above Hardy, Nebraska. This time frame corresponds closely with a noticeable decline in river flows throughout the Basin. Base flow of many of these streams also declined providing a strong indication that there is a significant aquifer-streamflow interaction. These wells are likely intercepting groundwater that formerly discharged into the stream or they may be reversing the gradients to the streams, thereby inducing streamflow into the aquifer. The following graph shows the increase in the number of registered wells over time in Nebraska.



### Water Rights

In Nebraska, Reclamation has the storage rights associated with the Federal reservoirs as well as the storage use rights to use the water to supplement the irrigation districts' natural flow rights. The natural flow rights (larger rights) associated with the Federal projects have priority dates that vary from 1890 until 1954 and numerous small rights with later priority dates. For example, Frenchman-Cambridge Irrigation District has a natural flow water right for 38.70 cubic feet per second for Meeker-Driftwood Canal that has a priority date of December 22, 1890 and total natural flow water rights of 185.79 cubic feet per second that have priority dates prior to 1960. The diversion point for these water rights is at the Trenton Dam Canal Outlet Works. Another example is that Frenchman Valley Irrigation District has a natural flow water right for 130.86 cubic feet per second for Culbertson Canal with a priority date of May 16, 1890. Frenchman Valley Irrigation District has an additional natural flow right for 16.64 cubic feet per second and H&RW Irrigation District has natural flow rights totaling 139.04 cubic feet per second that have priority dates prior to 1960. The diversion point for these rights is at the Culbertson Diversion Dam near Palisade. The storage rights held by Reclamation vary in priority from 1946 through 1960. These dates are prior to the rapid increase in groundwater development.

### Water Supply

Surface water flows in the Basin have declined significantly since the late 1960s. In 1995, with several irrigation district water service contracts expiring, Reclamation and the districts entered into a process for renewal of these contracts. Studies prepared for the contract renewal process suggest that current stream and river flows were only 45 percent of the flows that were available when the Federal projects were first planned. In

1996, as part of the contract renewal process, Reclamation completed a Resource Management Assessment (RMA) study. Based on the findings for the RMA, there were 1,888,252 acres of total irrigated land located in the Basin in 1992, with the vast majority served from groundwater pumping. The report indicates that from 1964 until 1992 irrigated land in the Basin increased from 507,931 acres to 1,888,252 acres. Over this time frame surface water yield in the Basin declined significantly. The combined inflows into all of the Federal reservoirs above Harlan County Lake, a Corps project near the Nebraska-Kansas state line, averaged only 309,400 acre-feet per year for the period, 1984-2003. By comparison, the Definite Plan Reports (DPR), prepared for project planning purposes in the 1950s, show that, based on the historic records through the early 1950s, inflows were expected to average 662,900 acre-feet per year.

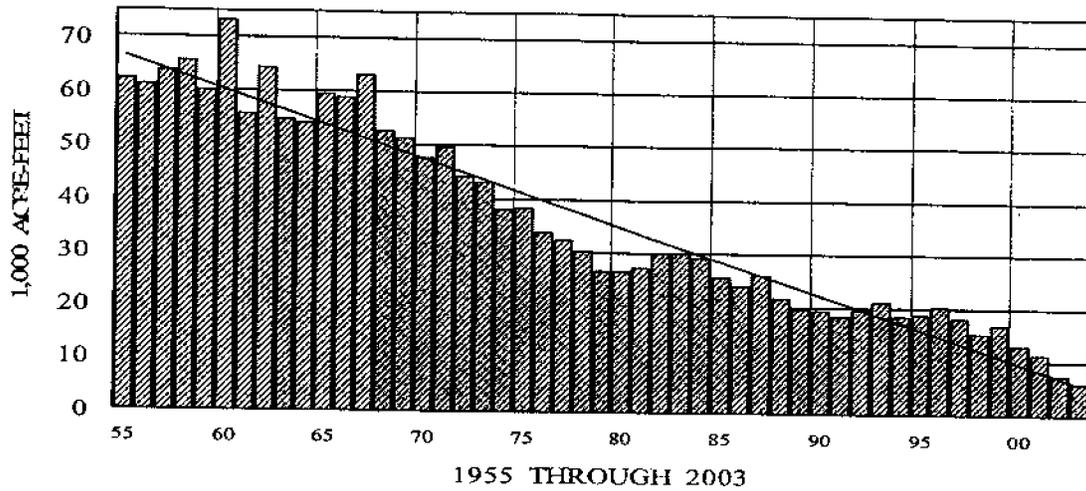
In general, the inflows to all reservoirs that serve Reclamation projects have declined at a significant rate since the projects were first developed. The following table shows the average flows that were included in the DPR's compared to the actual flows experienced since 1984.

RESERVOIR	Inflow Comparisons in Acre-Feet			ACTUAL 2003
	DPR AVERAGE	20 Yr. AVERAGE 1984-2003	5 Yr. AVERAGE 1999-2003	
BONNY	30,800	14,500	9,900	7,200
SWANSON	115,300	51,500	27,500	14,500
ENDERS	55,100	18,400	10,900	6,000
HUGH BUTLER	19,300	16,200	12,900	9,500
HARRY STRUNK	56,800	39,400	34,700	30,400
KEITH SEBELIUS	26,600	9,000	8,100	5,100
HARLAN COUNTY	359,000	160,400	111,000	38,500
TOTALS	662,900	309,400	215,000	111,200
Percentage of DPR		47%	32%	17%

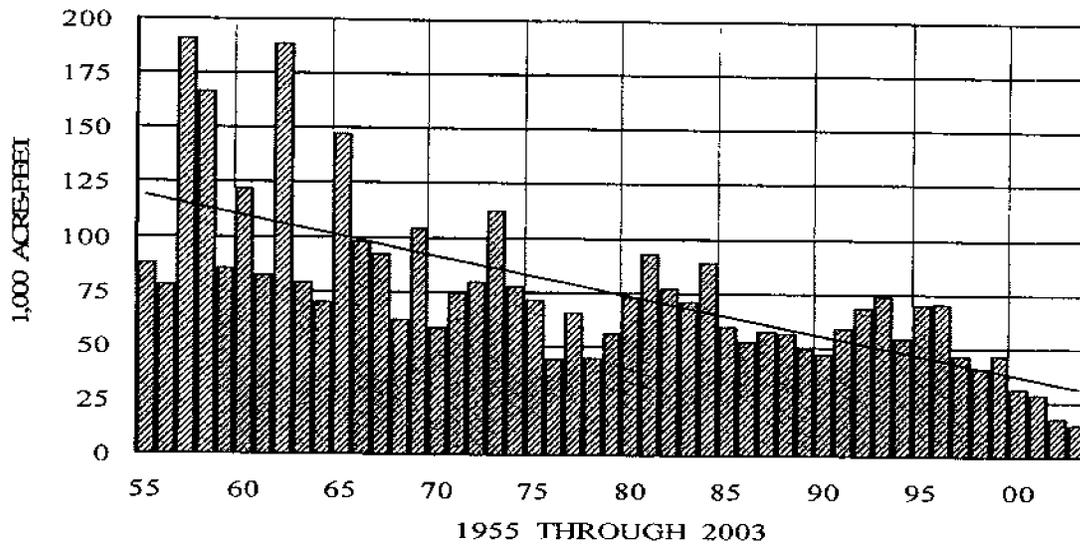
The only Federal reservoir located in the Upper Republican Natural Resource District (URNRD) is Enders Reservoir. However, Republican River inflows into Swanson Lake are also impacted by activities in the URNRD. It can be noted from the table that the inflow declines to these reservoirs are significant. The table shows the 2003 inflows for the listed reservoirs are only 17% of the flows expected in the DPR. For 2004, the computed inflows to Swanson Lake were 12,700 acre-feet and the computed inflows to Enders Reservoir were 4,800 acre-feet. The other reservoirs in the Basin had 2004 inflows near or less than the 2003 inflows. The total inflow for 2004 for all of the listed reservoirs was only 14% of the DPR flows.

The following graphs show the annual inflows for Enders Reservoir and Swanson Lake. The trend lines on each graph indicate the inflows are continuing to decline.

**ENDERS DAM & RESERVOIR  
YEARLY HISTORICAL INFLOW**



**TRENTON DAM and SWANSON LAKE  
YEARLY HISTORICAL INFLOW**

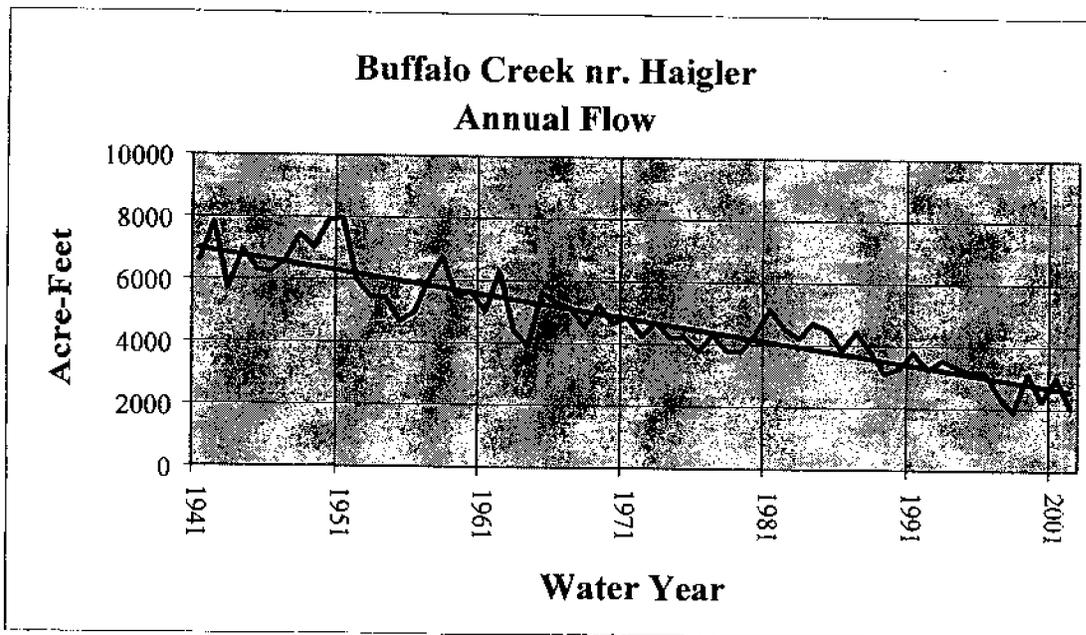


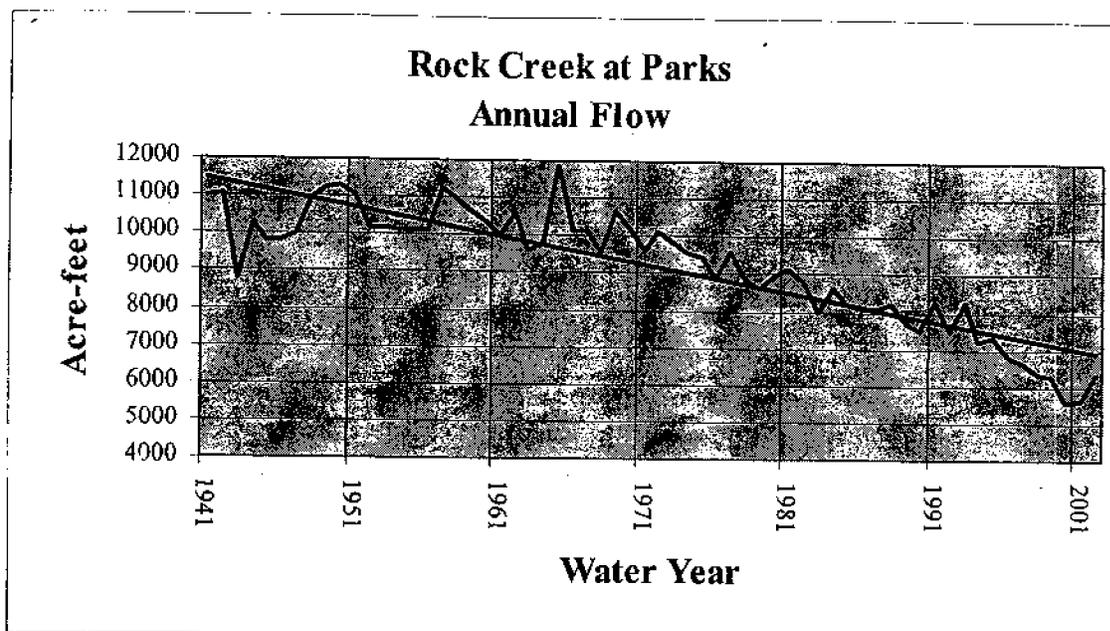
According to Reclamation's RMA study mentioned previously average base flow in selected streams that have drainage area in the URNRD have declined as shown in the following table.

### Average Annual Base Flow of Selected Streams

Stream	Period	Base Flow	Period	Base Flow	Decline
Frenchman Creek nr. Imperial	1942-67	42,000 AF	1984-93	16,700 AF	60%
Stinking Water Creek nr. Palisade	1950-76	21,500 AF	1984-93	16,700 AF	22%
Buffalo Creek nr. Haigler	1941-64	5,000 AF	1984-93	3,400 AF	42%

The following graphs show the annual flow for selected sites in the URNRD. The trend lines indicate that the flows are continuing to decline at these gauging stations.





**Federal Project Water Deliveries**

Reduced surface water supplies have caused project water deliveries, throughout the Basin, to decline over the last 40 years. Each irrigation district has experienced a declining water supply which in turn has caused a number of impacts including shortening of the season that water can be delivered, changes in cropping patterns, and in some years a reduction in total acres irrigated. During water-short years, irrigators have also planted shorter season varieties of crops which have less yield potential which usually results in less farm income. The total acres with project water have essentially remained the same, while the amount of water diverted and delivered to each acre has steadily declined. Activities in the URNRD directly impact the water supply for several canals associated with Federal projects in the Basin. The following table indicates the canal deliveries for several time periods showing a progressive decline in water deliveries to the farms.

WATER DELIVERIES – INCHES/ACRE

	CULBERTSON CANAL	CULBERTSON EXTENSION CANAL	MEEKER-DRIFTWOOD CANAL	BARTLEY CANAL
1965-1974	17.0	15.1	16.1	15.3
1975-1984	10.5	8.7	14.5	13.9
1985-1994	6.4	5.3	12.6	10.3
1994-2003	5.2	3.6	9.6	8.3
2004	3.1	0.0	0.0	0.0

The only canal that received water in 2004 was the Culbertson Canal and the water deliveries were all from natural flows as a limited amount of stored water was available.

Generally, the Definite Plan Reports for the projects estimated that approximately 1.5 feet of water delivered to the land would be necessary for full crop production. Due to the depletion of streamflow that has occurred since the projects were planned, water deliveries have fallen far below this level in recent years. Some of the impacts from this have been offset as irrigators have become more efficient in utilizing the water supply through improved technology and irrigation methods. Several districts have replaced some open-ditch laterals with pipe laterals, and Frenchman-Cambridge Irrigation District has replaced all of their open-ditch laterals with pipe. A number of irrigators are also converting to sprinkler irrigation systems in an effort to be more efficient.

**Specific Comments on the proposed rules and regulations for the Natural Resources District Management Area and the Integrated Management Plan**

**Rule 9. Republican River Compact Compliance, Article 9.01, Water Short Year Determination:** Reclamation uses September 30<sup>th</sup> data for the calculation so it would be after October 1<sup>st</sup> before the calculation is furnished to the Nebraska Department of Natural Resources.

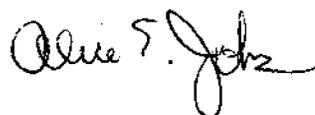
**Surface Water Controls – Department of Water Resources, Paragraph 2:** The second sentence could be rewritten for clarification.

**Conclusion and Final Statement**

Depletions to stream flows have resulted in reduced storage in Federal reservoirs as well as less flows being available for direct flow diversions into the canals that are a part of the Federal projects. The reduced water deliveries have reduced the economic benefits

provided by the projects. As a result, users of federal hydropower generated on the Missouri River will pay for a greater portion of the irrigation construction costs through "aid-to-irrigation". Other impacts associated with reduced streamflows include a reduction in reservoir levels in the Republican River Basin which reduces the recreational and fish and wildlife benefits associated with these projects.

I would like to note that the draft Integrated Management Plan states the goals and objectives of an integrated management plan must have as a purpose "sustaining a balance between water uses and water supplies so that the economic viability, social and environmental health, safety, and welfare of the river basin...can be achieved and maintained for both the near term and the long term". Sustained surface water inflows to the Federal reservoirs provide not only irrigation benefits, but also significant recreation and fish and wildlife benefits to the area. I would like to again note the water right priority dates associated with the Federal projects are prior to the dates that the majority of the groundwater development occurred. Therefore, in areas of groundwater-surface water interaction, I would request that specific consideration be given to surface water supplies for the Federal projects when establishing long-term and water-short year groundwater allocations.

A handwritten signature in black ink, appearing to read "Alice S. Johnson". The signature is written in a cursive style with a large, looped initial "A".