UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEVADA

UNITED STATES OF AMERICA, Plaintiff, WALKER RIVER PAIUTE TRIBE, Plaintiff-Intervenor, vs. WALKER RIVER IRRIGATION DISTRICT, a corporation, et al., Defendants.	IN EQUITY NO. C-125-RCJ-WGC Subproceeding: C-125-C 3:73-CV-00128-RCJ-WGC **NOTICE IN LIEU OF SUMMONS**
MINERAL COUNTY, Proposed-Plaintiff-Intervenor, vs. WALKER RIVER IRRIGATION DISTRICT, a corporation, et al., Proposed Defendants.	

FILED ___ RECEIVED
ENTERED ___ SERVED ON
COUNSEL/PARTIES OF RECORD

OCT 11 2016

CLERK US DISTRICT COURT
DISTRICT OF NEVADA
BY: _____ DEPUTY

TO: Megan Hunewill : (As _____ of _____).

To the above named Defendant:

You have been named as a Defendant in a civil action, because the district court substituted you as a successor in interest to Stanley Hunewill on September 7, 2016. A Notice of Motion and Motion for Intervention, Proposed Petition to Intervene, Amended Complaint in Intervention, and a Motion for Preliminary Injunction by Mineral County, Nevada, claiming a right to a minimum level of water for Walker Lake ("Intervention Documents"), which may affect the water rights that you (or the entity on whose behalf you are addressed) claim under the Walker River Decree have been filed in the United States District Court for the District of Nevada, Reno, Nevada, Case No. C-125. This matter has been assigned Subfile No. C-125-C,

docket number 3:73-cv-00128-RCJ-WGC. The Court granted Mineral County's Motion for Intervention on September 23, 2013. The district court issued an Order on May 28, 2015, dismissing the action. That Order is on appeal to the 9th Circuit Court of Appeals.

The time for responding to Mineral County's Complaint in Intervention will be established by further order of the Court. You are not required to respond to Mineral County's Complaint in Intervention until the Court establishes the time for responding to that pleading. You are not required to answer or otherwise respond to the Proposed Petition to Intervene or Amended Complaint in Intervention and Amended Memorandum of Points and Authorities until a schedule for doing so is established by further of the Court. Similarly, you are not required to respond to Mineral County's Motion for Preliminary Injunction and Points and Authorities in support thereof until a time for responding to that motion is established by further order of the Court.

You **are required**, within thirty (30) days after service of this Notice in Lieu of Summons upon you, to file with the Court and serve by mail on counsel for Mineral County, the Walker River Irrigation District, United States, Walker River Paiute Tribe, State of Nevada, State of California, and United States Board of Water Commissioners the attached Notice of Appearance and Intent to Participate. If you fail to do so, you shall nevertheless be deemed to have notice of subsequent orders of the Court and subsequent pleadings filed and served in this matter.

The materials in this package include ten (10) documents that you should review. These documents are listed in Attachment A to this Notice in Lieu of Summons and are explained below. Please note that two of these documents address the sale or other conveyance of your water rights. Please read these materials carefully, as they are important to your legal rights and legal obligations.

This package includes an Order Relating to Completion of Service that requires you to provide certain information to the Court and Mineral County.

The Order Relating to Completion of Service requires you to notify the Court and Mineral County within thirty (30) days of being served if you contend that you have been included in this litigation in error because at the time you were served, you claimed no water right under the Walker River Decree. If you contend that you have been included in this litigation in error, the Order Relating to Completion of Service also requires you to provide certain information and documents related to the transfer of water rights that would be part of this litigation. If you disclaim any water right in this litigation, you must comply with the Order Relating to Completion of Service and you may use the form entitled DISCLAIMER OF INTEREST IN WATER RIGHTS AND NOTICE OF RELATED INFORMATION AND DOCUMENTATION SUPPORTING DISCLAIMER, which is attached to the Order Relating to Completion of Service and included herein. You should review this Order carefully and retain it and all forms attached to it for your files.

The Order Relating to Completion of Service also provides that if, during the course of this litigation, you sell or otherwise convey ownership of all or a portion of any water right under the Walker River Decree, you may use the JOINT MOTION FOR SUBSTITUTION OF PARTIES FOLLOWING TRANSFER OF INTEREST FORM, which is attached to the Order Relating to Completion of Service and included herein, to substitute your successor(s)-in-interest. You should retain this Order and the attached form for use whenever appropriate during the course of this litigation. You may also wish to make additional copies of the form attached to the Order for use if you sell or otherwise convey ownership of applicable water rights on more than one occasion during the course of this litigation. Pursuant to the Order Relating to Completion of Service and other orders of the Court, even if a successor-in-interest is not substituted, the successor will nonetheless be bound by the final decision of the Court.

The STATEMENT NOTING DEATH form, which is attached to the Order Relating to Completion of Service and included herein, is for use by heirs or successors-in-interest should the named Defendant die during the course of this litigation. The contact information for the heir or successor must be included on that form. When a Statement Noting Death is filed with the Court, it must also be served on all parties listed on the form. After a Statement Noting Death is filed and served, any party to the case may move to substitute the proper successor-in-interest to the deceased Defendant. Pursuant to the Order Relating to Completion of Service and other orders of the Court, if no Statement Noting Death is filed, even if a successor-in-interest is not substituted, the successor will nonetheless be bound by the final decision of the Court.

DATED this 11 day of Oct., 2016.

LANCE S. WILSON, CLERK

Clerk of the Court

By: Brenda L. Herbert
Deputy Clerk

(Seal)

NOTICE IN LIEU OF SUMMONS
ATTACHMENT A

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UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEVADA

UNITED STATES OF AMERICA, Plaintiff, WALKER RIVER PAIUTE TRIBE, Plaintiff-Intervenor, vs. WALKER RIVER IRRIGATION DISTRICT, a corporation, et al., Defendants.	IN EQUITY NO. C-125-RCJ-WGC Subproceeding: C-125-C 3:73-CV-00128-RCJ-WGC **NOTICE IN LIEU OF SUMMONS**
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FILED ____ RECEIVED ____
ENTERED ____ SERVED ON ____
COUNSEL/PARTIES OF RECORD
OCT 11
CLERK US DISTRICT COURT
DISTRICT OF NEVADA
BY: ____ DEPUTY

TO: Jon and Betsy Elliott Family Trust: (As _____ of _____).

To the above named Defendant:

You have been named as a Defendant in a civil action, because the district court substituted you as a successor in interest to Stanley Hunewill on September 7, 2016. A Notice of Motion and Motion for Intervention, Proposed Petition to Intervene, Amended Complaint in Intervention, and a Motion for Preliminary Injunction by Mineral County, Nevada, claiming a right to a minimum level of water for Walker Lake ("Intervention Documents"), which may affect the water rights that you (or the entity on whose behalf you are addressed) claim under the Walker River Decree have been filed in the United States District Court for the District of Nevada, Reno, Nevada, Case No. C-125. This matter has been assigned Subfile No. C-125-C,

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DATED this 11 day of October, 2016.

[redacted]

Clerk of the Court

By: Deputy Clerk

(Seal)

NOTICE IN LIEU OF SUMMONS
ATTACHMENT A

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FOR THE DISTRICT OF NEVADA

UNITED STATES OF AMERICA, Plaintiff, WALKER RIVER PAIUTE TRIBE, Plaintiff-Intervenor, vs. WALKER RIVER IRRIGATION DISTRICT, a corporation, et al., Defendants.	IN EQUITY NO. C-125-RCJ-WGC Subproceeding: C-125-C 3:73-CV-00128-RCJ-WGC **NOTICE IN LIEU OF SUMMONS**
MINERAL COUNTY, Proposed-Plaintiff-Intervenor, vs. WALKER RIVER IRRIGATION DISTRICT, a corporation, et al., Proposed Defendants.	

TO: Jeff and Denise Hunewill Family Trust: (As _____ of _____).

To the above named Defendant:

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DATED this 11 day of Oct., 2016.

LANCE S. WILSON, CLERK

Clerk of the Court

By Brenda L. Harbet
Deputy Clerk

(Seal)

NOTICE IN LIEU OF SUMMONS
ATTACHMENT A

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10. **Mineral County's Motion for Preliminary Injunction and Memorandum of Points and Authorities and supporting affidavits (March 10, 1995).**

TREVA J. HEARNE, ESQ. (Bar No. 004450)
JAMES SPOO, ESQ. (Bar No.
ZEH, SPOO & HEARNE
450 Marsh Avenue
Reno, Nevada 89509
702/323-4599

Attorneys for Intervenor
MINERAL COUNTY OF NEVADA

FILED
OCT 25 2 31 PM '94
CARDL ...
BY JRH
DEPUTY

U.S. DISTRICT COURT
DISTRICT OF NEVADA
FILED
JAN 3 1995
CLERK, U.S. DISTRICT COURT
BY JRH DEPUTY

IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF NEVADA

UNITED STATES OF AMERICA, Plaintiff, WALKER RIVER PAIUTE TRIBE, Plaintiff-Intervenor, vs. WALKER RIVER IRRIGATION DISTRICT, a corporation, et al. Defendants.	IN EQUITY NO. ~~C-125s~~ Subfile No. ~~C-125-B~~ C-125-C **NOTICE OF MOTION AND MOTION OF MINERAL COUNTY OF NEVADA FOR INTERVENTION**

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ZEH, SPOO & ASSOCIATES
450 Marsh Avenue • Reno, NV 89509
Phone: (702) 323-4599 • Fax (702) 786-8183

WALKER RIVER IRRIGATION DISTRICT,

Petitioner,

vs.

CALIFORNIA STATE WATER RESOURCES CONTROL BOARD, W. DON MAUGHAN, EDWIN H. FINSTER, ELISEO M. SAMANIEGO, JOHN CAFFREY and DARLENE E. RUIZ, Members of the California Water Resources Control Board,

Respondents.

ZEH, SPOO & ASSOCIATES
450 Marsh Avenue • Reno, NV 89509
Phone: (702) 323-4599 • Fax (702) 786-8183

TO: ALL PARTIES AND THEIR COUNSEL OF RECORD

PLEASE TAKE NOTICE that MINERAL COUNTY, a nonprofit organization, moves this Court pursuant to Rule 24(a)(2), or in the alternative, Rule 24(b)(2), of the Federal Rules of Civil Procedure for an Order granting intervention in this action.

The grounds for this motion are as follows:

(a) MINERAL COUNTY claims an interest relating to the subject matter of this action and is so situated that the disposition of this action may as a practical matter impair or impede its ability to protect that interest, which may not be adequately represented by existing parties. FRCP 24(a)(2).

(b) MINERAL COUNTY's defense and the main action have a question of law or fact in common and intervention will not unduly delay the litigation or prejudice existing parties. FRCP 24(b)(2).

This motion is based on this Notice of Motion, the accompanying Memorandum of Points and Authorities, the Declaration of Kelvin J. Buchanan, Louis Thompson, Harold Staat, Marlene Bunch, and the proposed Petition in Intervention served and filed herewith, and papers and records on file herein.

DATED this 21st day of October, 1994.

ZEH, SPOO & HEARNE

BY _____
TREVA J. HEARNE
Attorney for Intervenor
MINERAL COUNTY OF NEVADA

ZEH, SPOO & ASSOCIATES
450 Marsh Avenue • Reno, NV 89509
Phone: (702) 323-4599 • Fax (702) 786-8183

CERTIFICATE OF MAILING

Pursuant to FRCP 5(b), I certify that I am an employee of the Law Office of ZEH, SPOO & HEARNE, and that on this date I caused to be mailed a copy of the attached **NOTICE OF MOTION AND MOTION OF MINERAL COUNTY OF NEVADA FOR INTERVENTION**, with postage fully prepaid to:

See attached Service List

DATED this 25th day of October, 1994.

MARILYN MITCHELL

ZEH, SPOO & ASSOCIATES
450 Marsh Avenue • Reno, NV 89509
Phone: (702) 323-4599 • Fax (702) 786-8183

ZEH, SPOO & ASSOCIATES
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Phone: (702) 323-4599 • Fax (702) 786-8183

SERVICE LIST

Shirley A. Smith
Asst. U.S. Attorney
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Reno, Nevada 89509

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Water Master
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Yerington, NV 89447

James T. Markle
State Water Resources Control Board
Post Office Box 100
Sacramento, CA 95814

John Kramer
Dept. of Water Resources
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Sacramento, CA 95814

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Classen & Olson
Post Office Box 1311
Bishop, CA 93514

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Water Resources Control Board
State of California
Post Office Box 2000
Sacramento, CA 95810

Linda Bowman
Vargas & Bartlett
Post Office Box 281
Reno, NV 89504

Mary Hackenbracht
Deputy Attorney General
State of California
2101 Webster Street
Oakland, CA 94612-3049

TREVA J. HEARNE, ESQ.
JAMES SPOO, ESQ.
ZEH, SPOO & HEARNE
450 Marsh Avenue
Reno, Nevada 89509
702/323-4599

Attorneys for Intervenor-Petitioner
MINERAL COUNTY OF NEVADA

FILED
OCT 25 2 30 PM '94
CLERK
BY JRH
DEPUTY

U.S. DISTRICT COURT
DISTRICT OF NEVADA
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IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF NEVADA

UNITED STATES OF AMERICA, Plaintiff, WALKER RIVER PAIUTE TRIBE, Plaintiff-Intervenor, vs. WALKER RIVER IRRIGATION DISTRICT, a corporation, et al. Defendants.	IN EQUITY NO. ~~C-125s~~ Subfile No. ~~C-125-B~~ C-125-C **MINERAL COUNTY'S PROPOSED PETITION TO INTERVENE**

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WALKER RIVER IRRIGATION DISTRICT,

Petitioner,

vs.

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Respondents.

COMES NOW, Intervenor-Petitioner, MINERAL COUNTY OF NEVADA, by and through its attorneys of record, on its own behalf and for benefit of the citizens, residents, and users of Walker Lake, and claims as follows:

I.

INTRODUCTION

1. This claim is made for recognition of a right of minimum level of water for Walker Lake by means of certain right being reserved and allowed to flow down the Walker River both east and west forks, in sufficient quantity to reach, replenish, and maintain Walker Lake. Such minimum levels are requested based upon sufficient water to sustain naturally occurring fish population.

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Phone: (702) 323-4599 • Fax (702) 786-8183

II.

JURISDICTION

2. Jurisdiction over this claim is pursuant to the continuing jurisdiction of this Court over the waters of the Walker River and its tributaries in California and Nevada; and the matter in controversy arises under the Constitution, laws, or treaties of the United States.

III.

PARTIES

3. Intervenor-Petitioner, MINERAL COUNTY OF NEVADA, appears in this case on its own behalf and for the benefit of the citizens and residents of Mineral County and users of Walker Lake for recreational, aesthetic, preservation of wildlife, and economic purposes. Mineral County is duly established under the laws of the State of Nevada and retains all rights delegated pursuant to NRS 244.165 with the capacity to sue in its own name.

4. Respondents are all water users on the Walker River and its tributaries as set forth in the Final Decree.

IV.

GENERAL ALLEGATIONS

5. Petitioner-Intervenor, MINERAL COUNTY OF NEVADA, hereinafter referred to as, "County," currently benefits from the presence of sufficient levels of

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450 Marsh Avenue • Reno, NV 89509
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water in Walker Lake. The Nevada Department of Wildlife holds in trust for Mineral County, the right to 700 cfs. of surplus flows annually, Certificate No. 10860, granted by the State Engineer of Nevada on December 28, 1983.

6. Walker Lake and approximately 16 linear miles of Walker River are totally contained within the legal boundaries of Mineral County. The elevation of Walker Lake in 1908 was 4,077 feet. The elevation of Walker Lake in 1993 was 3,950 feet which is equivalent to a loss of one-half of the Lake. The levels required to maintain Walker Lake as a viable fishery are at an elevation of 3,972 feet. At the present rate of depletion Walker Lake will be dry by the year 2020.

7. Walker Lake supports recreational fishing, boating, and wildlife habitat. Activities and businesses attributable to the presence and use of Walker Lake represents approximately 50% of the economy of Mineral County.

8. The current and consistent total loss of flows from Walker River into Walker Lake has degrated the quality of water in Walker Lake substantially.

9. The public interest requires the maintenance of minimum levels in Walker Lake that will sustain the naturally occurring fish population and provide for the preservation of Walker Lake for the citizens and residents of the County for recreational values, preservation of wildlife, and maintenance of the economy of Mineral County.

10. Without reallocation of the waters to insure priority minimum flows to sustain the Lake, Walker Lake, its users and the citizens of Mineral County will suffer substantial and irreparable damage.

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11. Minimum flowage guaranteed to Walker Lake was not dealt with, resolved, or considered in the original decree (C-125) of 1936.

12. Paragraph XIV of the Final Decree provides that this Court retain jurisdiction.

V.

FIRST CLAIM FOR RELIEF

11. An adjudication and reallocation of the waters of Walker River to preserve the minimum levels in Walker Lake, as a condition to the water rights licenses of all upstream users -- such requirements of minimum levels of Walker Lake to be a condition to each license and certificate presently held by upstream license holders in California and Nevada.

12. The right to, at least, 103,000 acre feet of flows annually reserved from the Walker River that will reach Walker Lake.

WHEREFORE, Petitioner-Intervenor, prays:

1. The Court, pursuant to its continuing jurisdiction under paragraphs XIV of the Final Decree, reopen and modify the final Decree to recognize the rights of Mineral County, its citizens and residents and other users of Walker Lake to have minimum levels to maintain the viability of Walker Lake as a body of water to sustain its naturally occurring fish population and for recreational benefits, wildlife preservation, aesthetic and economic beneficial use.

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2. That the Court order the State of Nevada to grant a certificate to Mineral County for the benefit of Walker Lake in the amount of 103,000 acre/feet per year.

3. That the Court recognize that the minimum levels necessary to maintain the viability of Walker Lake as a body of water to sustain its naturally occurring fish population and for recreational benefits, wildlife preservation, aesthetic and economic benefits is a beneficial use and in the public interest and required under the doctrine of maintenance of the public trust.

4. That the Court grant such other and further relief as it deems just and proper.

DATED this 21st day of October, 1994.

RESPECTFULLY SUBMITTED,

ZEH, SPOO & HEARNE

BY _____
TREVA J. HEARNE
Attorney for Intervenor-Petitioner
MINERAL COUNTY OF NEVADA

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CERTIFICATE OF MAILING

Pursuant to FRCP 5(b), I certify that I am an employee of the Law Office of ZEH, SPOO & HEARNE, and that on this date I caused to be mailed a copy of the attached **MINERAL COUNTY'S PROPOSED PETITION TO INTERVENE**, with postage fully prepaid to:

See attached Service List

DATED this 25th day of October, 1994.

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OCT 25 2 ...

IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF NEVADA

UNITED STATES OF AMERICA, Plaintiff, WALKER RIVER PAIUTE TRIBE, Plaintiff-Intervenor, vs. WALKER RIVER IRRIGATION DISTRICT, a corporation, et al. Defendants.	IN EQUITY NO. C-125s Subfile No. C-125-B **MEMORANDUM OF POINTS AND AUTHORITIES IN SUPPORT OF MINERAL COUNTY'S PROPOSED PETITION TO INTERVENE**

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WALKER RIVER IRRIGATION DISTRICT,

Petitioner,

vs.

CALIFORNIA STATE WATER RESOURCES CONTROL BOARD, W. DON MAUGHAN, EDWIN H. FINSTER, ELISEO M. SAMANIEGO, JOHN CAFFREY and DARLENE E. RUIZ, Members of the California Water Resources Control Board,

Respondents.

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I.

INTRODUCTION

Since the dawn of the ice age, Walker Lake, an arm of the Pleistocene Lake Lahontan, has graced the desert landscape of Mineral County. Throughout pre-recorded human history and into the twentieth century, Walker Lake continued to support the naturally occurring cut throat trout, Lahontan suckers, and tui chub, enough so that the Indian tribes living on the banks of this lake were actually named for their consumption of the bounty of the Lake. Walker Lake is a terminal lake fed by the waters of the Walker River. This river represents 84% of the lake's source of recharge with the balance made up from rainwater and groundwater. (See, Declaration of Kelvin J. Buchanan filed herewith, hereinafter referred to as, "Buchanan Declaration".)

In 1989, there were a series of events beginning with the release of sediment-laden irrigation water from Bridgeport Reservoir. This dewatering of the Reservoir resulted in litigation by upstream interests, initiated by the State Water Resources Control Board of California (SWRCB), which began the death of the Walker Lake, quickly and certainly, without further consideration. By the actions taken to retain minimum levels at Bridgeport Reservoir, a man-made trout fishery, the SWRCB essentially decreed a death sentence to Walker Lake, a naturally created trout fishery.

Simultaneously, in conjunction with this action by the SWRCB, the Walker River Irrigation District (WRID), manager of the allocations along the River, has failed in its stewardship. WRID has failed to mitigate waste of water resources along

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the River, failed to monitor and require returns of irrigation water to the river channel, and failed to require that the diversions be technically efficient, thereby, preserving the river to the extent possible with twentieth century technology. This failure has reduced the available waters to flow through the Walker River to Walker Lake. (See, Buchanan Declaration.)

The State of Nevada has issued certificates for diversions that result in the overall location of the waters of the River which deprives any natural or excess flows from reaching Walker Lake. WRID, the State of Nevada, and the Walker River Paiute Tribe (the "Tribe") have not contracted with the United States to install and maintain accurate measuring devices along the Walker River so that lawful and proper allocations of water will be made (see, Declaration of Buchanan). As a result, Walker Lake has been denied flows that might have survived the treacherous path along the River to its inlet.

Without sufficient flows through the Walker River arriving at Walker Lake, the Lake has dropped so precipitously that, some scientists predict, within two years the Lake will not be able to support its naturally occurring fish population (see, Declaration of Buchanan). Mineral County depends on this resource for recreation, wildlife habitat, and other economic and aesthetic reasons for both the citizens of Mineral County and the users of the Lake.

Mineral County requests intervention into this case in order to represent interests for the preservation of this irreplaceable natural resource, Walker Lake, which is nearly totally dependent on adequate flows from the Walker River.

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II.

ARGUMENT

A. MINERAL COUNTY MEETS THE REQUIREMENTS FOR INTERVENTION AS OF RIGHT UNDER RULE 24(a)(2), F.R.C.P.

1. Mineral County Has Not Delayed in Moving to Intervene in the Pertinent Federal Case Affecting the Adjudication of the Waters of the Walker River, Case C-125.

Intervention as of right under Rule 24(a)(2) Federal Rules of Civil Procedure[1] requires that the applicant claim an interest, the protection of which may as a practical matter be impaired or impeded if the lawsuit proceeds without him. The Ninth Circuit has enunciated the test to be administered for applying these elements of Rule 24, F.R.C.P.:

> We (the 9th Circuit Court of Appeals) apply a four-part test under this rule: (1) the motion must be timely; (2) the applicant must claim a "significant protectable" interest relating to the property or transaction which is the subject of the action; (3) the applicant must be so situated that the disposition of the action may as a practical matter impair or impede its ability to protect that interest; and (4) the applicant's interest must be inadequately represented by the parties to the action. Sierra Club v. U.S. E.P.A., 995 F.2d 1478 (9th Cir. 1993) at page 1481.

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[1]Rule 24 Federal Rules of Civil Procedure: (a) Intervention of Right. Upon timely application anyone shall be permitted to intervene in an action: (2) when the applicant claims an interest relating to the property or transaction which is the subject of the action and the applicant is so situated that the disposition of the action may as a practical matter impair or impede the applicant's ability to protect that interest, unless the applicant's interest is adequately represented by existing parties.)

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Moreover, Rule 24, F.R.C.P., is to be liberally applied:

> The rule is construed "broadly in favor of the applicants for intervention." Sierra Club v. U.S. E.P.A., supra at page 1481.

Taking the elements of the Ninth Circuit's test, *seriatum*, and then tempering that by the liberal construction to be given Rule 24, F.R.C.P., it is evident that Mineral County satisfied the requirements of Rule 24, F.R.C.P., and should be allowed to intervene as of right in this case as developed, below.

A decision on the appropriation of the waters of the Walker River materially affects the preservation of Walker Lake. Mineral County cannot protect the interests of the Lake unless it can represent those interests in the present litigation.

The Court must, in its discretion, based upon the circumstances, determine if the motion to intervene is timely:

> Timeliness of intervention is a matter for the sound discretion of the trial court, NAACP v. New York, 413 U.S. 345, 365-66, 93 S.Ct. 2591, 2602-03, 37 L.Ed.2d 648(1973), but a court should be more reluctant to refuse when intervention is sought of right, as here. United Sates v. American Telephone and Telegraph Co., 642 F.2d 1285, 1295 (D.C. Cir.1980). Williams and Humbert Limited v. W.&H. Trade Marks (Jersey) Ltd., 840 F.2d 72 (D.C. Cir. 1988) at pp. 74-75.

The Ninth Circuit has also set forth the standard for assessing the timeliness of a motion to intervene:

> In determining whether a motion to intervene is timely, we evaluate three factors: (1) the stage of the proceeding at which an applicant seeks to intervene; (2) the prejudice to

> other parties; and (3) the reason for and length of the delay. County of Orange v. Air California, 799 F2d 535 (9th Cir. 1986), cert. denied, 480 U.S. 946, 107 S.Ct. 1605, 94 L.Ed2d 791 (1987) (citing United States v. Oregon, 745 F.2d 550 (9th Cir.1984).

Sierra Club v. U.S. E.P.A., supra at p. 1481.

Without a doubt, Mineral County's motion under Rule 24, F.R.C.P. is timely, first and foremost, because Mineral County began the process for intervention as soon as the Commissioners learned of the litigation. Mineral County had no knowledge of the litigation until September 1, 1994, and has never had written notice by any of the other parties of this litigation (see, Declaration of Herman F. Staat filed concurrently herewith). The County has clearly acted immediately upon the information, once supplied them. The County's immediate actions could not be construed as dilatory or less than vigilant in protecting their rights. Rule 24, F.R.C.P., demands no more of a potential intervenor in the timely pursuit of a claim.

Furthermore, Mineral County seeks to intervene in these proceedings at a time that notice is being given to other parties that may wish to intervene. By November 25, 1994, the Tribe, Plaintiff-Intervenor, will give notice to all surface water diversion license holders of the Walker River, pursuant to order of the Court (see, May 23, 1994, Stipulation and Order for Enlargement of Time). After this Notice any certified holder may wish to intervene to protect his interest or water diversion. Mineral County's intervention at this time will not be any different than the other potential interventions that may join after this Court ordered notice.

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Moreover, these proceedings have not progressed to an agreement on the merits or substance of the case. Neither actual diversions, the request by the Tribe for additional quantities, the unlawful conditions imposed upon the Walker River Irrigation District ("WRID") by the SWRCB, nor the change of diversion requested by WRID has been heard, nor has discovery been commenced by any of the parties. The preliminary stage in the proceedings also argues in favor of intervention. See, Mille Lacs Band of Indians v. State of Minn., 989 F.2d 994 (8th Cir. 1993).

No prejudice to other parties could possibly arise because of the intervention of Mineral County. Its presence will not cause to unravel a complex settlement since none has been completed and entered into by the parties. The parties will remain essentially in the same position as if Mineral County had intervened earlier. See, U.S. ex rel. McGough v. Covington Technologies, 967 F.2d 1391 (9th Cir. 1992).

Each element of the three-pronged timeliness test set forth in the Sierra Club case is manifestly satisfied, here. There is no plausible basis for denying the motion of Mineral County to intervene because it is delinquent. Having engaged counsel, approved its intervention and voted to go forward to protect the interests of Walker Lake within less than 60 days from the date Mineral County learned of this litigation, Mineral County has been diligent. For these reasons, the intervention of Mineral County is timely and should be allowed by this Court.

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B. MINERAL COUNTY HAS A SIGNIFICANT PROTECTABLE INTEREST IN THE PRESERVATION OF WALKER LAKE

1. Mineral County Has Water Rights in the Surplus Flows of the Walker River That Directly Feed the Waters of Walker Lake and, Moreover, Mineral County Asserts the Right to Minimum Sustainable Levels in Walker Lake on Behalf of the Public.

Mineral County is the only party representing the preservation of Walker Lake. Nevada State Law recognizes that recreational purpose is a beneficial use, NRS 533.030(c). This recreational, beneficial use can be a right to flows in situ without the requirement of diversion from the source. A similar fact situation arose in Humbolt County, Nevada:

> The Blue Lake application is for a water grant to waters of Blue Lake in situ, in place as a natural body of water. The BLM manages the land surrounding the lake and desires this water right to assure maintenance of Blue Lake for public recreation and fishery purposes.

State v. Morros, 766 P.2d 263, 265 (Nev. 1988).

The State of Nevada recognizes the recreational purpose and the in situ appropriation. Pursuant to this recognition, the State of Nevada issued a certificate for 795.2 Cfs to the Nevada Department of Fish and Game (now the Department of Wildlife) on December 28, 1983. The Department of Wildlife holds the certificate in trust for the benefit of Mineral County. (See, Exhibit "A.") This trust relationship where a state agency holds rights for the benefit of the public has been recognized by other states. Permit No. 36-7200 In the Name of the Idaho

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Department of Parks & Recreation, 828 P.2d 848 (Id. 1992).

The Court must determine beneficial use from the circumstances before it. United States v. Alpine Land and Reservoir Co., 697 F.2d 851 (9th Cir. 1983). Beneficial use is a dynamic concept and should not allow waste. Circumstances in 1994 are different than in 1936 when the Walker River Decree was last considered; different, in that society has determined that preservation of our natural waterways are critical to environmental balance and ecological survival. A summary of the conflict between in-stream flow preservation and appropriative rights is found in "Reallocation" Chapter 16, Water and Water Rights.

A reallocation of the waters of Walker River is required to preserve the public's right to the natural body of water existing in Mineral County known as Walker Lake. The State holds land in its sovereign capacity in trust for the public purposes of navigation and fisheries. Any conveyance of trust property to a private individual, as in the case of a certificate of appropriation for waters, is subject to the public trust and the State remains trustee with the duty to supervise the trust. See, National Audubon Society v. Superior Court, 33 Cal.3d 419, 189 Cal.Rptr. 346, 658 P.2d 709 (Cal. 1983). Mineral County requests intervention to insure that the State of Nevada performs its duties and obligations as trustee of the waters of Walker Lake for the benefit of the public.

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2. Mineral County Has a Great Financial Stake in the Property Values of Mineral County's Taxable Private Property, Which Are Inexorably Attached to the Presence of Walker Lake and Would, Likewise, Be Devalued by Loss of the Lake.

Mineral County has the right to tax the property of the private owners situated in and around Walker Lake since it is totally located within the political and legal boundaries of the County. N.R.S., Section 244.150. Any devaluation of the property values in Mineral County because of loss of Walker Lake will substantially reduce the budget of Mineral County which is dependent upon property tax revenues (see, Declaration of Marlene Bunch, hereinafter referred to as "Declaration of Bunch," filed concurrently herewith). "These taxing and regulatory interests are inherently ripe for protection by intervention as a practical means for a political subdivision to protect its financial and administrative affairs. Scotts Valley Band of Pomo Indians of the Sugar Bowl Rancheria v. U.S., 921 F.2d 924, 928 (9th Cir.1990).

3. Mineral County Has a Significant Protectable Interest in the Recreation, Wildlife Habitat, Aesthetic and Other Economic Concerns That Support Mineral County Because of the Presence of Walker Lake.

Mineral County has participated in many federal and state actions to preserve and enhance the Lake. (See, Exhibit "B.") Mineral County has always been very interested and active in Lake matters (see, Declaration of Buchanan).

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Likewise, the federal courts have recognized these are significant protectable interests justifying the right to intervene by other public agencies that have actively participated in the issue that will be affected by the litigation. See, Sagebrush Rebellion, Inc. v. Watt, 713 F.2d 525 (9th Cir. 1983).

Mineral County has a more critical concern than a public advocacy group as was the intervenor in Sagebrush Rebellion in protecting the interests of its citizens and the users of Walker Lake. A substantial percentage of Mineral County's businesses is related to Walker Lake and its available recreation (see, Declaration of Louis Thompson (hereinafter referred to as "Declaration of Thompson") filed concurrently herewith). Significant decreases in the revenues to these businesses have been realized already because of the damage to the Lake by the loss of flows into the Lake from the Walker River. (See, Declarations of Bunch and Thompson.)

The loss of flows of the Walker River into Walker Lake has so degraded the quality of the water of the Lake that fish no longer flourish and other wildlife have disdained to make Walker Lake their home or transient stop in migratory journeys. Besides the inability for the businesses to survive because of the loss of fishing in the Lake, other tourists are lost because the pathetic condition of reduced Lake levels does not entice those who came before to witness the pristine beauty of the Lake and the abundance of waterfowl and other wildlife present. Tourists do not come to witness the death of a Lake.

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Only Mineral County is so affected by the loss of tourism and the presence of a naturally occurring desert lake with the exceptional beauty of the water itself and the incumbent wildlife populations. The loss of the familiar view of the Lake to a community that has little else in its vista cannot be measured in property terms alone, but must also be measured in sentimental and historical terms. Flows from Walker River are the only means by which Walker Lake can be rejuvenated and maintained. (See, Declaration of Buchanan.)

> "[T]he determination of whether an interest is sufficient for Rule 24(a)(2) purposes is colored to some extent by the third factor-whether disposition of the action may, as a practical matter, impair or impede the applicant's ability to protect its interest." Conservation Law Foundation v. Mosbacher, 966 F.2d 39 (1st Cir. 1992).

One of the allegations of the Mineral County position is that the waters of Walker River are allocated beyond the capacity of the River, leaving no natural flows left to enter the Lake. The instant litigation is where the issues of allocation will be adjudicated. Mineral County must be allowed to intervene in order to preserve and protect Walker Lake in the forum where reallocations can and will be determined, the instant case.

C. MINERAL COUNTY IS NOT ADEQUATELY REPRESENTED BY ANY OF THE PRESENT PARTIES TO THE LITIGATION

Mineral County may very well have interests coincident with some of the parties to the present litigation to contest the right of the SWRCB to entrap flows to

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protect the man-made fishery of Bridgeport Reservoir at the cost of the natural fishery in Walker Lake. But no other party to this litigation has expressed even a casual reference to the protection of the levels of Walker Lake.

> Whether a party may intervene turns, in part, upon a comparison of the adequacy of representation primarily by comparing the interests of the proposed intervenor with the current parties to the action. Sierra Club v. Robertson, 960 F.2d 83, 86 (8th Cir. 1992). To satisfy the adequacy of representation test, an intervenor . . . need only show that representation may be inadequate, not that it is inadequate. Conservation Law Foundation v. Mosbacher, 966 F.2d 39 (1st Cir. 1992). (Emphasis added.)

The State of Nevada is required by its very position to protect all of its citizens. The interests of its citizens are not necessarily identical and may become competing. Some residents may not favor the preservation of Walker Lake, if other, more immediate, pronounced, or self-serving interests are at stake. The burden of showing inadequate representation by a political sub-entity of a State when that State is a party also, may be more than minimal; however, Mineral County can more than show why its interests differ from all of the interests that the State of Nevada must represent upstream. See, Environmental Defense Fund v. Higginson, 631 F.2d 738 (D.C. Cir. 1979). The State must protect its own decisions regarding the appropriation of the waters of the Walker River which may in large part have deprived Walker Lake of its critical recharge. Further the State of Nevada only listed its concern for protection of the Mason Valley Wildlife Preserve as any specific reason for its intervention. (See, State of Nevada Motion for Intervention, Page 3,

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Lines 12-15.) Walker Lake, indeed, has no protector but Mineral County.

D. MINERAL COUNTY HAS NO OTHER MEANS TO PROTECT ITS INTEREST IN WALKER LAKE THAN TO ENTER THIS PROCEEDING AND PRAY THAT THIS COURT REALLOCATE THE WATERS OF THE WALKER RIVER

The Walker River is a stream the headwaters of which rise on the eastern slopes of the Sierra Nevada mountains in California. United States v. Walker River Irr. Dist., 104 F.2d 334 (9th Cir. 1939). The River flows through lands that are arid, mostly rough or mountainous into the Walker River Paiute Reservation for a distance of approximately thirty miles where the stream empties into Walker Lake. See, United States v. Walker River Irr. Dist., supra at p. 335. The River has been the subject of litigation culminating in the Decree of C-125 entered on April 14, 1936, which is the basis for the continuing jurisdiction of this Court and the instant litigation. In order for Mineral County to claim minimum flows and in situ rights for the Lake, Mineral County must be a party to this action. An adjudication is a quiet title action in equity for the purpose of settling all claims to the waters of the watercourse that is the subject of the adjudication. (United States v. Truckee-Carson Irrigation District, 649 F.2d 1286, 1308 (9th Cir. 1981), United States v. Alpine Land and Reservoirs Co., 697 F.2d 851 (9th Cir. 1983). When the matters brought before this Court are determined and the waters of the Walker River reallocated accordingly, the fate of Walker Lake will be in the balance.

///

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E. IN THE EVENT THAT THIS COURT DOES NOT ALLOW MINERAL COUNTY INTERVENTION AS OF RIGHT, IN THE ALTERNATIVE MINERAL COUNTY ASKS FOR PERMISSIVE INTERVENTION PURSUANT TO F.R.C.P. 24(b)(2)

1. Mineral County Meets Each and Every Element of Permissive Intervention Pursuant to F.R.C.P. 24(b)(2).[2]

Permissive intervention is allowed a party that has a claim that involves a question of law or fact that is common to the main action. In both the claims presently filed, Mineral County's request for flows to Walker Lake will impact the outcome and the considerations. Because Walker Lake is located in Mineral County and comprises such an integral part of the economy and well-being of Mineral County, the County Commission considered it part of their public duty to protect and preserve the Lake as a healthy, viable recreational asset and fishery.

> It is a living tenet of our society and not mere rhetoric that a public office is a public trust. While a public official may not intrude in a purely private controversy, permissive intervention is available when sought because an aspect of the public interest with which he is officially concerned is involved in the litigation. Nuesse v. Camp, 385 F.2d 694, 702 (D.C. Dist. 1967).

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[2]Rule 24. Intervention (b) Permissive Intervention. Upon timely application anyone may be permitted to intervene in an action: . . .(2) when an applicant's claim or defense and the main action have a question of law or fact in common.)

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2. The Intervention of Mineral County at this Stage of These Proceedings Will Not Unduly Delay the Litigation And, Moreover, Will Significantly Contribute to the Underlying Factual and Legal Issues.

No party to this litigation presently can offer the intimate knowledge of the Lake that Mineral County can. Mineral County has accumulated as much information as it can find regarding the scientific studies involving the biology, geology, hydrology and history of Walker Lake. Starting when the Bureau of Land Management indicated an interest in funding the recreational aspects of the Lake, and particularly through the last years when the loss of the Lake has been imminent, Mineral County has requested assistance in analysis from United States Senator Harry Reid, the Office of Technology Assistance, the University of Nevada at Reno, the State of Nevada Division of Wildlife, the Bureau of Land Management, the United States Geologic Survey and other engineers and other governmental and non-profit agencies. See, Natural Resources Defense Council v. Tennessee Valley Authority, 340 F.Supp. 400 (S.D.N.Y.1971); and Levin v. Ruby Trading Corporation, 333 F.2d 592 (2d Cir. 1964). In those cases the Court gave weight to the knowledge and expertise of those seeking intervention in its granting of their motion to intervene.

> Other factors to be considered in connection with permissive intervention are: the nature and extent of the intervenor's interest, whether the intervention will unduly delay or prejudice the adjudication of the rights of the original parties, whether the applicant will benefit by the intervention, whether the intervenor's interests are adequately represented by the other parties, and whether the intervenors will significantly contribute to the full development of the underlying factual issues in the suit and

to the just and equitable adjudication of the legal questions presented. State of Utah v. Kennecott Corp., 801 F.Supp. 553, 572 (D.Utah 1992).

As discussed heretofore, granting intervention to Mineral County will in no way delay these proceedings. Granting intervention to Mineral County will add an aspect to the adjudication of the waters of Walker River that has been neglected to this point in history and is a very necessary consideration to save Walker Lake.

III.

CONCLUSION

As stated hereinabove, Mineral County seeks intervention as of right or, in the alternative, as permissive intervention pursuant to Rule 24, F.R.C.P. For the foregoing reasons, Mineral County respectfully requests that the Court grant its motion for intervention.

DATED this 21st day of October, 1994.

RESPECTFULLY SUBMITTED,

LAW OFFICES OF
ZEH, SPOO & HEARNE

By _____
TREVA J. HEARNE
Attorney for Intervenor-Petitioner
MINERAL COUNTY OF NEVADA

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Application No. 35792 Certificate Record No. 68 Book 31 Page 10800

THE STATE OF NEVADA
CERTIFICATE OF APPROPRIATION OF WATER

WHEREAS, Roger E. Grable, Agent has presented to the State Engineer of the State of Nevada Proof of Application of Water to Beneficial Use, from East Walker River, West Walker River, Walker River and Tributaries through Walker River natural channel to Walker Lake for Fish, Game and Recreation purposes. The point of diversion of water from the source is as follows: SE¼ SE¼ Section 16, T.11N., R.29E., M.D.B.&M., or at a point from which the meander corner common to Sections 20 and 21, T.11N., R.29E., M.D.B.&M., bears S. 69° 58' 16" W., a distance of 5113.8 feet situated in Mineral County, State of Nevada.

NOW KNOW YE, That the State Engineer, under the provisions of NRS 533.425, has determined the date, source, purpose, amount of appropriation, and the place where such water is appurtenant, as follows:

Name of appropriator State of Nevada, Department of Fish and Game

Post-office address Reno, Nevada

Amount of appropriation 795.2 c.f.s., but not to exceed 575,870 acre-feet per annum

Period of use, from January 1st to December 31st of each year

Date of priority of appropriation September 17, 1970

Description of place and manner of use:

The place of use is described as Walker Lake downstream from Schurz, Nevada, where the water is used to help maintain the lake at a stable level to support public use for recreation and improve water quality and quantity to sustain and help prevent loss of the fishery in Walker Lake.

This certificate is issued subject to the terms of the permit.

The right to water hereby determined is limited to the amount which can be beneficially used, not to exceed the amount above specified, and the use is restricted to the place and for the purpose as set forth herein.

IN TESTIMONY WHEREOF, I PETER G. MORROS, State Engineer of Nevada, have hereunto set my hand and the seal of my office, this 28th day of DECEMBER, A.D. 19 83

Compared bc/bl

Recorded ..... Bk. ..... Page .....

..... County Records.

State Engineer

1923

A RESOLUTION

WHEREAS, Walker Lake, situated in Mineral County, Nevada, is a large naturally created body of water of imposing majesty and beauty; and,

WHEREAS, Walker Lake is one of the few remaining mountain/desert lakes still extant in the Western States in essentially the same condition (except for volume) as it was when first explored in 1845 by the Joseph Walker Expedition; and,

WHEREAS, Walker Lake has proven to be a natural resource of inestimable value to humanity, both prehistorically and historically, by providing food and fiber to the ancients and unlimited and diversified recreation to current generations; and,

WHEREAS, in 1962 the U.S. Bureau of Land Management, the agency of primary jurisdiction, saw the need for, and the advantage of, providing camping and other facilities for public use on the lake and created such facilities; and,

WHEREAS, ever-increasing use of the lake and the accomodations by boaters, hunters, fishermen, water-skiers, campers and nature-lovers and because of the limited funds available to the USBLM for maintenance or expansion of the facilities over their 20 year life span. They have now proven to be inadequate to meet current public demand; and,

WHEREAS, the Carson City district of the USBLM (Nevada) has developed and created a comprehensive and commendable plan for improvement of its Walker Lake facilities entitled "Walker Lake Recreation Management Plan" copies of which are attached hereto as a part of this resolution; and,

WHEREAS, because Walker Lake is both an economic and esthetic resource and asset for both the State of Nevada and the County of Mineral which is of primary and overriding importance; now therefore,

BE IT RESOLVED, and it hereby is, that U.S. Senator Paul Laxalt, U.S. Senator Chic Hecht, U.S. Congresswoman Barbara Vucanovich and U.S. Congressman Harry Reid are hereby respectfully requested by the Mineral County Board of Commissioners to urgently intercede with the Honorable James Watt and the United States Department of Interior and attempt to obtain special funding in the full amount needed as well as accelerated construction authorization for immediate initiation

and completion of the facilities and operational measures set forth in the "Walker Lake Recreation Management Plan"; and,

BE IT FURTHER RESOLVED, and it hereby is, that by copy hereof the Honorable Richard Bryan, Governor of the State of Nevada, is respectfully requested to lend his vigorous and continuing support toward early accomplishment and execution of the "Walker Lake Recreation Management Plan" as conceived and designed by the U.S. Bureau of Land Management.

Board of Mineral County Commissioners

By: _____
Harry L. Poe, Chairman

By: _____
Donald F. Seevers, Vice-Chairman

By: _____
Allen E. Conelly, Member

Attest: _____
Clerk

Copy to:
U.S. Senator Paul Laxalt
U.S. Senator Chic Hecht
U.S. Representative Barbara Vucanovich
U.S. Representative Harry Reid
Governor Richard Bryan

Approved June 16th., 1983 by the Board of Mineral County Commissioners.

CERTIFIED COPY
The document to which this certificate is attached is a full, true and correct copy of the original on file and of record in my office.

DATE: September 22, 1994
MARLENE S. BUNCH, Clerk of the Fifth Judicial District Court, in and for the county of Mineral, State of Nevada.
By _____ CLERK ~~Deputy~~

ZEH, SPOO & ASSOCIATES
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CERTIFICATE OF MAILING

Pursuant to FRCP 5(b), I certify that I am an employee of the Law Office of ZEH, SPOO & HEARNE, and that on this date I caused to be mailed a copy of the attached **MEMORANDUM OF POINTS AND AUTHORITIES IN SUPPORT MINERAL COUNTY'S PROPOSED PETITION TO INTERVENE**, with postage fully prepaid to:

See attached Service List

DATED this 25th day of October, 1994.

MARILYN MITCHELL

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Attorneys for Intervenor-Petitioner
MINERAL COUNTY

IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF NEVADA

UNITED STATES OF AMERICA, Plaintiff, WALKER RIVER PAIUTE TRIBE, Plaintiff-Intervenor, vs. WALKER RIVER IRRIGATION DISTRICT, a corporation, et al., Defendants.	IN EQUITY NO.C-125 AFFIDAVIT OF KELVIN J. BUCHANAN
WALKER RIVER IRRIGATION DISTRICT, Petitioner, vs. CALIFORNIA STATE WATER RESOURCES CONTROL BOARD, W. DON MAUGHAN, EDWIN H. FINSTER, ELISEO M. SAMANIEGO, JOHN CAFFREY and DARLENE E. RUIZ, Members of the California State Water Resources Control Board, Respondents.	

1. I am a Nevada Registered Professional Engineer with twenty (20) years experience and have been a Nevada resident since 1975.

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2. I have researched and compiled documents and papers authored by the U.S. Geological Survey (USGS), the Nevada Department of Wildlife (NDOW), the U.S. Bureau of Reclamation, the Nevada State Engineers' office, the California Division of Water Resources, in addition to Federal Decree C-125. I have reviewed scientific papers authored by Alex Horne, limnologist, and Mike Sevon, NDOW employee, in addition to perusing pertinent press releases on the subject of Walker Lake.

3. I have personally visited USGS gauge stations and reservoirs on the Walker River system prior to and including 1994. I am told there are no gauge stations on the Walker River System downstream from Wabuska. (J. Thomas, USGS, personal communication)

4. I concur with the findings of the report, *Walker River Basin Water Rights Model, Nevada Department of Conservation and Resources, June, 1993*, that the readings derived for inflow into Walker Lake from the Walker River represent 84% of the lake's recharge (Attachment A).

5. I concur with the *Office of Assessment Technology Memorandum, August, 1993*, that the diversions in the Walker River Irrigation District (WRID) source areas are not technically efficient and that irrigation ditches should be lined with impervious material to prevent leakage. (Attachment B)

6. I concur with the report *Walker River Basin Water Rights Model, Nevada Department of Conservation and Resources, June, 1993*, that if Walker Lake does not continue to receive at least 84% (or 103,000 acre feet per annum) of its recharge from the Walker River system, it will eventually be unable to support fish life. This demise of Walker Lake will result in the financial collapse of tourist facilities in Mineral County which depend on fishing.(Attachment A)

7. I conclude that the lack of gauge stations downstream from the Wabuska station would make it difficult to accurately estimate C.P.S. rates of water flow on the Walker River Paiute Reservation.

I declare under penalty of perjury that the foregoing is true and correct. Executed this 5th day of October, 1994, at Reno, Nevada.

Kelvin J. Buchanan

SUBSCRIBED and SWORN to before me this 5th day of October, 1994

NOTARY PUBLIC

CAROLE J. THOMAS
Notary Public - State of Nevada
Appointment Recorded in Washoe County
MY APPOINTMENT EXPIRES APR. 2, 1995

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Treva J. Hearne, Esq.
James Spoo, Esq.
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Attorneys for MINERAL COUNTY OF NEVADA

IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF NEVADA

UNITED STATES OF AMERICA, Plaintiff, WALKER RIVER PAIUTE TRIBE, Plaintiff-Intervenor, vs. WALKER RIVER IRRIGATION DISTRICT, a corporation, et al. Defendants.	IN EQUITY NO. C-125s Subfile No. C-125-B **AFFIDAVIT**

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WALKER RIVER IRRIGATION DISTRICT,

Petitioner,

/vs.

CALIFORNIA STATE WATER RESOURCES CONTROL BOARD, W. DON MAUGHAN, EDWIN H. FINSTER, ELISEO M. SAMANIEGO, JOHN CAFFREY and DARLENE E. RUIZ, Members of the California Water Resources Control Board,

Respondents.

STATE OF NEVADA)
) ss.
COUNTY OF MINERAL)

I, HERMAN F. STAAT, being duly sworn, say:

1. I am a duly elected Commissioner of Mineral County, Nevada. I currently serve as a Commissioner of Mineral County and at all times relevant to the statements made herein, have served as Commissioner of Mineral County. I have served in this capacity since I was elected in 1991.

2. Walker Lake is a terminal, desert lake totally contained within the political and legal boundaries of Mineral County, Nevada.

3. The information that Walker Lake has been diminished in total water quantity and, therefore, quality has been made known to me in my official capacity as a

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Commissioner of Mineral County. I have personally observed the loss of water in Walker Lake over the last three years and the loss of flow through the Walker River reaching Walker Lake.

4. Since 1991 until on or about July 1994, no information had been presented to me as a Commissioner nor to the Commission of Mineral County in its official capacity nor to me personally that federal litigation had been initiated regarding the water of Walker River affecting Walker Lake. Other litigation had been discussed or considered regarding the waters of Walker River affecting Walker Lake in State Courts of California and Nevada.

5. To my best knowledge and belief, September 1 was the first time that the possibility of intervention by Mineral County in a federal lawsuit was discussed with the Mineral County Commission in its official capacity.

6. After discussing this matter on September 1, 1994, the Mineral County authorized certain attorneys and engineers on September 15, 1994, to go forward and prepare an intervention on behalf of Mineral County in the federal lawsuit to protect and preserve Walker Lake for the citizens and residents of Mineral County and other

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users of Walker Lake for recreation, wildlife preservation, and other economic interests.

DATED this 22nd day of September, 1994.

HERMAN F. STAAT, Chairman
County Commissioners Mineral County

SUBSCRIBED and SWORN to
before me this 22nd
day of September, 1994.

NOTARY PUBLIC

My commission expires August 13, 1995

JEAN JUSTUS
Notary Public - State of Nevada
Appointment Recorded in Mineral County
MY APPOINTMENT EXPIRES AUG. 13, 1995

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CERTIFICATE OF MAILING

Pursuant to FRCP 5(b), I certify that I am an employee of the Law Office of ZEH, SPOO & HEARNE, and that on this date I caused to be mailed a copy of the attached **AFFIDAVIT**, with postage fully prepaid to:

See attached Service List

DATED this 25th day of October, 1994.

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MINERAL COUNTY

IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF NEVADA

UNITED STATES OF AMERICA, Plaintiff, WALKER RIVER PAIUTE TRIBE, Plaintiff-Intervenor, vs. WALKER RIVER IRRIGATION DISTRICT, a corporation, et al. Defendants.	IN EQUITY NO. C-125s Subfile No. C-125-B **AFFIDAVIT OF MARLENE BUNCH**

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WALKER RIVER IRRIGATION DISTRICT,

Petitioner,

vs.

CALIFORNIA STATE WATER RESOURCES CONTROL BOARD, W. DON MAUGHAN, EDWIN H. FINSTER, ELISEO M. SAMANIEGO, JOHN CAFFREY and DARLENE E. RUIZ, Members of the California Water Resources Control Board,

Respondents.

STATE OF NEVADA)
) ss.
COUNTY OF MINERAL)

I, MARLENE BUNCH, being duly sworn, say:

1. I am a duly elected and presently serving Clerk and Treasurer of Mineral County, Nevada, and have served in that capacity for approximately the last four years and have served at all times relevant to the statement herein.

2. As Treasurer, I am in charge of accounting for the property tax revenues due, owing, and received by Mineral County. 30% of Mineral County's general fund budget is made up of revenues from property taxes.

3. I am also in charge of accounting for the receipts from the State remitted to the County for sales tax. A significant percentage of the sales tax received in

/ / /

Mineral County is attributable to businesses associated with recreation, fishing or other sales to persons using Walker Lake.

4. I am a resident of Mineral County and have been for the last 31 years. I have personally observed the loss of water in the Lake and have personally observed that business has declined in the County because fishing and other recreational activities have decreased because Walker Lake is a less desirable destination for tourists because of the loss of water in the Lake.

I declare upon penalty of perjury that the foregoing is true and correct.

EXECUTED this 5th day of October, 1994, at Hawthorne, Nevada.

Marlene S. Bunch
MARLENE BUNCH, Affiant

SUBSCRIBED and SWORN to before before me this 5th day of October, 1994.

Jean Justus
Notary Public in and for said County and State

JEAN JUSTUS
Notary Public - State of Nevada
Appointment Recorded in Mineral County
MY APPOINTMENT EXPIRES AUG. 13, 1995

My commission expires: Aug. 13, 1995

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CERTIFICATE OF MAILING

Pursuant to FRCP 5(b), I certify that I am an employee of the Law Office of ZEH, SPOO & HEARNE, and that on this date I caused to be mailed a copy of the attached **AFFIDAVIT OF MARLENE BUNCH**, with postage fully prepaid to:

See attached Service List

DATED this 25th day of October, 1994.

MARILYN MITCHELL

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MINERAL COUNTY

IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF NEVADA

UNITED STATES OF AMERICA, Plaintiff, WALKER RIVER PAIUTE TRIBE, Plaintiff-Intervenor, vs. WALKER RIVER IRRIGATION DISTRICT, a corporation, et al., Defendants.	IN EQUITY NO. C-125 AFFIDAVIT OF LOUIS THOMPSON
WALKER RIVER IRRIGATION DISTRICT, Petitioner, vs. CALIFORNIA STATE WATER RESOURCES CONTROL BOARD, W. DON MAUGHAN, EDWIN H. FINSTER, ELISEO M. SAMANIEGO, JOHN CAFFREY and DARLENE E. RUIZ, Members of the California State Water Resources Control Board, Respondents.	

1. I am a member of a not-for-profit organization known as "The Walker Lake Working Group." I am also a teacher and management consultant. I am a resident of Mineral County, Nevada.

2. I have worked with the Walker Lake Working Group for the last two years and pursuant to that work, I have gathered statistics and information regarding

the economic benefits of the presence of Walker Lake as a viable fishery and recreational facility in Mineral County, Nevada.

3. Attached hereto are the graphs that I personally prepared based upon the information that I gathered from documents from the Nevada Department of Wildlife containing the annual count of fishermen, the Nevada Commission on Tourism, and other agencies.

4. The graphs are from information that was gathered within the last two years and relates to the present and immediate past economic situation in Mineral County.

5. The graphs were fashioned from a computer program that I am familiar with and which has been used by me before. It is a standard program for illustrating information such as economic statistics and in my opinion the graphs prepared are an adequate illustration of the information that was the basis of the graphs. I am experienced and knowledgeable in graph preparation and to my best information and belief these graphs accurately illustrate the information.

6. In my opinion the economy of Mineral County is dependent upon the existence of Walker Lake. Walker Lake will only support recreation and tourism if the Lake is able to support its naturally occurring fish population, the cutthroat trout, Lahontan suckers, and tui chub. The Walker Lake Working Group as a whole supports this opinion and has worked to preserve and maintain minimum levels in Walker Lake so that the fish population will survive.

I declare under penalty of perjury that the foregoing is true and correct. Executed this 5th day of October, 1994, at Hawthorne, Nevada.

Louis Thompson

SUBSCRIBED and SWORN to before me
this 5th day of October, 1994

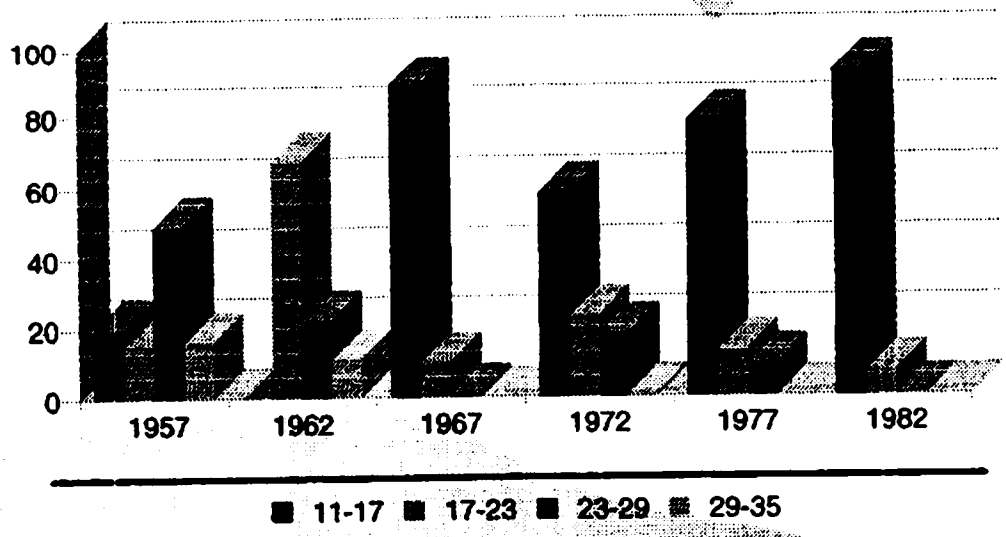
NOTARY PUBLIC

CAROLE J. THOMAS
Notary Public - State of Nevada
Appointment Recorded in Washoe County
MY APPOINTMENT EXPIRES APR. 2, 1995

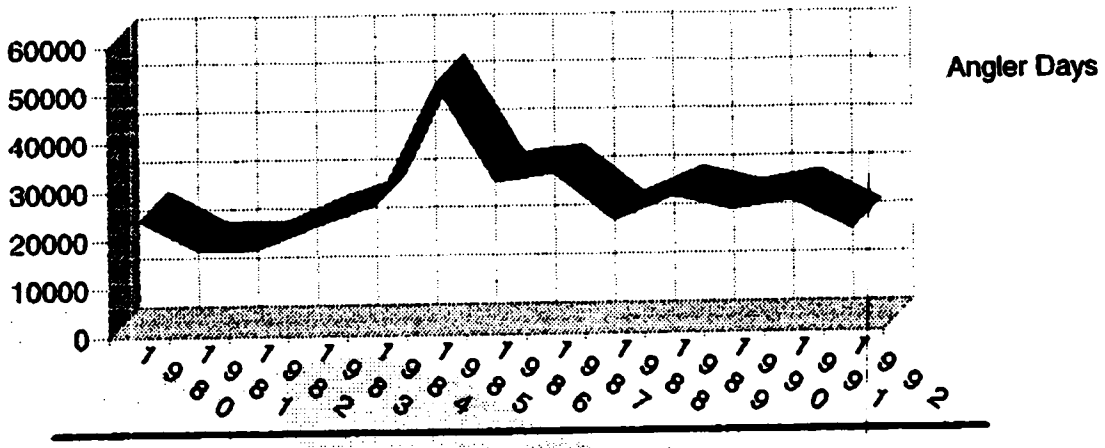
Lake Impact on County Business

- Businesses related to Walker Lake/recreation
  - 50%
- Walker Lake Important to Business?
  - Yes = 75%
- Development Help Business? How Much?
  - Yes = 77% Increase 25%

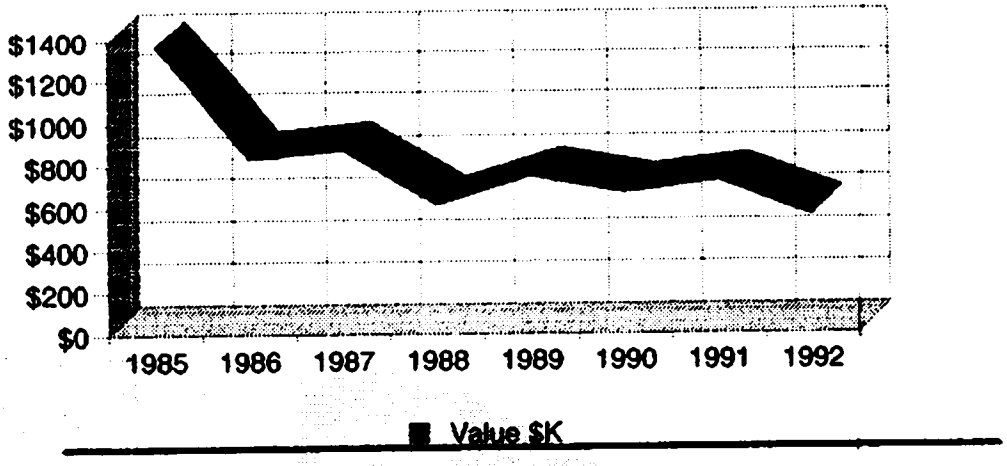
Fish Size Trends (% Caught)



Walker Lake Angler Days



Economic Impact of Fishing



Angler Impact

Angler Origin	1968	1982	1998
Mineral County	17,183	10,666	0
Other Nevada	10,956	5,288	0
Out of State	3,237	1,742	0
TOTAL	31,376	17,696	0
Non-County Total	14,193	7,040	0
Economic Value	$1,632,195	$809,600	0

Walker Lake Visitors

- Total visitors to Lake:
  - BLM Recreation Area, 1990 = 82,700 Visitor Days
  - Walker Lake State Park, 1987 = 85,434 Visitor Days

Economic Potential

- Mineral County & State of Nevada:
  - Commercial Growth
    - 200 to 500 new jobs
  - Tourism
    - Increase of Hundreds/Thousands of Tourists per Year

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CERTIFICATE OF MAILING

Pursuant to FRCP 5(b), I certify that I am an employee of the Law Office of ZEH, SPOO & HEARNE, and that on this date I caused to be mailed a copy of the attached **AFFIDAVIT OF LOUIS THOMPSON**, with postage fully prepaid to:

See attached Service List

DATED this 25th day of October, 1994.

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IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF NEVADA

UNITED STATES OF AMERICA, Plaintiff, WALKER RIVER PAIUTE TRIBE, Plaintiff-Intervenor, vs. WALKER RIVER IRRIGATION DISTRICT, a corporation, et al. Defendants.	IN EQUITY NO. C-125s Subfile No. C-125-B **PROPOSED ORDER**

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WALKER RIVER IRRIGATION DISTRICT,

Petitioner,

vs.

CALIFORNIA STATE WATER RESOURCES CONTROL BOARD, W. DON MAUGHAN, EDWIN H. FINSTER, ELISEO M. SAMANIEGO, JOHN CAFFREY and DARLENE E. RUIZ, Members of the California Water Resources Control Board,

Respondents.

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Respondents.

The Court, having considered MINERAL COUNTY OF NEVADA'S Motion for Intervention, and having reviewed the briefs on the motion and all relevant pleadings and documents, and good cause appearing,

IT IS HEREBY ORDERED, ADJUDGED AND DECREED that MINERAL COUNTY OF NEVADA's Motion to Intervene is granted and that the State may hereafter participate as a party to this action.

DATED this ___ day of _____, 1994.

_____
UNITED STATES DISTRICT JUDGE

ZEH, SPOO & ASSOCIATES
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CERTIFICATE OF MAILING

Pursuant to FRCP 5(b), I certify that I am an employee of the Law Office of ZEH, SPOO & HEARNE, and that on this date I caused to be mailed a copy of the attached **PROPOSED ORDER**, with postage fully prepaid to:

See attached Service List

DATED this 25th day of October, 1994.

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BOB MILLER
GOVERNOR

STATE OF NEVADA

WALKER RIVER BASIN WATER RIGHTS MODEL

Randy Pahl

JUNE, 1993

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
Director:
Peter G. Morros, P.E.

DIVISION OF WATER PLANNING
State Water Planner:
Everett A. Jesse, P.E.

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1.0 INTRODUCTION

1.1 Purpose of Study

The purpose of this modeling study was to develop a planning tool for evaluating the impacts of operational and water use changes within the Walker River basin. With the aid of the model, planners will be able to:

- evaluate the effects of changes in reservoir and river operations
- study the impact of changes in land and water use in the basin
- analyze the effects of water right purchases
- develop information useful for placing a monetary value on water rights that may be offered for sale
- evaluate additional storage reservoir options

More specifically, the model will be useful for: 1) evaluating the impacts of ongoing litigation involving the Walker River Irrigation District (WRID) and other parties; 2) developing options for preventing further decline of Walker Lake levels.

1.1.1 Litigation. The rights to divert and use water from the Walker River system, both in Nevada and California, were determined in an adjudication proceedings in the federal district court in Nevada. These water rights are set forth in the Final Decree entered on April 14, 1936, as amended on April 24, 1940. The Walker River Decree Court has continuing jurisdiction to administer the distribution of these waters.

In 1988, the Walker River Irrigation District (WRID) released all active storage water in Bridgeport Reservoir, which was already at low levels because of the drought, to supply District irrigators. This release of warm water containing large quantities of sediment had caused a fish kill in the East Walker downstream. Following this release, California Trout, Inc., a sport-fishing association, filed a complaint with the California State Water Resources Control Board alleging that the District's dewatering of the reservoir violated several state fish protective statutes and caused a loss of fisheries in the reservoir and in the East Walker (Calif. Dept. of Water Resources, June 1992). In 1990, the California State Water Resources Control Board (State Board) issued three orders in response to the dewatering of Bridgeport Reservoir. The three orders require, in part, a minimum pool in and minimum releases from Bridgeport Reservoir.

In response, WRID filed an action for declaratory and injunctive relief with the Walker River Decree Court. WRID seeks a declaration that the three orders of the State Board are inconsistent with the Final Decree and interfere with the Decree Court's jurisdiction over the Walker River system. WRID also seeks to enjoin the State Board from enforcing those portions of the orders inconsistent with the Final Decree. The Walker River Paiute Tribe (Tribe), the United States and the State of Nevada are also involved in this action on the side of WRID and California Trout, Inc. intervened on behalf of the State Board.

The Tribe and the United States also asserted claims for the use of additional waters for the Tribe from the Walker River system. The Court ordered that the Tribe and the United States join as parties all claimants to the waters of the Walker River system. These two actions are proceeding separately before the Walker River Decree Court.

1.1.2 Walker Lake. Walker Lake, a remnant of the ancient Lake Lahontan at the terminus of Walker River, is rapidly declining in both volume and quality. Since 1920 the surface elevation of Walker Lake has dropped over 110 feet, and the alkalinity of the water has increased to a point which affects the longevity of the existing cutthroat trout population. If the current trend continues, trout habitat in the lake will no longer exist (Cooper and Koch, 1984).

1.2 Scope of Study

A computer model was developed which simulates historic monthly operations of the Walker River basin for the period 1961-90. There are a number of computer programs available for an application of this nature. The model selected for this study was the Wyoming Integrated River System Operation Study (WIRSOS) Model. WIRSOS is computer model developed for the State of Wyoming as a tool for defining and quantifying the impact of Federal claims for reserved rights, including Indian rights, on State-awarded water rights in connection with the general adjudication of water rights in the Bighorn River Basin of Wyoming. The WIRSOS Model is essentially a monthly accounting model that simulates river and reservoir operations in accordance with the doctrine of prior appropriation.

Use of the WIRSOS model required the development of an extensive input data set describing several aspects of the river including:

- Water right demands and priorities
- Reservoir area-capacity data, priority, evaporation, and water righted storage amounts
- Monthly inflows and losses
- Locations of confluences, inflow and demand points, return flow points

This report describes the steps taken in the development of these data and the general use of the WIRSOS model.

1.3 Background

The Walker River Basin is located in eastern California and western Nevada (Figure 1-1) and has a total area of approximately 4,270 square miles, of which 3,340 square miles are in Nevada. The river system within the basin consists of the East and West Walker River, Walker River, and several small tributaries.

1.3.1 Climate. Climatic conditions vary widely from the valley floors to the higher mountains in the Sierra Nevada. Annual precipitation ranges from over 50 inches in the Sierra Nevada to a low of about 4 inches near Walker Lake. At the higher elevations, a majority of the precipitation is in the form of snow. Growing seasons vary from an average of about 90 days at Bridgeport to over 200 days at Hawthorne.

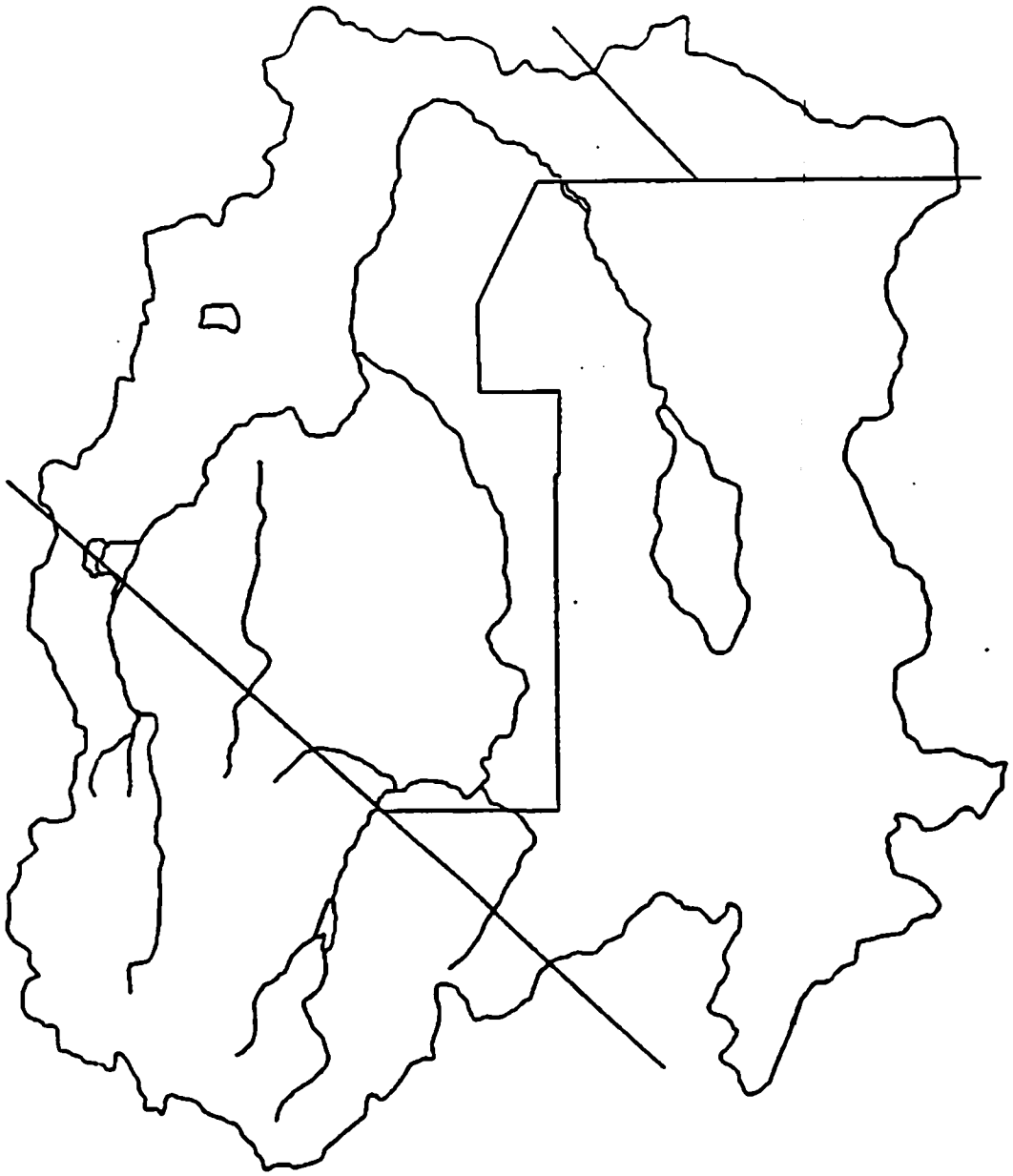

FIG. 1-1 WALKER RIVER BASIN

1.3.2 Water Resources. The hydrology of the Walker River Basin is typical for basins in the eastern Sierra Nevada rain shadow. Precipitation varies seasonally with most occurring in the winter as snow. Streamflows are also seasonal with peak flows in late spring as a result of snowmelt.

Under uncontrolled, conditions, runoff typically reaches a peak flow in late spring. The wide ranges in flow create multiple problems. Seasonal high flows often cause flood damage with serious erosion and sedimentation problems. At the other end of the flow regime, low flows limit agricultural production and result in higher water temperatures. Both sedimentation, low flows and high water temperatures adversely impact fish and wildlife, and water quality in the area.

1.3.3 Surface Water Rights. Federal Court records indicate the white man began irrigating lands on the upper tributaries of the Walker River Basin during 1860. Irrigation increase rapidly over next 20 years and by the turn of the century the natural flow of the river was deemed insufficient to meet the increasing demand. On March 24, 1919, under Decree 731 of the Federal District Court for Nevada, the amount of water to which each party was entitled, the source of the water, the area to which it was to be applied, and the priority for each use were established.

In April 1919, the Walker River Irrigation District (WRID) was organized. The District included all irrigated areas in Nevada on the East and West Walker, and main Walker Rivers, except for those lands within the Walker River Indian Reservation. Soon after formation of WRID, construction of Topaz and Bridgeport Reservoirs began. Topaz Reservoir was completed first and storage began the end of June 1922. Its capacity was originally 45,000 acre-feet, but in 1937 was increased to the present capacity of 59,440 acre-feet. Bridgeport was constructed to a 42,460 acre-foot capacity and storage began in December 1923.

Floodwater storage rights in the amount of 50,000 and 42,000 acre-feet were granted for Topaz Reservoir and Bridgeport Reservoir, respectively. Refill rights of 35,000 acre-feet for Topaz and 15,000 acre-feet for Bridgeport are also available, but can only be utilized when flows are in excess of the total demand by decreed rights.

Following the construction of Topaz and Bridgeport Reservoirs, duties of either 3.2 or 4.3 acre-feet per acre were established for the 120,000 acres within WRID. However, the available surface water in the system could only satisfy about 1/2 of these irrigation demands. As a result, about 80,000 acres are actually served by WRID. The remaining 40,000 acres have been stripped of associated water rights. A summary of these irrigated acres is given below:

Location	Acres
Smith Valley	20,750
East Walker River above Mason Valley	8,810
Mason Valley	
West Walker River	6,660
East Walker River	15,125
Walker River	28,955
Total	80,300

Source: Walker River Irrigation District database

In Decree 731, rights for many of the tributaries and several locations on the East and West Walker Rivers were considered. Also, Decree 731 granted the United States for the Walker River Indian Reservation rights to 22.93 cubic feet per second (cfs) for 1,906 acres with priorities ranging from 1868 to 1886. The U.S. Government did not accept these rights as being in the best interest of the Reservation.

Consequently, in July 1924 the United States initiated a new action to determine the rights of the upstream water users. This lengthy action was concluded in June 1939 with Decree C-125, which entitled the Reservation to a right of 26.25 cfs for 2,100 acres with an 1859 priority during a 180 day irrigation season.

The Decree further stated that the irrigation season in the Walker River Basin extends from March 1 to October 31, except for those areas above Bridgeport Reservoir on the East Walker and above the Coleville gaging station on the West Walker, where the irrigation season shall run from March 1 to September 15.

The California-Nevada Interstate Compact, which has been ratified by both states with U.S. Congressional ratification pending, further granted 13,000 acre-feet per year for storage in Weber Reservoir and later rediversion for use on the Walker River Indian Reservation. The Compact allocated all "unused water" physically available above the head of Mason Valley to the State of California and the State of Nevada on 35-65 percent split, respectively. Subsequently, the State Engineer's Office has issued water rights to WRID for this "unused water."

In addition to the rights discussed above, the Nevada Department of Wildlife has appropriated 795.2 cfs of river flow into Walker Lake for fish, game and recreation purposes with a priority date of September 17, 1970

A Board of U.S. Water Commissioners acts as watermaster, and has the duty of apportioning and distributing the waters of the Walker River system in both states, including water for storage and stored water, in accordance with all provisions of the Decree.

1.3.4 Ground Water Rights. In Nevada, ground water, as with surface water, is considered the property of the State. The Nevada State Engineer has established a duty of water to be applied to a beneficial use when issuing permits and certificates for irrigation purposes. In the Nevada portion of the Walker River Basin, this duty is 4 acre-feet per acre per season. The courts determine the quantity or duty of water to be applied to a beneficial use in the adjudication of water rights.

The most extensive groundwater development in the Walker River Basin has taken place in Smith and Mason Valleys. Portions of the ground water are used to supplement surface supplies during times of low flows. Due to increased development of groundwater, the State Engineer classified 3 of the valleys as designated basins (Smith Valley in 1960, Mason Valley in 1977, and Antelope Valley in 1978). Once designated, the State Engineer has additional authority in the administration of groundwater in the basin.

A summary of groundwater rights in the Nevada portion of the Walker River Basin is given below.

Area	Permitted Withdrawals, acre-feet		
	Irrigation	Other	Total
Antelope Valley	5,980	1,437	7,417
Smith Valley	57,109	1,979	59,088
Mason Valley	119,776	29,399	149,175
East Walker Area	8,266	742	9,008
Total	191,131	33,557	224,688

Source: Hydrographic Basin Summaries, 1992, Divisions of Water Planning and Water Resources.

2.0 WATER BUDGET

Prior to the development of the model, average annual water budgets for each of the 6 subareas were developed. The water budget of a basin can be expressed as a balance of the water entering the system with the amount of water leaving the system and any associated change in storage. The water budget can be expressed as the equation:

$$I = O \pm \Delta S \qquad (1)$$

where: I = inflow to the system
O = outflow leaving the system
ΔS = change in storage

The change in storage component can be either an addition of depletion of water. For the 30-year water budgets presented in this report, the budgets are assumed to be in steady-state conditions (inflow = outflow); therefore, the change in storage term in Equation (1) is assumed negligible with the exception of the Walker Lake subarea.

Inflows considered in the calculations included:

- river inflows
- local surface runoff
- groundwater recharge
- groundwater inflow

Outflows considered in the budgets included:

- river outflows
- diversions/withdrawals
- irrigation consumptive use
- phreatophyte evapotranspiration
- evaporation

Estimates of each of these components of the water budgets were taken from previous studies, if available, and adjusted as necessary to achieve a balance between inflows and outflows. As needed, the Division of Water Planning estimated other component values. The average annual water budgets for the 6 subareas of the Walker River basin are presented in Table 2-1. Figure 2-1 provides a schematic representation of the average budget for the entire study area. Following is a discussion of each component of the water budgets.

Table 2-1. Summary of Average 1961-90 Water Budgets
(All values in acre-feet per year)

Antelope Valley	
Inflow	
River inflow	199,000
Other surface inflow	7,000
Groundwater recharge	22,300
TOTAL	228,300
Outflow	
River outflow	188,100
Irrig. consumptive use	29,200
Phreatophyte ET	5,000
Lake evaporation	6,000
TOTAL	228,300
Smith Valley	
Inflow	
River inflow	188,100
Other surface inflow	
Artesia Lake basin	1,600
West Walker basin	6,400
Groundwater recharge	
Artesia Lake basin	3,000
West Walker basin	12,000
TOTAL	211,100
Outflow	
River outflow	142,000
Irrig. consumptive use	
Surface water	
Artesia Lake basin	10,000
West Walker basin	
W. Walker water	24,300
Local runoff	2,900
Groundwater	
Artesia Lake basin	1,800
West Walker basin	7,400
Phreatophyte ET	
Artesia Lake basin	9,000
West Walker basin	7,700
Artesia Lake evaporation	6,000
TOTAL	211,100

Table 2-1. Summary of Average 1961-90 Water Budgets (cont'd)
(All values in acre-feet per year)

East Walker River Basin	
Inflow	
River inflow	120,900
Other surface inflow	7,000
Recharge	17,900
TOTAL	145,800
Outflow	
River outflow	120,800
Irrig. consumptive use	10,600
Lake evaporation	4,000
Phreatophyte ET	10,400
TOTAL	145,800
Mason Valley	
Inflow	
River inflow	
West Walker River	142,000
East Walker River	120,800
Other surface inflow	6,000
Groundwater recharge	2,000
TOTAL	270,800
Outflow	
River outflow	136,900
Irrig. consumptive use	
Surface water	65,000
Groundwater	14,500
Phreatophyte ET	54,400
TOTAL	270,800
Schurz Area	
Inflow	
River inflow	136,900
Groundwater recharge	1,000
TOTAL	137,900
Outflow	
River outflow	103,000
Weber Reservoir evaporation	3,000
Irrig. consumptive use	15,000
Phreatophyte ET	16,900
TOTAL	137,900

Table 2-1. Summary of Average 1961-90 Water Budgets (cont'd)
(All values in acre-feet per year)

Walker Lake

Inflow	
River inflow	103,000
Precipitation	13,000
Local surface runoff	3,000
Groundwater inflow	3,000
TOTAL	122,000
Outflow	
Walker Lake evaporation	155,000
Storage deficit	-33,000
TOTAL	122,000

2.1 Antelope Valley

West Walker River flows. Based upon U.S.G.S. records (Sta. 10296500 and Sta. 10297500), an average of 199,000 AFY entered the valley and 188,100 AFY flowed from the valley (Appendix A).

Groundwater Recharge and Surface Water Inflow. Glancy (1971) estimated average recharge to be about 18,000 AFY and surface water inflow at 7,000 AFY. For this study, recharge and surface water inflows were assumed to be 22,100 AFY and 7,000 AFY, respectively. This adjustment was made in an effort to balance basin inflows and outflows.

Irrigation Diversions and Consumptive Use. Based upon W.R.I.D. records, an average of 64,800 AFY was diverted from the West Walker River within Antelope Valley (Appendix C). It was assumed that 29,000 AFY (45 %) of the diversions was consumed with the remainder entering the groundwater.

Phreatophyte Evapotranspiration. Glancy (1971) estimated phreatophyte evapotranspiration at 6,000 AFY. A value of 5,000 was used in this study.

Topaz Lake Net Evaporation. Utilizing USGS end-of-month storage data and the Topaz Lake storage-area relationship, an average water surface area value was estimated. Average evaporation in the Topaz Lake area of 4 feet per year was used (Navoy and others, November 1980). Based upon NOAA records, the 1961-90 average precipitation at Topaz Lake is about 9 inches per year (Appendix B). Applying a net evaporation rate of about 3.25 feet per year to the average lake surface area yields an average net evaporation of about 6,000 acre-feet per year.

2.2 Smith Valley

West Walker River Flows. Based upon USGS records and Division of Water Planning estimates, an average of 188,100 AFY entered the valley (Sta. 10297500) and 142,000 AFY flowed from the valley (Sta. 10300000) (Appendix A). For the period 1979-90, the USGS collected streamflow data at Sta. 10300000 only during the months April through September. The Division of Water Planning estimated flows for the missing months using equations developed from regression analyses of Sta. 10297500 and Sta. 10300000 data. This estimation process is described in more detail in Section 3.2.6.

Groundwater Recharge and Surface Water Inflow. Rush and Schroer (1976) estimated average recharge to be about 17,000 AFY. Snowmelt produces most of the streamflow that is generated within Smith Valley. For this report a total recharge figure of 15,000 AFY was used, with 12,000 AFY (80%) to the West Walker groundwater system and 3,000 AFY (20%) to the Artesia Lake basin groundwater system.

Rush and Schroer also calculated local surface runoff to average 12,000 AFY but stated that much of this contributes to recharge, is diverted for irrigation, and is consumed by phreatophytes and evaporation. An adjusted value of 8,000 AFY was selected for this study. Average surface inflows of 6,400 AFY (80%) and 1,600 AFY (20%) were assumed for the West Walker basin and Artesia Lake basin, respectively.

Surface Water Irrigation Diversions and Consumptive Use. WRID records indicate that an average of 76,300 AFY was diverted from the West Walker River within Smith Valley (Appendix C).

Rush and Schroer identified a groundwater divide between West Walker River and Artesia Lake. Groundwater north of this divide flows towards Artesia Lake, and groundwater south of the divide flows towards Walker River.

Of the 76,300 AFY diverted from the West Walker, 29,600 AFY were diverted into Colony Ditch on the north side of the river. It was assumed that 75% (22,200 AFY) of the Colony Ditch diversions served lands in the Artesia Lake basin (area north of groundwater divide), with the other 25% used in the West Walker drainage. Of the 54,100 AFY (76,300 - 22,200) used for irrigation in the West Walker drainage, about 24,300 AFY (45%) was assumed to be consumptively used with the remainder entering the groundwater system. In the Artesia Lake basin, approximately 10,000 AFY (45%) is consumptively used by irrigation activities.

In the West Walker basin, local runoff contributes about 6,400 AFY. It was assumed that all of this water is diverted for irrigation before it can enter the West Walker River. Additional irrigation consumptive use losses were estimated at 2,900 AFY (45%) with the remaining 3,500 AFY entering the groundwater system.

Groundwater Irrigation Pumpage and Consumptive Use.

Previous studies have estimated irrigation groundwater withdrawals for various years:

1961 - 18,200 AFY (Domenico and others, 1966)
1962 - 4,700 AFY
1963 - 3,500 AFY
1964 - 11,200 AFY

1965 - 2,300 AFY (USDA, June 1969)

1972 - 20,000 AFY (Rush and Schroer, 1972)

1974 - 12,600 AFY (Navoy and others, 1980)
1975 - 10,000 AFY
1976 - 30,000 AFY
1977 - 36,500 AFY

In general the above withdrawals were calculated using the following equation:

$$\text{Acre-feet pumped} = \frac{(0.976 \times KWH \times E)}{H} \qquad (2)$$

where: KWH = electrical energy consumption, in kilowatt hours
E = efficiency of the pump, in decimal
H = pumping lift, in feet

Using a similar methodology, the Division of Water Planning calculated annual groundwater pumpage for the period 1985-90 using Equation 2. Due to the lack of detailed information, many assumptions were required in this estimation process. Following is a discussion of the steps taken in deriving groundwater pumpage estimates.

Energy consumption data

The Division of Water Planning obtained energy consumption data from SPPCo for the period 1985-90. Data prior to this period were not readily available. SPPCo provided monthly energy consumption data for each of the 4 meter reading routes in Smith Valley. Because of customer privacy concerns, it was not possible to obtain more detailed information, such as customer name, account number and location.

Even though monthly power consumption data were available, the lack of other monthly data, such as pump lift, restricted pumpage estimates to an annual basis.

Efficiency

For this study, an efficiency of 50 percent was used for pumps. The normal efficiency range is about 50 to 80 percent (Navoy and others, November 1980). This efficiency term is for the pump motor and turbine, and not the well. Well efficiency was included in the pumping lift.

Pump lift

Determining actual pumping lift was the most difficult part of calculating pumpage. Pumping lift is the sum of 1) depth to the water table; 2) formation and well loss; and 3) head needed to drive a sprinkler system if one exists. Unfortunately the various components of pumping lift need to be approximated based upon limited data.

Some historic water level data are available for Smith Valley for the period 1985-90. However, without individual irrigation pump power consumption and well location information, it was

necessary to assume an average groundwater level for each meter reading route.

Average drawdowns in the irrigation wells (or formation losses) were developed from aquifer specific capacity estimates. Using some assumptions, Rush and Schroer (1976) demonstrated that specific capacity can be related to transmissivity as follows:

$$\text{Specific capacity, in gpm} = \frac{T}{2000} \qquad (3)$$

where: T = transmissivity, in gallons per day per foot (gpd/ft)

Based upon a map presented by Huxel (1969), transmissivity in Smith Valley varies from less than 50,000 gpd/ft to over 100,000 gpd/ft. Formation losses increase with decreasing transmissivity. For this study, a transmissivity of 50,000 gpd/ft was assumed. Next, average formation losses within the meter routes were estimated using the following equation:

$$\text{Formation loss, in feet} = \frac{\text{Pump rate, in gpm}}{\text{Specific Capacity, in gpm/ft}} \qquad (4)$$

Assuming an average pump discharge of 2000 gpm, an average formation loss of 80 feet was estimated for each meter reading route.

An additional component of pumping lift is the head required to drive a sprinkler system. In Smith Valley, pumped groundwater is applied to the fields through flood irrigation and sprinkler systems. Due to the lack of data, it was necessary to make an assumption of additional head required in each of the meter reading routes. For this study, an additional 50 feet was added to the pumping lift in the pumpage calculation.

Results

Annual groundwater pumpage volumes for each meter reading route were estimated using Equation 2 and the various assumptions discussed above. The aggregated results of these calculations are:

1985 - 21,000 AF
1986 - 13,000 AF
1987 - 23,000 AF
1988 - 32,000 AF
1989 - 28,000 AF
1990 - 34,000 AF

The next step was estimation of groundwater withdrawals for the years 1966-71, 1973, 1978-84. Figure 2-2 is a plot of the above groundwater withdrawals figures and corresponding surface water irrigation diversions. As expected, these data indicate that groundwater withdrawals increase with decreases in surface water diversions. There appears to have been an upward shift in the groundwater withdrawal-surface water withdrawal relationship from the early 1960s to the 1970s. This shift is probably indicative of increases in groundwater development during this period.

To serve as an upper bound of the data, the following equation was developed (See Figure 2-2):

$$AGW = 40{,}000 - (0.235 \times ASW) \qquad (5)$$

where: AGW = annual groundwater withdrawals, in acre-feet per year
ASW = annual surface water withdrawals, in acre-feet per year

Using this equation, groundwater withdrawals for the years 1966-71, 1973, 1978-84 were calculated. An average valley-wide groundwater pumpage of 18,400 AFY (14,700 AFY in West Walker drainage, 3,700 AFY in Artesia Lake basin) was then estimated for the study period 1961-90. It was assumed that 9,200 AFY (50%) is consumptively used.

Phreatophyte Evapotranspiration. Rush and Schroer (1976) estimated phreatophyte evapotranspiration at 14,000 AFY (5,000 AFY in the West Walker drainage; 9,000 AFY in the Artesia Lake basin). This value was adjusted to 16,700 AFY to facilitate the balancing of Smith Valley inflows and outflows. Of this total, 7,700 AFY was assumed to consumptively used by phreatophytes in the West Walker drainage, and 5,000 AFY in the Artesia Lake basin.

Artesia Lake Evaporation. Based upon Rush and Schroer (1976), an average Artesia Lake evaporation amount of 6,000 AFY was assumed.

2.3 East Walker River Basin

East Walker River flows. Based upon USGS records and Division of Water Planning estimates, an average of 116,900 AFY was released from Bridgeport Reservoir (Sta. 10293000) and 120,800 AFY flowed from the valley into Mason Valley (Sta. 10293500) (Appendix A). For the period 1979-90, the USGS collected streamflow data only during the months April through September. The Division of Water Planning estimated flows for the missing months using equations developed from regression analyses of Sta. 10293000 and Sta.

10293500 data. This estimation process is described in more detail in Section 3.2.6.

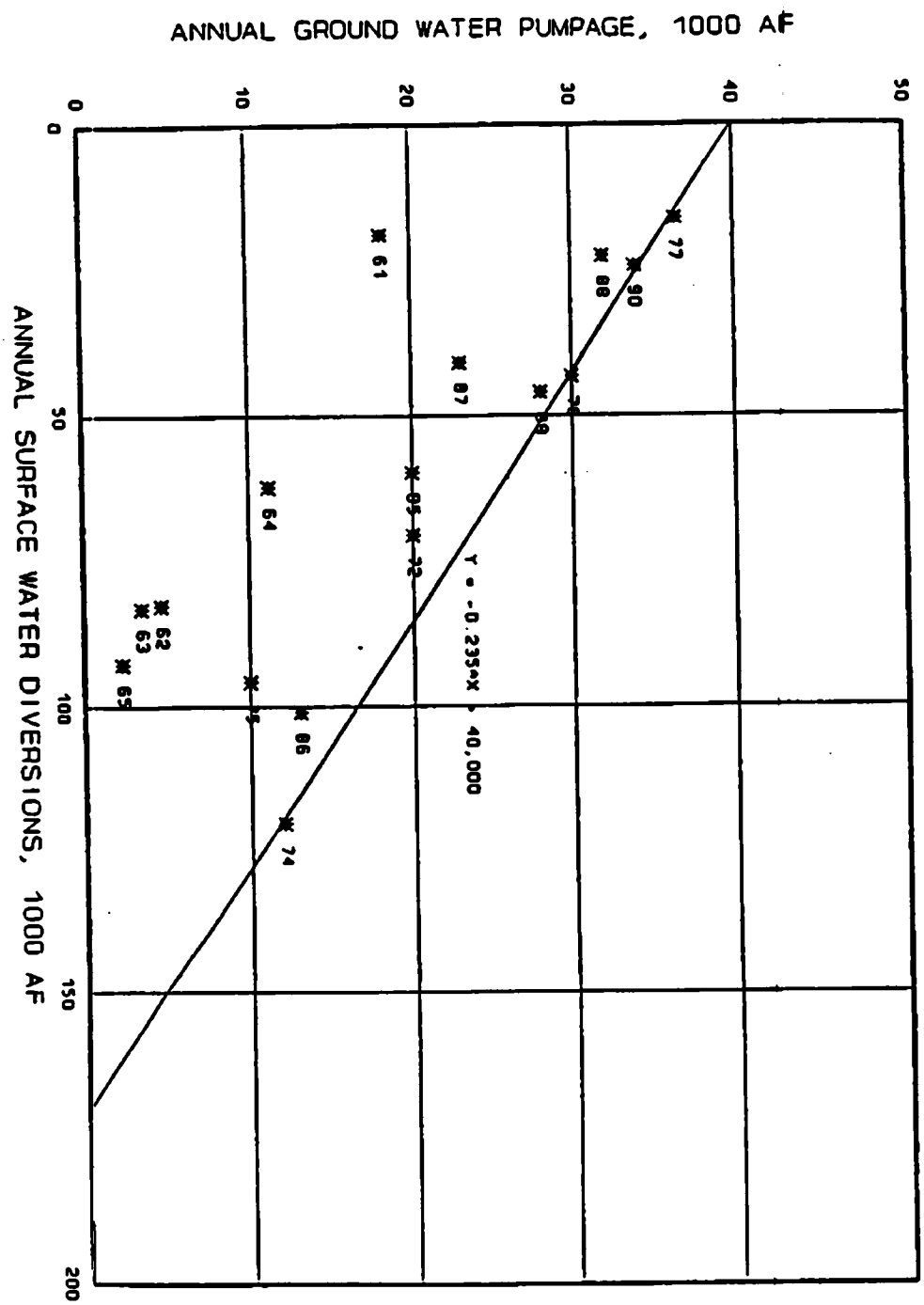

FIGURE 2-2. SMITH VALLEY GROUND WATER PUMPAGE VS. SURFACE WATER DIVERSIONS

Average annual stream inflows to Bridgeport Reservoir were estimated at 120,900 AFY by adding net reservoir evaporation (discussed under Bridgeport Reservoir Net Evaporation) from the average reservoir release of 116,900 AFY.

Groundwater Recharge and Surface Water Inflow. Glancy (1971) estimated average recharge to be about 31,000 AFY, and surface water runoff at 30,000. However, Glancy stated that the surface runoff contributes to the recharge with minimal flow entering the East Walker River. In the total water budget, Glancy assumed that the only inflow was the 31,000 AFY attributed to recharge. Even with this assumption, his estimated water budget was not balanced with total basin inflows exceeding outflows by 13,000 AFY. For this study, it was assumed that recharge is a lower value of 17,900 AFY and a runoff volume of 7,000 AFY reaches the East Walker River.

Irrigation Diversions and Consumptive Use. Based upon WRID records, an average of 23,800 AFY was diverted from the East Walker River (Appendix C). It was assumed that 10,700 AFY (45%) of the diversions are consumed with the remainder entering the groundwater system.

Phreatophyte Evapotranspiration. Glancy (1971) estimated phreatophyte evapotranspiration at 7,500 AFY. A higher value of 10,400 was used in this study as part of the inflow/outflow balancing adjustments.

Bridgeport Reservoir Net Evaporation. Utilizing USGS end-of-month storage data and the Bridgeport Reservoir storage-area relationship, an average water surface area value was estimated. Applying an evaporation rate of 3 feet per year and an average precipitation rate of about 10 inches per year (Appendix B), and average annual net evaporation of about 4,000 AFY was estimated.

2.4 Mason Valley

Walker River Flows. Based upon U.S.G.S. records, an average of 262,800 AFY (Sta. 10293500 - 120,800 AFY; Sta. 10300000 - 142,000 AFY) entered the valley and 136,900 AFY (Sta. 10301500) flowed from the valley (Appendix A).

Groundwater Recharge and Surface Water Inflow. Based upon Huxel (1969), average recharge and local surface water inflow values of 2,000 AFY and 6,000 AFY, respectively, were assumed.

Surface Water Irrigation Diversions and Consumptive Use. Based upon W.R.I.D. records, an average of 21,100 AFY was diverted from the West Walker River within Mason Valley; 51,400 AFY from the East Walker River within Mason Valley; and 71,800 AFY from the Walker River (Appendix C). Of the total 144,300 AFY diverted, it was assumed that approximately 65,000 AFY (45%) was consumptively used.

Groundwater Irrigation Pumpage and Consumptive Use. Groundwater irrigation pumpage was estimated by Huxel (1969) for the period 1961-65:

1961 - 20,000 AFY
1962 - 9,200 AFY
1963 - 6,700 AFY
1964 - 21,000 AFY
1965 - 1,200 AFY

To estimate groundwater pumpage, Huxel used Equation 2 and energy consumption data supplied by Sierra Pacific Power Company (SPPCo), estimates of pumping lift and a wire-to-water efficiency. For the period 1985-90, the Division of Water Planning used a similar methodology in estimating groundwater withdrawals in Mason Valley. A detailed discussion of the methodology is presented in Section 2.2.

Energy Consumption Data

The Division of Water Planning obtained energy consumption data from SPPCo for the period 1985-90.

Efficiency

For this study, an efficiency of 50% was used. As discussed in Section 2.2, this efficiency term is for the pump motor and turbine, and not the well. Well efficiency was included in the pump lift term.

Pump Lift

Pumping lift includes 1) depth to the water table; 2) formation and well loss; and 3) head needed to operate a sprinkler system. As discussed in Section 2.2, there were numerous problems encountered in estimating pump lift. For instance, water level data are available for Mason Valley for the period 1985-90. However, without individual irrigation pump power consumption and well location information, it was necessary to assume an average groundwater level for each meter reading route.

Based upon a map of aquifer transmissivity presented by Huxel (1969), transmissivity in Mason Valley ranges from less than 50,000 gpd/ft to over 200,000 gpd/ft in limited areas. For this study, a transmissivity of 50,000 gpd/ft was applied to each meter reading route. From Equation 3, an average specific capacity of 25 gpm/ft was calculated. It was assumed that the average pump discharge was 2000 gallons per minute. From Equation 4, an average formation loss of 80 feet was calculated.

An additional component of pumping lift is the head needed to drive a sprinkler system. In Mason Valley, pumped groundwater

is applied to the fields through flood irrigation and sprinkler systems. Without energy consumption data for specific wells with a known location, it was necessary to make an assumption of additional head required in each of the meter reading routes. For this study, an additional 50 feet was added to the pumping lift in the pumpage calculation.

Results

Annual groundwater pumpage volumes for each meter reading route were estimated using Equation 2 and the various assumptions discussed above. The aggregated results of these calculations are:

1985 - 28,000 AF
1986 - 16,000 AF
1987 - 43,000 AF
1988 - 59,000 AF
1989 - 48,000 AF
1990 - 63,000 AF

The next step was estimation of groundwater withdrawals for the years 1966-84. Figure 2-3 is a plot of the above groundwater withdrawals and corresponding surface water irrigation diversions. As anticipated, these data indicate that groundwater withdrawals increase with decreases in surface water diversions. There appears to have been an upward shift in the groundwater withdrawal-surface water withdrawal relationship from the 1960s to the 1980s. This shift was also identified in Smith Valley (Figure 2-2) and is probably indicative of increases in groundwater development between the 1960s and 1980s.

To serve as an upper bound of the data, the following equation was developed (See Figure 2-3):

$$AGW = 80{,}000 - (0.320 \times SWD) \qquad (6)$$

where: AGW = annual groundwater withdrawals, in acre-feet per year
ASW = annual surface water withdrawals, in acre-feet per year

Using this equation, groundwater withdrawals for the years 1966-84 were calculated. An average valley-wide groundwater pumpage of about 29,000 AFY was then estimated for the study period. Of this amount, it was assumed that 14,500 AFY (50%) was consumptively used.

Phreatophyte Evapotranspiration. Huxel (1969) estimated phreatophyte evapotranspiration at 57,000 AFY. For this study it was assumed that 54,400 AFY is lost through phreatophyte ET in Mason Valley. This value was adjusted in order to balance

estimated water budget inflows and outflows.

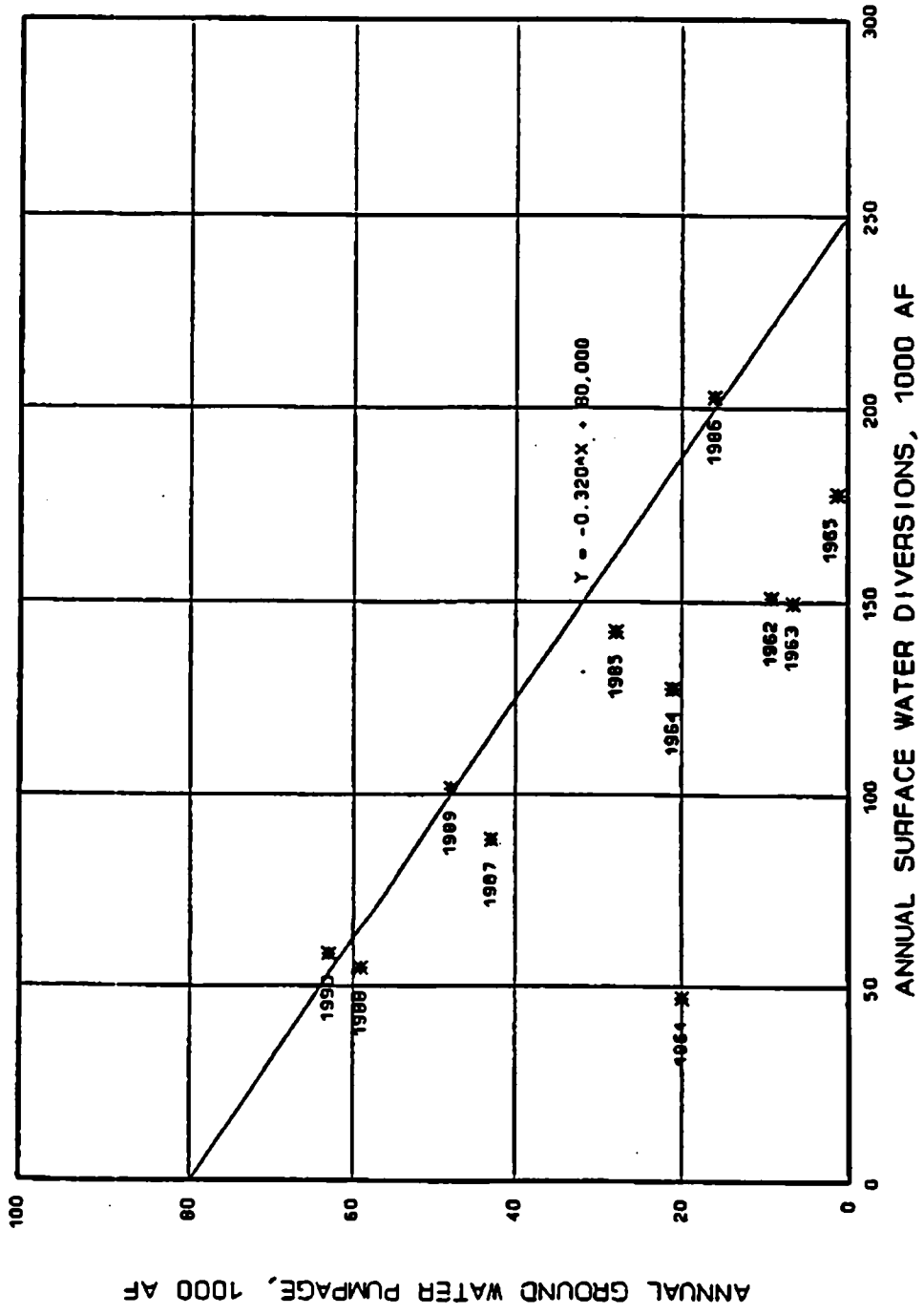

FIGURE 2-3. MASON VALLEY GROUND WATER PUMPAGE VS. SURFACE WATER DIVERSIONS

2.5 Schurz Area

Walker River Flows. Based upon USGS records and Division of Water Planning estimates, a 1961-90 average inflow of 136,900 AFY was measured at Sta. 10301500 (Appendix A). The Division of Water Planning has estimated an average outflow of about 103,000 AFY from the Schurz Area to Walker Lake (See Section 2.6).

Groundwater Recharge and Surface Water Inflow. Schaefer (December 1980) estimated groundwater recharge at 650 AFY. A value of 1,000 AFY was used for this study.

Irrigation Diversions and Consumptive Use. According to Schaefer (December 1980), an average of 32,000 AF is diverted annually for irrigation within the Walker River Indian Reservation. Of this amount, he assumed 12,000 AFY was consumptively used. As part of the inflow/outflow balance process, the consumptive use was increased to 15,000 AFY (about 45% efficiency) for this report.

Phreatophyte Evapotranspiration. Schaefer (1980) estimated phreatophyte evapotranspiration at 14,000 AFY. A higher value of 16,900 was used in this study as part of the inflow/outflow balancing adjustments.

Weber Reservoir Net Evaporation. An average net evaporation from Weber Reservoir of about 3,000 AFY was estimated (Schaefer, 1980).

2.6 Walker Lake

As Walker River flows into Walker Lake are not gaged, the Division of Water Planning estimated annual inflows for the 30-year study period.

For Walker Lake, where the change in storage has been an overall depletion, Equation 1 is modified as follows:

$$I_R + I_L + I_{GW} + P = E - \Delta S \qquad (7)$$

where: I_R = Walker River inflow
I_L = local surface runoff
I_{GW} = groundwater inflow
P = precipitation directly on the lake surface
E = lake evaporation
ΔS = change in storage

Solving for I_R, Equation (7) becomes:

$$I_R = E - I_L - I_{GW} - P - \Delta S \qquad (8)$$

From Equation (8), annual Walker River inflows were calculated for each year of the study period 1961-90. Local surface inflow, I_R, was estimated by Everett and Rush (1967) to be 3,000 AFY. I_{GW} was estimated by Rush (1974) at 3,000 AFY.

Utilizing USGS end-of-month storage data and the Walker Lake storage-area relationship, the annual water surface area for each year in the study period was calculated. Applying a precipitation rate of 4 inches per year, an average precipitation inflow, P, of 13,000 AFY was estimated. Assuming an evaporation rate of 4 feet per year, a 30-year average evaporation, E, of 155,000 AFY was estimated.

USGS end-of-month storage data indicate that Walker Lake has declined an average of 33,000 AFY (ΔS) during the study period.

Solving equation 8 yielded an average Walker River inflow of 103,000 AFY.

3.0 MODEL INPUT DEVELOPMENT

Required input for the WIRSOS Model can be divided into 5 main categories :

Stream network, identifying:

- Flow direction and stream confluences
- Points of inflow, losses, diversions

Inflows/losses, such as:

- River and local surface water inflows
- Ground water recharge
- Phreatophyte consumptive use
- Other inflows and losses

Water rights data, i.e. priority dates and allowable diversion amounts, for:

- Direct flow diversions
- Supplemental storage water diversions
- Storage water diversions
- Instream flow requirements

Return flow data, describing:

- Percentage of diversion that is consumed
- Delay pattern by which unconsumed portion returns to river

Reservoir and lake data, such as:

- Storage water rights
- Maximum and minimum storage volumes
- Outlet works capacity
- Evaporation rates
- Area-capacity curves

3.1 Stream Network Numbering System

For WIRSOS to simulate a river basin, a modeling system is necessary to define the network of stream which comprise the river basin study area. The stream network identified determines the direction of flow in the river and facilitates the distribution of runoff and the superposition of diversions, instream flows, and reservoirs. As part of this step, a schematic representation of the study area was defined (See Figure 3-1). Within the schematic, station numbers were assigned at points of inflows, diversions, return flows, losses, reservoirs, and any other point where an accounting of the water is desired.

WIRSOS does not directly handle interaction between the ground

water and surface water. In order to account for ground water recharge, ground water pumpage, phreatophyte losses, etc., artificial ground water "tributaries" were included in the WIRSOS network.

3.2 Inflows and Losses

One of the first steps in developing the WIRSO$ input data set is the estimation of inflows to and losses within the study area. Monthly inflows and losses that were developed included:

- East and West Walker River inflows
- Ground water irrigation consumptive use
- Ground water recharge
- Local surface water inflows
- Phreatophyte losses

As discussed in Section 2.0 WATER BUDGET, there are system losses other than those listed above, such as surface water irrigation consumptive use, and reservoir evaporation. However, these items are estimated by the WIRSOS model and therefore are not included in the input data set.

For this draft version of the model, natural monthly inflows and losses within the Schurz subarea were not included. All local inflows and losses were lumped into the irrigation diversions calculated by WIRSOS. It was assumed that 100% of the surface water diversions are consumed by irrigation activities, phreatophytes, and other losses with no return flows. According to the average annual water budget (Section 2.0), the difference between the Schurz inflows and outflows is approximately equal to the surface water diversions. It may be desirable to modify this portion of the model in future versions.

Following is a discussion of the annual and monthly data compiled and generated for WIRSOS input. Monthly West Walker River inflows were taken from USGS gaging records. Monthly values for the other components were estimated by the Division of Water Planning.

3.2.1 <u>River Inflows</u>. Monthly West Walker River inflows were compiled from USGS gaging records for Sta. 10296500 - West Walker River near Coleville, CA. East Walker River inflows into Bridgeport Reservoir were estimated using the following equation:

$$\begin{aligned} \textit{Bridgeport Reservoir inflow} = {} & \textit{Change in storage} \\ & + \textit{Reservoir outflow} \\ & + \textit{Lake evaporation} \\ & - \textit{Precipitation on lake surface} \end{aligned} \qquad (9)$$

In this equation, the "change in storage" component was calculated from USGS end-of-month storage data for Sta. 10292500 - Bridgeport Reservoir near Bridgeport, CA. Monthly reservoir outflow volumes were compiled from USGS records for Sta. 10293000 - East Walker

River near Bridgeport, CA. Average monthly water surface areas were calculated utilizing the Bridgeport Reservoir storage-area relationship. By applying monthly evaporation rates listed below:

January	0.06 ft.	July	0.50 ft.
February	0.07 ft.	August	0.53 ft.
March	0.16 ft.	September	0.40 ft.
April	0.18 ft.	October	0.25 ft.
May	0.27 ft.	November	0.14 ft.
June	0.38 ft.	December	0.06 ft.
		TOTAL	3.00 ft.

and the monthly precipitation amounts (Appendix B) to these areas, the remaining components of Equation 9 were estimated. Estimated monthly reservoir inflows are presented in Appendix D.

3.2.2 Ground Water Irrigation Consumptive Use. Annual ground water irrigation withdrawals were estimated as discussed in Section 2.0. Monthly withdrawals were assumed to vary in direct proportion to the surface water diversions and were calculated as follows:

$$MGWW_{Year=X,\ Month=Y} = \frac{MSWD_{Year=X,\ Month=Y}}{ASWD_{Year=X}} \times AGWW_{Year=X} \qquad (10)$$

where:

$AGWW_{Year=X}$ = Annual groundwater withdrawals for Year X, in acre-feet per year.

$ASWD_{Year=X}$ = Annual surface water diversions for Year X, in acre-feet per year.

$MGWW_{Year=X,\ Month=Y}$ = Monthly groundwater withdrawals for Year X, Month Y, in acre-feet per year.

$MSWD_{Year=X,\ Month=Y}$ = Monthly surface water diversions for Year X, Month Y, in acre-feet per year.

Estimated monthly ground water irrigation withdrawals are presented in Appendix E. Assuming an efficiency of 50%, monthly groundwater consumptive use amounts were estimated.

3.2.3 Groundwater Recharge. For the 6 subareas in WRID, it was assumed that recharge is directly proportional to flows at Sta. 10296000 - "West Walker River below Little Walker River near Coleville, CA," at which flows are assumed indicative of natural flow conditions. Annual and monthly recharge figures for model input were calculated using the following equations:

$$AGWR_{Year=X} = \frac{Annual\ Flow\ @\ Sta.\ 10296000_{Year=X}}{Avg.\ Annual\ Flow\ @\ Sta.10296000} \times AVGWR \qquad (11)$$

$$MGWR_{Year=X,\ Month=Y} = \frac{Monthly\ flow\ @\ Sta.10296000_{Year=X,\ Month=Y}}{Annual\ flow\ @\ Sta.10296000_{Year=X}} \times AGWR_{Year=X} \qquad (12)$$

where: $AGWR_{Year=X}$ = Annual groundwater recharge for year X, in acre-feet per year.

$AVGWR$ = Average annual groundwater recharge for years 1961-90, in acre-feet per year.

$MGWR_{Year=X,\ Month=Y}$ = Monthly groundwater recharge for Year X, Month Y, in acre-feet per year.

Estimated monthly ground water recharge values are presented in Appendix F.

3.2.4 Local Surface Water Inflow. As with recharge, it was assumed that local surface water inflow is directly proportional to flows at Sta. 10296000 - "West Walker River below Little Walker River near Coleville, CA." Annual and monthly local surface inflow figures for model input were calculated using the following equations:

$$ASWI_{Year=X} = \frac{Annual\ Flow\ @\ Sta.10296000_{Year=X}}{Avg.\ Annual\ Flow\ @\ Sta.10296000} \times AVSWI \qquad (13)$$

$$(14)\ MSWI_{Year=X,\ Month=Y} = \frac{Monthly\ flow\ @\ Sta.10296000_{Year=X,\ Month=Y}}{Annual\ flow\ @\ Sta.10296000_{Year=X}} \times ASWI_{Year=X}$$

where: $ASWI_{Year=X}$ = Annual surface water inflow for Year X, in acre-feet per year

$AVSWI$ = Average annual surface water inflow for period 1961-90, in acre-feet per year

$MSWI_{Year=X,\ Month=Y}$ = Monthly surface water inflow for

Year X, Month Y, in acre-feet per year

Estimated monthly local surface runoff values are presented in Appendix G.

3.2.5 Phreatophyte Evapotranspiration. Annual phreatophyte evapotranspiration was assumed to vary with flows at Sta. 10296000 - "West Walker River below Little Walker River near Coleville, CA."

$$APET_{Year-X} = \left(\left(\frac{Annual\ Flow\ @\ Sta.\ 10296000_{Year-X}}{Avg.\ Annual\ Flow\ @\ Sta.\ 10296000} - 1\right) \times 0.5 \times AVPET\right) + AVPET \qquad (15)$$

where: $APET_{Year-X}$ = Annual phreatophyte evapotranspiration for Year X, in acre-feet per year

AVPET = Average annual phreatophyte evapotranspiration for period 1961-90, in acre-feet per year

Monthly phreatophyte evapotranspiration amounts were calculated by distributing the annual figures by the following percentages:

January	1%	July	18%
February	3%	August	17%
March	5%	September	10%
April	8%	October	7%
May	11%	November	3%
June	16%	December	1%

This distribution follows the monthly distribution of crop evapotranspiration in the Yerington area as presented by the SCS (1981). Estimated monthly phreatophyte evapotranspiration values are presented in Appendix H.

3.2.6 Inflows and Losses Calibration. The purpose of this step was to test the suitability of the input data described in Sections 3.2.1 through 3.2.5. With the aid of spreadsheets, the monthly water budgets for Antelope, Smith and Mason Valleys, and the East Walker River subarea were simulated. Due to the lack of monthly streamflow data in the Schurz and Walker Lake subareas, monthly water budgets were not developed for these areas.

Utilizing the equations in Table 3-1, the spreadsheets

calculated annual and monthly river outflows from Antelope, Smith and Mason Valleys, and the East Walker River subarea. These predicted outflows were compared to actual gaged flows. Statistics performed on the historic and predicted outflows were used as a measure of input suitability.

Spreadsheet input included those data described in Section 3.2.1 through 3.2.5 and other additional data needed for solving the equations in Table 3-1:

- River inflows to and outflows from valleys
- Surface water irrigation diversions and return flows
- Topaz Lake diversions and releases

River Inflows and Outflows

Monthly data were compiled for the following USGS gaging stations (See Appendix A):

Sta. 10293500 - East Walker River above Strosnider Ditch near Mason, NV
Sta. 10297500 - West Walker River at Hoye Bridge near Wellington, NV
Sta. 10300000 - West Walker River near Hudson, NV
Sta. 10301500 - Walker River near Wabuska, NV

For those years after 1978, data were not collected by the USGS at Sta. 10293500 and Sta. 10300000 during the non-irrigation season (October through March). In order to estimates these missing flows, regression equations were developed which related monthly flows at Sta. 10293500 to those at Sta. 10293000, and monthly flows at Sta. 10300000 to flows at Sta. 10297500 (Table 3-2). The resulting equations had high coefficients of determination, R^2, and therefore were deemed suitable for purposes of this study.

Table 3-1. Monthly Water Budget Equations

River Outflow Equations

Antelope Valley only

River outflow = River inflow
- Surface water diversions
+ Local surface water runoff (16)
- Topaz Lake diversions(+)/releases(-)
+ Groundwater discharge to river

Smith Valley, East Walker River & Mason Valley

River outflow = River inflow
- Surface water diversions (17)
+ Local surface water runoff
+ Groundwater discharge to river

Groundwater Discharge Equation

Antelope Valley and East Walker River

Groundwater discharge to river = Irrigation return flow
+ Recharge (18)
- Phreatophyte evapotranspiration

Smith and Mason Valleys

Groundwater discharge to river = Irrigation return flow
+ Recharge
- Phreatophyte evapotranspiration (19)
- Groundwater withdrawals
+ Groundwater irrigation return flow

Table 3-2. Regression Equations for Estimating Monthly Flows at Sta. 10293500 and Sta. 10300000

Equation for estimating flows at Sta. 10293500:

Flow at 10293500 = A x (Flow at 10293000) + B

Month	Equation Coefficients A	Equation Coefficients B	R^2
October	1.102	700	0.893
November	1.014	1,300	0.889
December	0.941	1,400	0.901
January	0.984	1,200	0.984
February	1.116	850	0.925
March	1.025	200	0.974

Equation for estimating flows at Sta. 1030000:

Flow at 10293500 = A x (Flow at 10293000) + B

Month	Equation Coefficients A	Equation Coefficients B	R^2
October	0.716	850	0.884
November	1.149	750	0.818
December	1.003	1,050	0.900
January	0.985	1,150	0.959
February	1.074	1,100	0.983
March	1.053	1,100	0.989

Surface Water Irrigation Diversions and Return Flows

Monthly diversions for each of the canals within the Walker River Irrigation District and Antelope Valley were compiled from records at the WRID office in Yerington. Return flows were set equal to 55% of diversions (45% efficiency - See Section 2.0 WATER BUDGET).

Topaz Lake Diversions and Releases

Monthly diversions to and releases from Topaz Lake were calculated using the following equation:

$$\begin{aligned} \textit{Topaz Lake diversions}(+)/\textit{releases}(-) = {} & \textit{Change in storage} \\ & + \textit{Lake evaporation} \\ & - \textit{Precipitation on lake surface} \end{aligned} \qquad (20)$$

In this equation, the "change in storage" component was calculated from USGS end-of-month storage data for Sta. 10297000 - Topaz Lake near Topaz, CA. Average monthly water surface areas were calculated utilizing the Topaz Lake storage-area relationship. By applying monthly evaporation rates listed below (Navoy and others, November 1980):

January	0.08 ft.	July	0.68 ft.
February	0.09 ft.	August	0.72 ft.
March	0.21 ft.	September	0.53 ft.
April	0.24 ft.	October	0.33 ft.
May	0.36 ft.	November	0.18 ft.
June	0.50 ft.	December	0.08 ft.
		TOTAL	4.00 ft.

and the monthly precipitation amounts (Appendix *) to these areas, the remaining components of Equation 20 were estimated.

Calibration Process

Initial monthly spreadsheet runs were performed using the input previously described. Resulting monthly and annual outflows are graphically compared with historic outflows on Figure 3-2 through 3-5. In all cases, predicted monthly inflows were higher than measured during the runoff months May, June and July, and lower than measured during the fall and winter. A better correlation between measured and simulated monthly flows was desired.

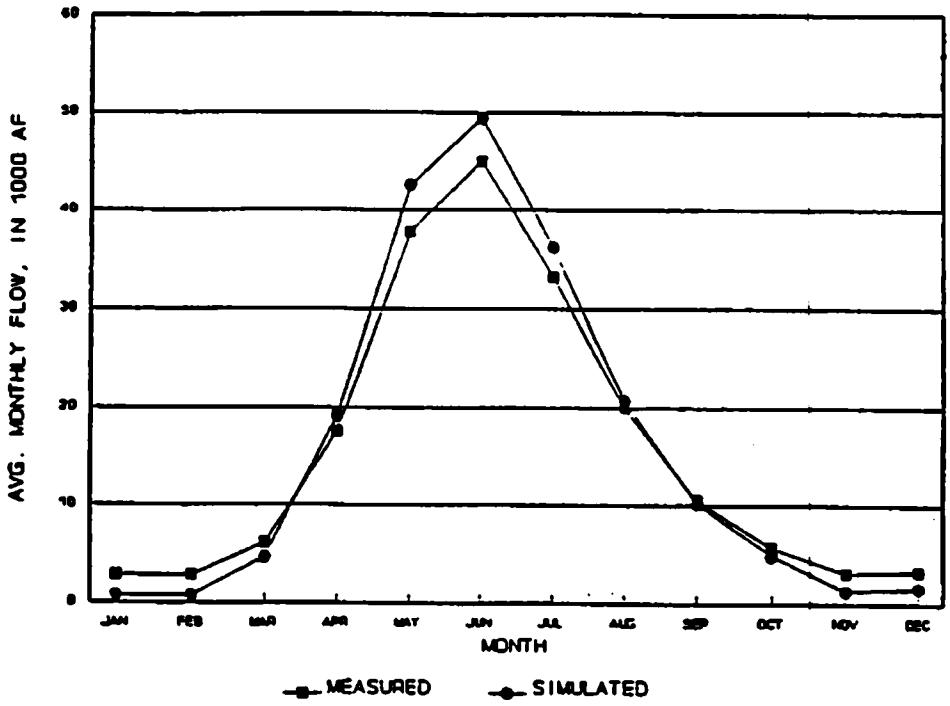

FIGURE 3-2. MEASURED AND SIMULATED (INITIAL) AVERAGE MONTHLY OUTFLOW FROM ANTELOPE VALLEY - STA. 10297500

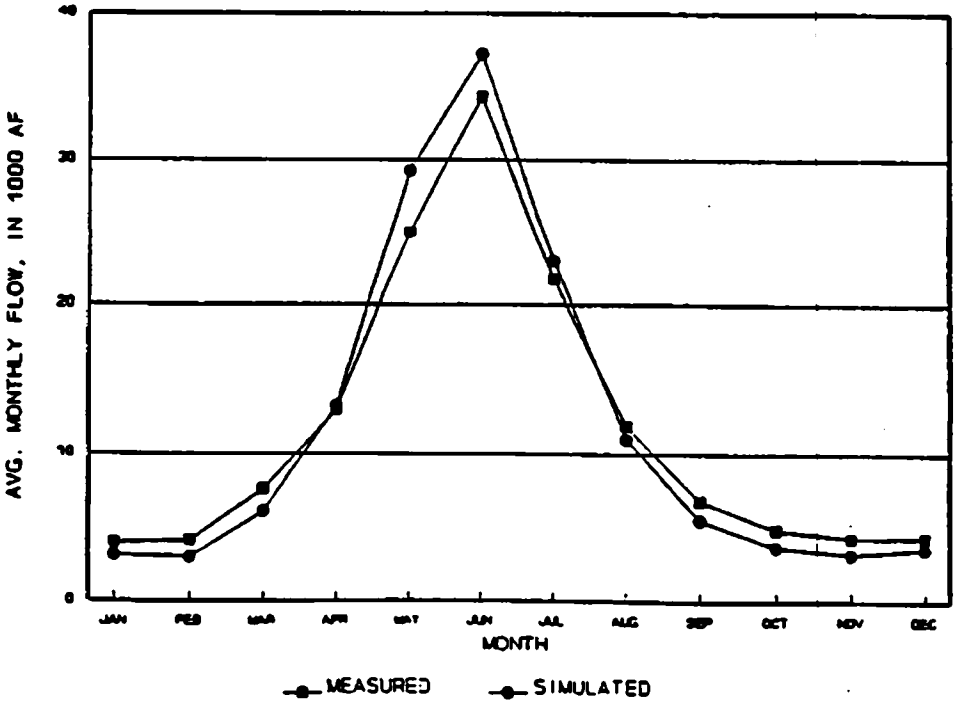

FIGURE 3-3. MEASURED AND SIMULATED (INITIAL) AVERAGE MONTHLY OUTFLOW FROM SMITH VALLEY - STA. 10300000

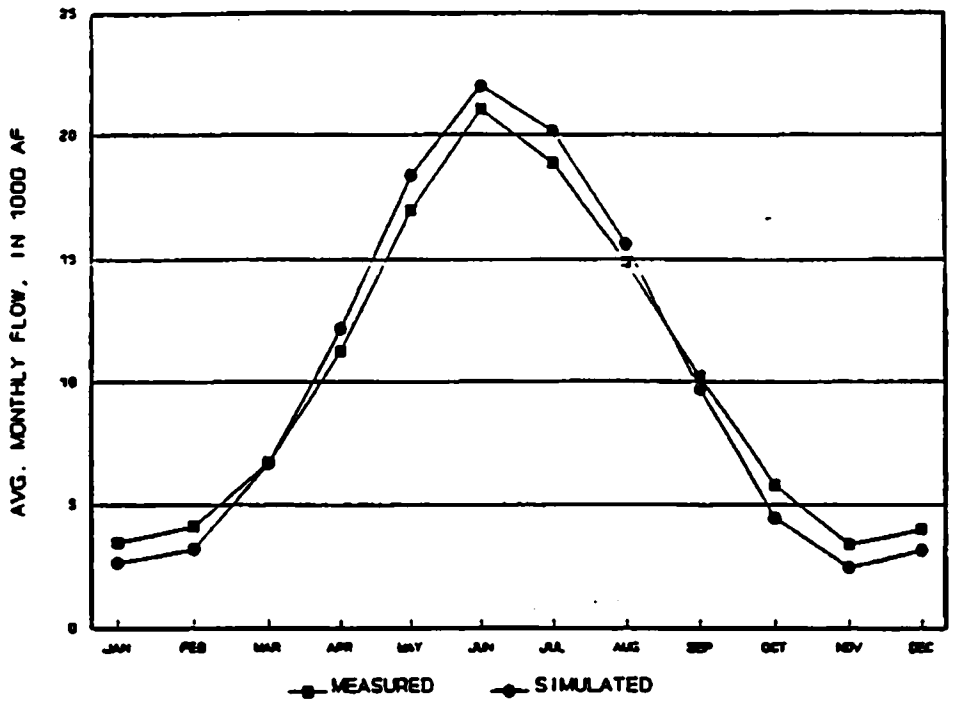

FIGURE 3-4. MEASURED AND SIMULATED (INITIAL) AVERAGE MONTHLY OUTFLOW FROM EAST WALKER RIVER SUBAREA - STA. 10293500

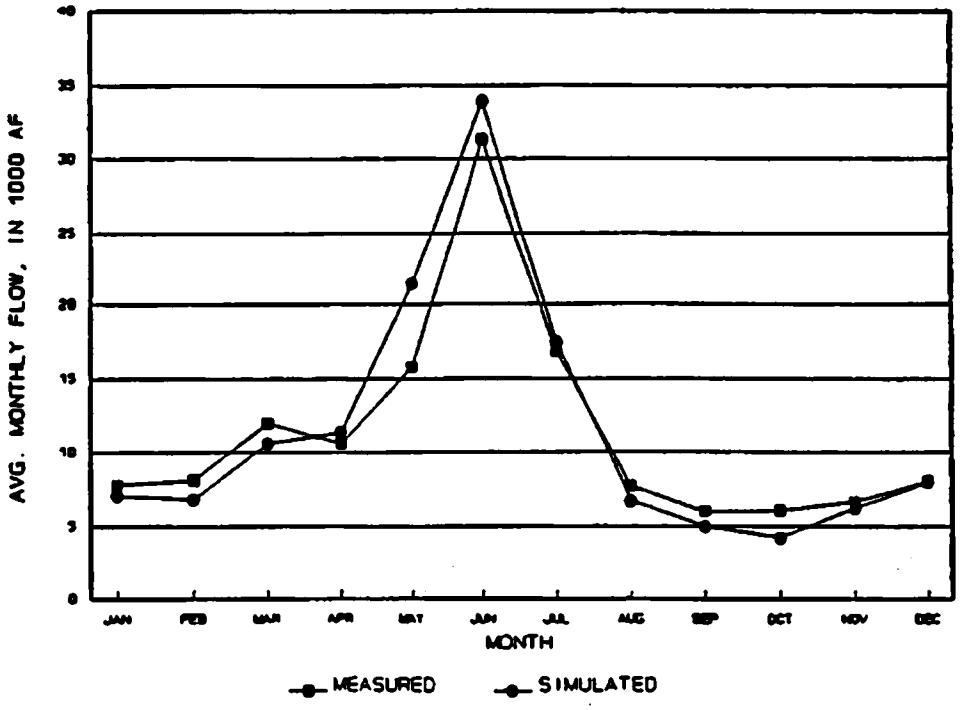

FIGURE 3-5. MEASURED AND SIMULATED (INITIAL) AVERAGE MONTHLY OUTFLOW FROM MASON VALLEY - STA. 10301500

In an attempt to improve the correlation between measured and simulated monthly flows, the monthly water budget spreadsheets were reworked with trial and error changes in some of the original input and assumptions.

One of the assumptions inherent with the initial spreadsheet runs was that the net ground water aquifer inflows for a given month discharged to the river during the same month. A more appropriate assumption for ground water flow is that the inflows are lagged while traveling through the subsurface formation with discharges to the river spread out over time. It was soon discovered that changes in these ground water return flow patterns alone did little to improve the correlation between measured and simulated monthly flows. Therefore, changes in the timing of the recharge entering the groundwater aquifers were made in addition to the modified return flow patterns.

Utilizing the monthly water budget spreadsheets, various combinations of return flow patterns and recharge timing shifts were evaluated. Seven different groundwater discharge patterns were evaluated. The patterns define the fraction of the groundwater inflow for a given month that discharges to the river in the same month and fractions for subsequent months. For instance, under Pattern 2 it is assumed that 80% of June inflows discharge to the river in June with the remaining 20% discharging in July.

	1st	2nd	3rd	4th	5th
Pattern 1	1.00	0.00	0.00	0.00	0.00
Pattern 2	0.80	0.20	0.00	0.00	0.00
Pattern 3	0.60	0.30	0.10	0.00	0.00
Pattern 4	0.50	0.40	0.10	0.00	0.00
Pattern 5	0.50	0.30	0.20	0.00	0.00
Pattern 6	0.40	0.30	0.20	0.10	0.00
Pattern 7	0.30	0.30	0.20	0.10	0.10

For all of the valleys, shifting the monthly groundwater recharge values up in time improved model calibration. A shift of 1 month resulted in the June recharge value, as calculated in Section 3.1.3, entering the groundwater aquifer in May (1 month earlier). Shifts of 0 to 3 months were evaluated as part of the calibration process.

Using the individual monthly water budget spreadsheets, a total of 28 calibration runs were performed for each valley. This represents all possible combinations of the selected recharge timing shifts and the groundwater discharge patterns. For each run, the average monthly absolute errors (AMAE) were calculated using the following equation:

$$AMAE = \frac{\sum (|S - M|)}{n} \qquad (21)$$

where: AMAE = average monthly absolute error, in acre-feet per month.
S = simulated monthly river outflow from basin, in acre-feet per month.
M = measured (gaged) monthly river outflow from basin, in acre-feet per month.
n = 360 (30 years x 12 months/year).
|S-M| = the absolute value (all numbers are positive) of the simulated monthly flows minus measured monthly flows, in acre-feet per month.
Σ|S-M| = sum of the 360 absolute values, in acre-feet per month.

Those runs with the lowest AMAE were selected as the final individual simulations. For Antelope, Smith and Mason Valleys, use of "Ground Water Discharge Pattern 7" and a shift in the recharge values of 3 months in the monthly water budget calculations yielded river flows with the least AMAE. Use of "Pattern 7" and a recharge shift of 1 month in modeling the East Walker River basin produced the lowest AMAE of the 28 runs. The statistics comparing measured and simulated monthly flows for these 4 individual runs are presented in Table 3-3.

It was interesting that shifting the recharge values improved simulation results. These results suggest that the recharge peak occurs 1 to 3 months earlier than the surface runoff. Considering the dynamics involving snowmelt and surface runoff, this shift may have some basis in the physical world. As snow begins melting, infiltration and percolation losses occur reducing the potential for runoff. Runoff does not occur until the snowmelt rate exceeds the loss rate. Over time, runoff from snowmelt increases however infiltration tends to decrease as the surface and subsurface materials reach saturation. Declining infiltration and percolation losses coupled with increasing runoff result in the difference between the recharge and runoff hydrograph peaks.

Though the recharge hydrograph may peak before the surface runoff hydrograph, the contribution recharge water eventually makes to the river flow is lagged several months during its travel through the aquifer.

By combining the 4 individual water budget spreadsheets, a joint monthly water budget model for the entire study area was developed. The joint model incorporated the same monthly water budget equations in Table 3-1. However with the joint model, the only gaged inflows to the study area were as measured at Sta.

10293500 (East Walker River basin inflow) and Sta. 10296500 (Antelope Valley inflow). Other valley inflows were replaced with simulated outflows from the upstream basins, i.e. Smith Valley inflows were set equal to simulated Antelope Valley outflows rather than Sta. 10297500 gaged flows. Utilizing Equation 21, the AMAEs for the predicted flows were calculated.

The results of both the individual and joint simulation runs are graphically compared with measured streamflows in Figures 3-6 through 3-15. Table 3-3 presents a summary of the errors associated with the individual and joint simulations. Pertinent statistics have been provided for annual flows, monthly flows (January-December), and the irrigation season monthly flows (March-October). Statistics have been presented for those months with flows greater than 5,000 and 10,000 acre-feet per month. The model accuracy tends to increase for these higher flows.

In general, model results are favorable for the purposes of this study. The predicted 30-year average annual river outflows from each valley compare well with actual historic flows. This is not surprising as the monthly inputs developed for the model were derived from the average water budgets discussed in Section 2.1. The joint model also does a good job of predicting annual flows for a given year. On the average, predicted annual flows are within 4.5 to 11.7 percent of the measured flows, close to the accuracy of the USGS gaging stations. Gaging records for Stations 10293000, 10296000, 102965000 and 10300000 have been rated as good (95% of the daily discharge measurements are within 10% of actual). Gaging records for Stations 10293500, 10297500 and 10301500 have been rated as fair (95% of the daily discharge measurements are within 15% of actual).

Joint model predictions of Mason Valley monthly outflows were the least accurate with an AMAE of 30.7%. However, it must be noted that this value is based upon the absolute values of the monthly errors. For a given year, the model will overpredict river flows in some months and underpredict in others with the negative errors canceling out the positive. Therefore, the model performs better when predicting annual flows. As discussed above, simulated annual Mason Valley outflows for a given year are, on the average, within 11.7 percent of the historic flows.

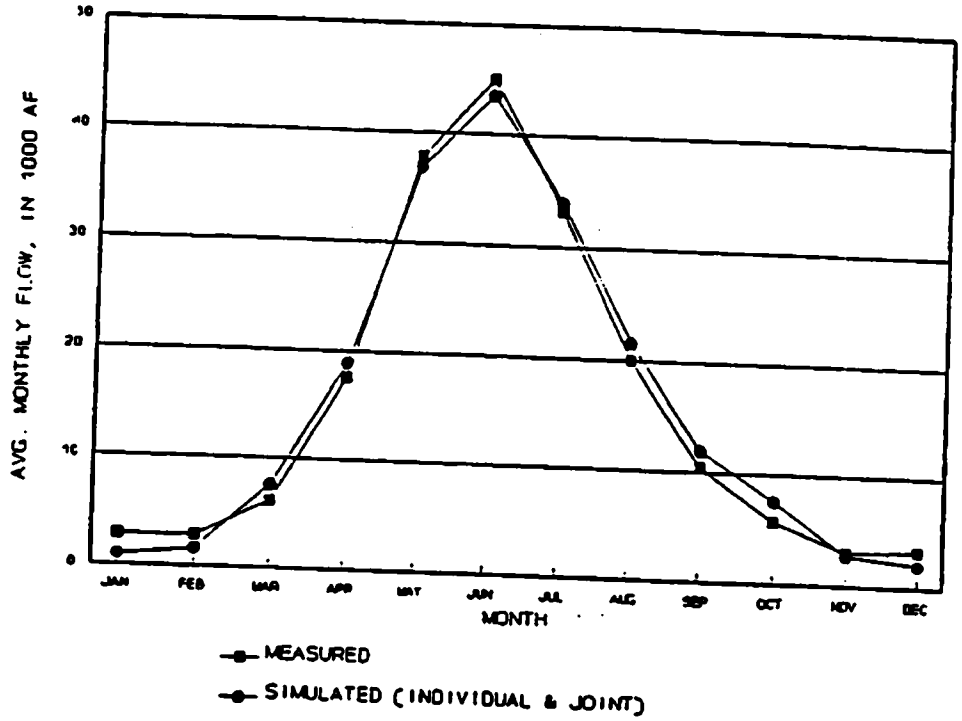

FIGURE 3-6. MEASURED AND SIMULATED (INDIVIDUAL & JOINT) AVERAGE MONTHLY OUTFLOW FROM ANTELOPE VALLEY - STA. 10297500

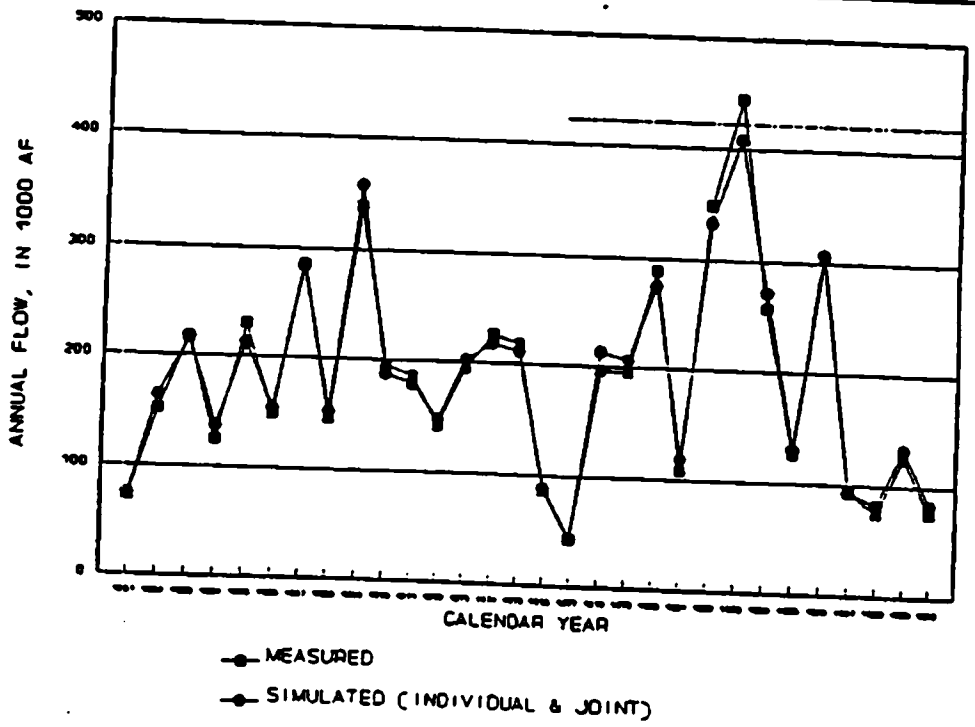

FIGURE 3-7. MEASURED AND SIMULATED (INDIVIDUAL & JOINT) ANNUAL OUTFLOW FROM ANTELOPE VALLEY - STA. 10297500

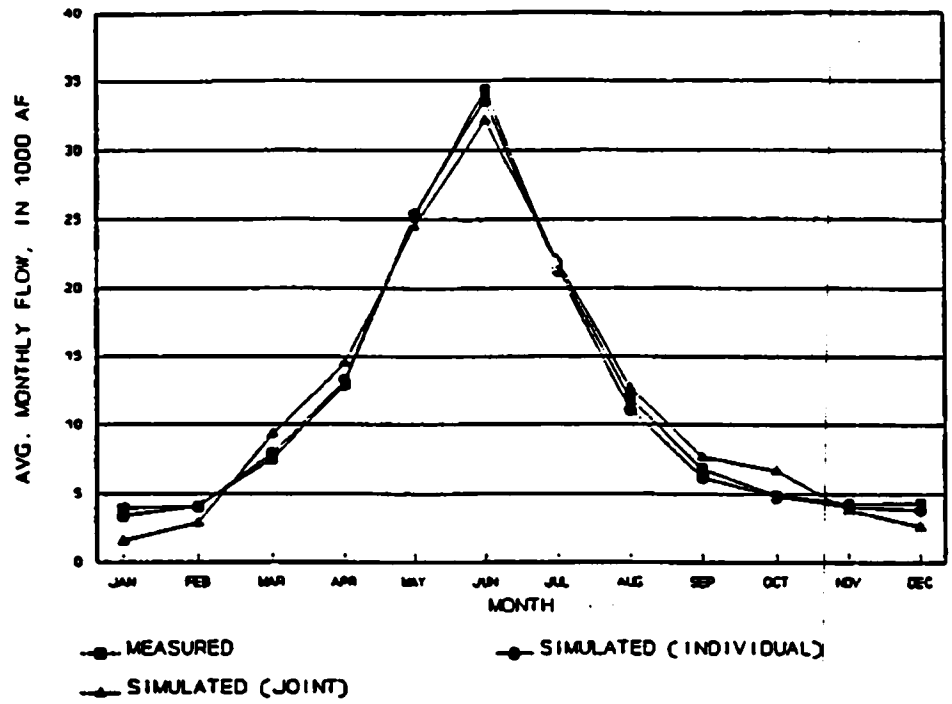

FIGURE 3-8. MEASURED AND SIMULATED (INDIVIDUAL & JOINT) AVERAGE MONTHLY OUTFLOW FROM SMITH VALLEY - STA. 10300000

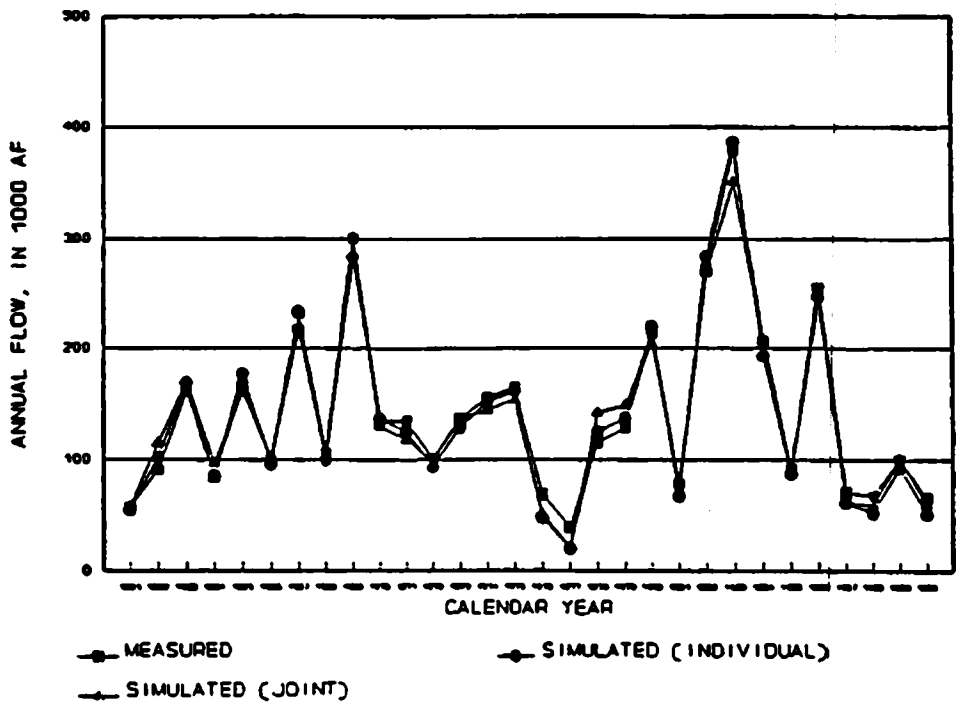

FIGURE 3-9. MEASURED AND SIMULATED (INDIVIDUAL & JOINT) ANNUAL OUTFLOW FROM SMITH VALLEY - STA. 10300000

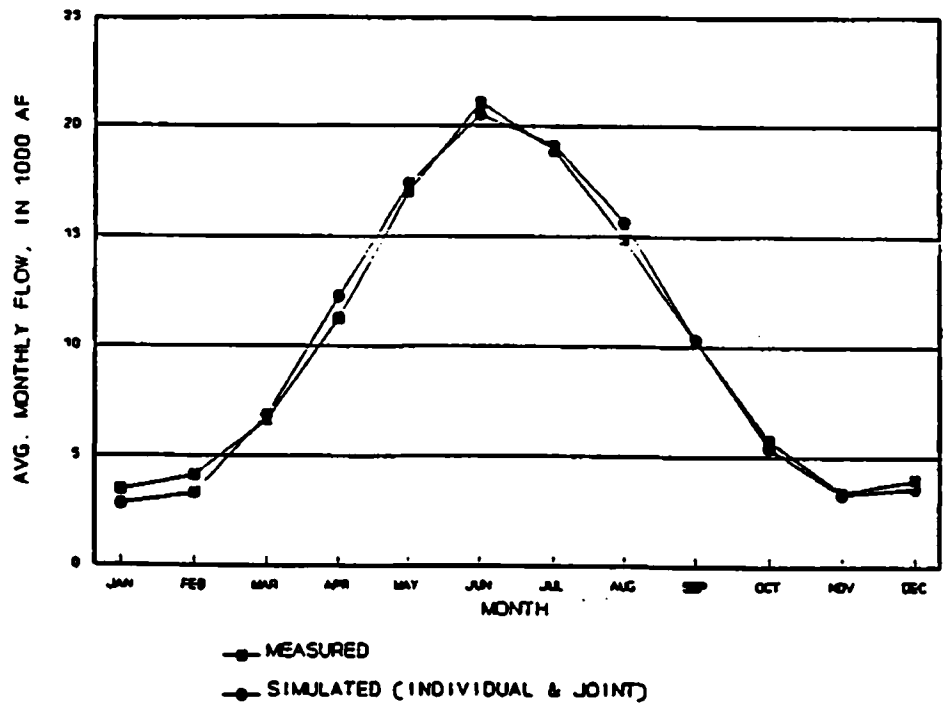

FIGURE 3-10. MEASURED AND SIMULATED (INDIVIDUAL & JOINT) AVERAGE MONTHLY OUTFLOW FROM EAST WALKER RIVER BASIN - STA. 10293500

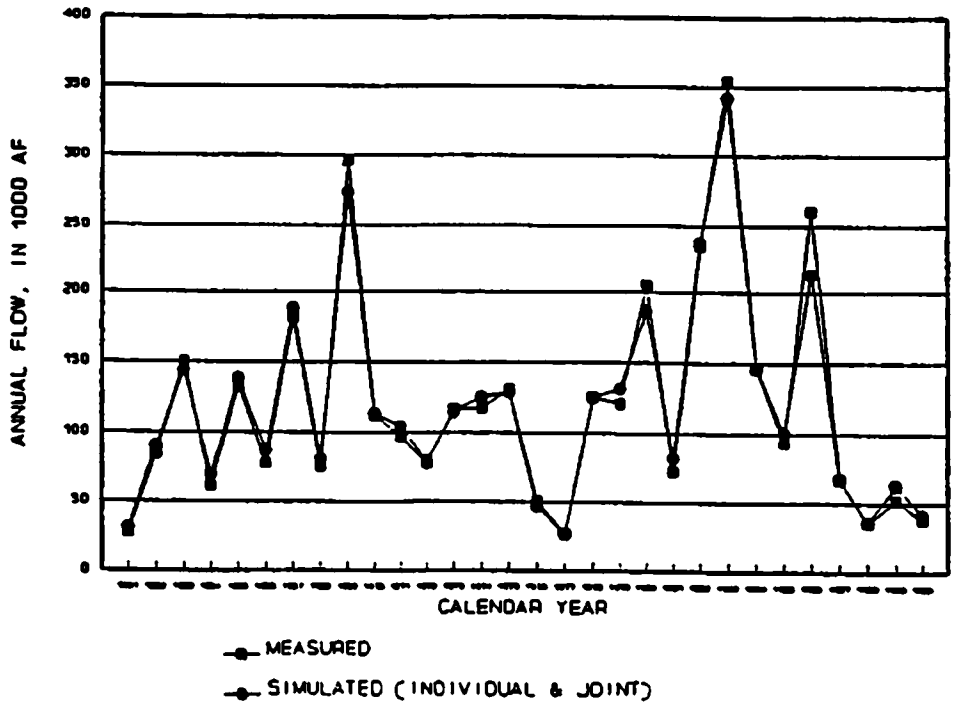

FIGURE 3-11. MEASURED AND SIMULATED (INDIVIDUAL & JOINT) ANNUAL OUTFLOW FROM EAST WALKER RIVER BASIN - STA. 10293500

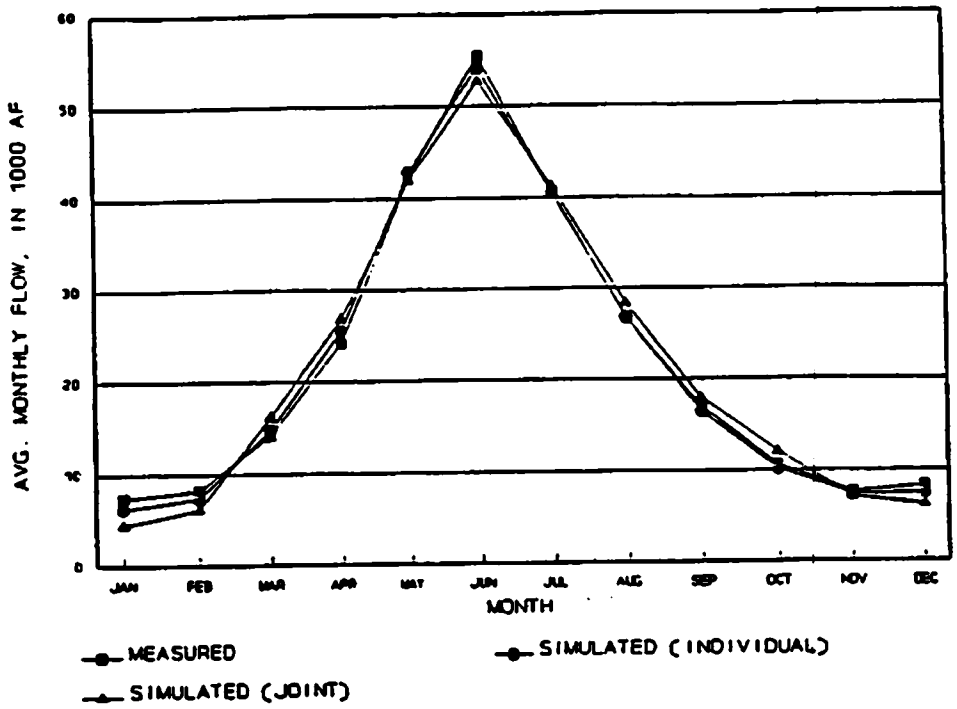

FIGURE 3-12. MEASURED AND SIMULATED (INDIVIDUAL & JOINT) AVERAGE MONTHLY INFLOW TO MASON VALLEY - STA. 10293500 AND 10300000

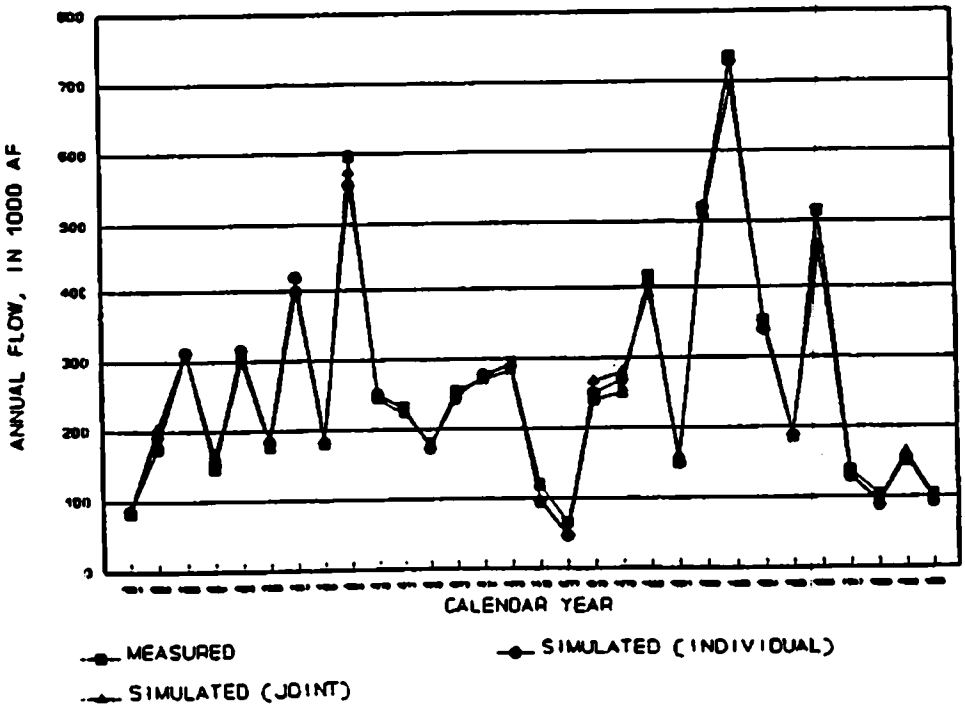

FIGURE 3-13. MEASURED AND SIMULATED (INDIVIDUAL & JOINT) ANNUAL INFLOW TO MASON VALLEY - STA. 10293500 AND 10300000

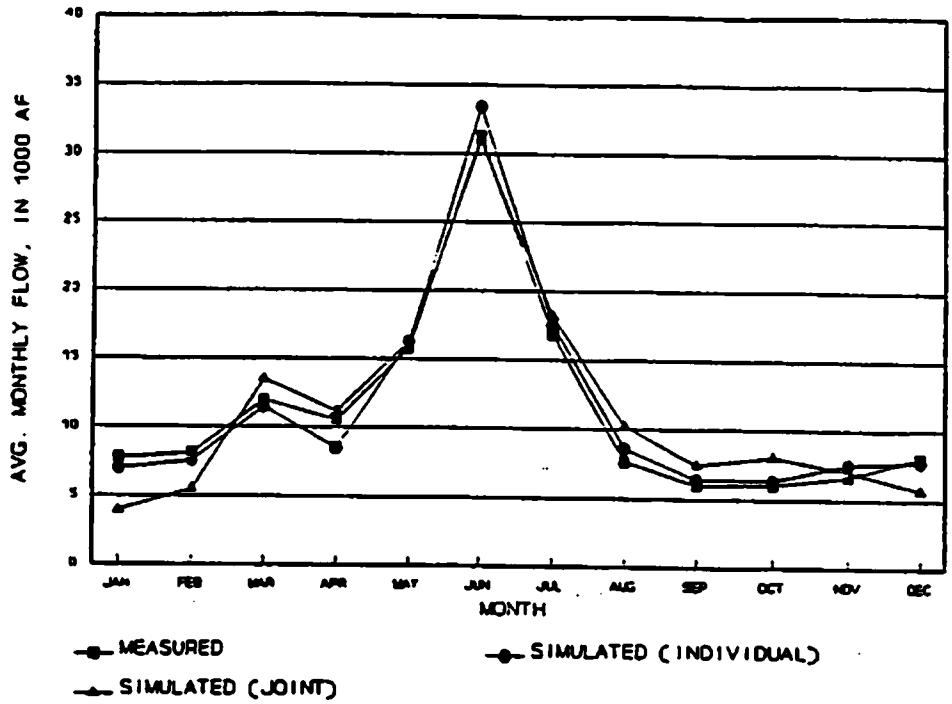

FIGURE 3-14. MEASURED AND SIMULATED (INDIVIDUAL & JOINT) AVERAGE MONTHLY OUTFLOW FROM MASON VALLEY - STA. 10301500

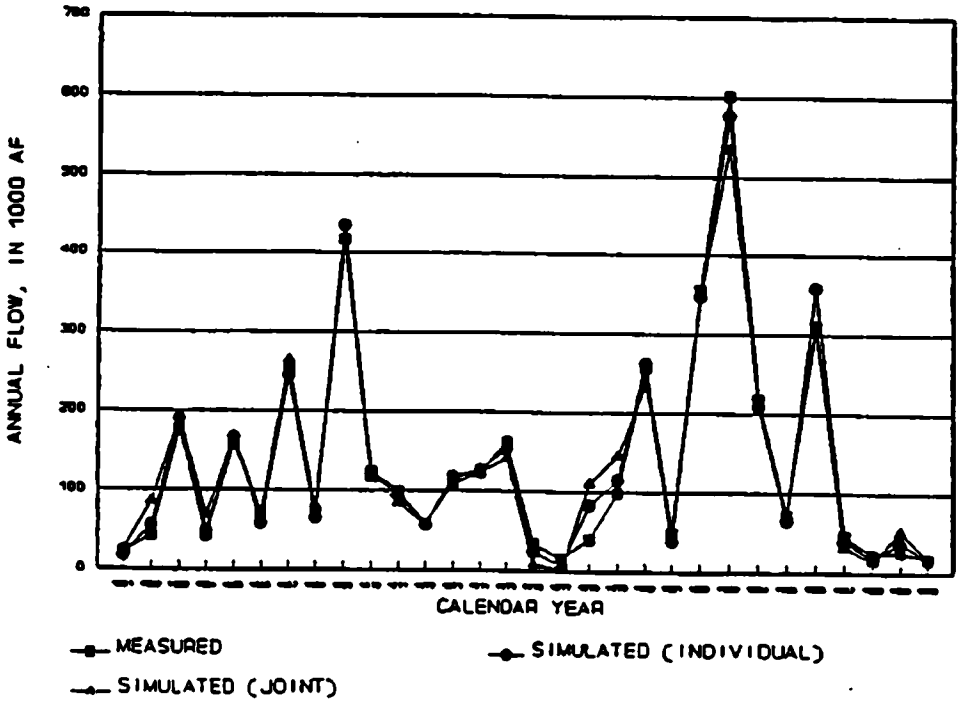

FIGURE 3-15. MEASURED AND SIMULATED (INDIVIDUAL & JOINT) ANNUAL OUTFLOW FROM MASON VALLEY - STA. 10301500

Summary

As stated earlier, the intent of the calibration process was to test and refine monthly inflows and losses for input into WIRSOS. Based upon the calibration results, it was decided to use the input data described in Sections 3.1.1 through 3.1.5, with the exception of the ground water recharge values. The recharge values described in Section 3.1.3 were shifted 1 month for East Walker River subarea and 3 months for Antelope, Smith and Mason Valleys.

The calibration runs suggest that the ground water discharge to the river, as calculated by Equations 18 and 19 (Table 3-1), enters the river in a delayed fashion (Pattern 7 of the calibration runs). WIRSOS has the capability to delay surface water irrigation return flows (See discussion in Section 3.4 Return Flow Data), but can not directly delay inflows and losses, such as ground water recharge, ground water irrigation consumptive use, and phreatophyte evapotranspiration. For these input items, additional pre-processing of the data was required prior to use in WIRSOS. With the aid of a spreadsheet template, the monthly values for these 3 items were manually lagged in accordance with Delay Pattern 7, i.e. 30% - 1st month; 30% - 2nd month; 20% - 3rd month; 10% - 4th month; and 10% - 5th month. These adjusted WIRSOS input values are presented in Appendices I, J and K.

There are a number of potential problems associated with the calibration methodology used to estimate ground water inflow and return flow patterns:

1. The main foundation for the calibration process is the average annual water budget presented in Chapter 2.0. Any errors in the average annual water budget result in errors in the calibration process.

2. Various assumptions were made in the development of monthly values for ground water recharge, surface water inflow, phreatophyte evapotranspiration, and ground water irrigation consumptive use. Errors associated with these assumptions affect the calibration results.

3. This approach assumed a consistent irrigation return flow pattern (Delay Pattern 7) for each year in the study period. It is more likely that the pattern varies with time and is dependent upon numerous factors. A ground water model would be required to more accurately simulate return flows.

4. Changes in ground water storage from year to year and its impacts upon the ground water contribution to streamflow are not taken into account. With the above approach, it is assumed that all valley inflows for a particular year are generally discharged in that same year. This is not the case in the real world. During times of drought, groundwater

storage declines. When followed by a higher water year, inflows serve to replenish the groundwater rather than discharge to the river. Unfortunately, the WIRSOS Model and other similar models are not capable of accounting for changes in ground water storage and its effect upon streamflow. Here again, a ground water model would be required to more accurately simulate the ground water and surface water interaction.

The amount of error these assumptions introduce into the calibration results is not known. Some of the errors may cancel each other out while others will cause results to deviate from actual conditions.

Table 3-3. Summary of Individual and Joint Flow Simulations

	ANTELOPE V. OUTFLOW INDIVIDUAL & JOINT			SMITH VALLEY OUTFLOW INDIVIDUAL			SMITH VALLEY OUTFLOW JOINT			E. WALKER R. OUTFLOW INDIVIDUAL & JOINT		
	ALL	>5 KAFM	>10 KAFM	ALL	>5 KAFM	>10 KAFM	ALL	>5 KAFM	>10 KAFM	ALL	>5 KAFM	>10 KAFM
Annual												
Avg. Measured, KAFY	188.1	---	---	142.0	---	---	142.0	---	---	120.8	---	---
Avg. Simulated, KAFY	189.7	---	---	139.0	---	---	140.6	---	---	120.7	---	---
Avg. Absolute Error, KAFY	9.1	---	---	9.0	---	---	9.2	---	---	7.4	---	---
% Avg. Absolute Error, %	4.8	---	---	6.3	---	---	6.5	---	---	6.1	---	---
All Months												
Avg. Measured, KAFM	15.7	25.1	30.0	11.8	18.7	24.3	11.8	18.7	24.3	10.1	16.1	21.1
Avg. Simulated, KAFM	15.8	25.4	30.4	11.6	18.5	24.1	11.7	18.8	24.1	10.1	16.2	21.0
Avg. Absolute Error, KAFM	2.1	2.6	2.7	1.2	1.6	1.9	2.4	3.0	3.1	1.2	1.7	2.0
% Avg. Absolute Error, %	13.4	10.4	9.0	10.2	8.6	7.8	20.3	16.0	12.8	11.9	10.6	9.5
Irrigation Season												
Avg. Measured, KAFM	22.0	26.5	30.6	15.7	19.5	24.6	15.7	19.5	24.6	13.2	16.6	21.6
Avg. Simulated, KAFM	22.9	27.3	31.1	15.5	19.3	24.5	16.3	20.0	24.7	13.4	16.8	21.4
Avg. Absolute Error, KAFM	2.4	2.9	2.7	1.6	1.7	1.9	2.6	2.8	3.1	1.5	1.7	2.1
% Avg. Absolute Error, %	10.9	9.4	8.8	10.2	8.7	7.7	16.6	14.4	12.6	11.4	10.2	9.7

KAFY = 1,000 acre-feet per year
KAFM = 1,000 acre-feet per month
Avg. Absolute Error = $\Sigma(|\text{Simulated flow} - \text{Measured flow}|) \div \text{number of observations}$
% Avg. Absolute Error = (Avg. Absolute Error)/(Avg. Measured) x 100

Table 3-3. Summary of Individual and Joint Flow Simulations (cont'd.)

	MASON VALLEY INFLOW						MASON VALLEY OUTFLOW					
	INDIVIDUAL			JOINT			INDIVIDUAL			JOINT		
	ALL	>5 KAFM	>10 KAFM	ALL	>5 KAFM	>10 KAFM	ALL	>5 KAFM	>10 KAFM	ALL	>5 KAFM	>10 KAFM
Annual												
Avg. Measured, KAFY	262.8	---	---	262.8	---	---	136.8	---	---	136.8	---	---
Avg. Simulated, KAFY	259.7	---	---	261.3	---	---	138.7	---	---	138.4	---	---
Avg. Absolute Error, KAFY	11.9	---	---	13.9	---	---	11.2	---	---	16.0	---	---
% Avg. Absolute Error, %	4.5	---	---	5.3	---	---	8.2	---	---	11.7	---	---
All Months												
Avg. Measured, KAFM	21.9	26.7	33.3	21.9	26.7	33.3	11.4	18.3	31.8	11.4	18.3	31.8
Avg. Simulated, KAFM	21.6	26.6	33.2	21.8	26.9	33.6	11.6	18.1	32.1	11.5	17.4	30.5
Avg. Absolute Error, KAFM	1.8	2.1	2.4	3.0	3.3	3.8	2.2	2.7	3.6	3.5	4.1	5.0
% Avg. Absolute Error, %	8.2	7.9	7.2	13.7	12.4	11.4	19.3	14.8	11.3	30.7	22.4	15.7
Irrigation Season												
Avg. Measured, KAFM	28.9	30.0	34.3	28.9	30.0	34.3	13.3	21.9	34.0	13.3	21.9	34.0
Avg. Simulated, KAFM	28.9	30.0	34.4	29.7	30.8	35.1	13.6	22.0	34.7	14.6	22.2	33.8
Avg. Absolute Error, KAFM	2.3	2.3	2.5	3.4	3.4	3.7	2.6	3.2	3.9	3.9	4.3	4.9
% Avg. Absolute Error, %	8.0	7.7	7.3	11.8	11.3	10.8	19.6	14.6	11.5	29.3	19.6	14.4

KAFY = 1,000 acre-feet per year
KAFM = 1,000 acre-feet per month
Avg. Absolute Error = $\Sigma(|\text{Simulated flow} - \text{Measured flow}|) \div$ number of observations
% Avg. Absolute Error = (Avg. Absolute Error)/(Avg. Measured) x 100

3.3 Water Rights

Surface water irrigation water rights were compiled for 3 different sections (8 subareas) of the Walker River basin:

- Walker River Irrigation District
  - Smith Valley - south of river
  - Smith Valley - north of river
  - East Walker River
  - West Walker River in Mason Valley
  - East Walker River in Mason Valley
  - Mason Valley
- Schurz subarea
- Walker Lake subarea

From the available water right information, the necessary WIRSOS input was developed. Historic Antelope Valley diversions were used as model input rather the water rights. In otherwords, it was assumed that Antelope Valley diversions will not change with changes in downstream operations.

From the available water right information, the necessary WIRSOS input was developed. WIRSOS input required for diversions includes:

- Station number of diversion
- Percentage of diversion that is consumed
- Priority date
- Monthly diversion demands for 12 months, in cfs
- Station where return flows enter the river

3.3.1 Walker River Irrigation District

Lands within the WRID are classified as either bottom or bench land and are irrigated with 3 types of water: 1) decree (or direct flow) water; 2) storage water; and 3) permit water.

The decree and storage water is distributed in accordance with Decree 731 which assigned annual duties of 3.28 AF/ac and 4.21 AF/ac for bottom and bench land, respectively. A summary of bench and bottom lands within WRID and associated duties is presented in Table 3-4. Total acres within each subarea were taken from a database maintained by WRID, and were broken into the bench and bottom categories based upon the bench/bottom distribution presented by Sharp, Krater & Assoc. (Feb. 26, 1969).

Table 3-4. Bench and Bottom Lands within WRID

	Bottom Land		Bench Land		Total	
	Acres[1]	Duty, AF[2]	Acres[1]	Duty, AF[2]	Acres[3]	Duty, AF[4]
Smith Valley						
South of river	3,560	11,430	9,815	42,010	13,375	53,440
North of river	1,960	6,290	5,415	23,175	7,375	29,465
East Walker	80	225	8,730	36,755	8,810	37,010
Mason Valley						
West Walker River	0	0	6,660	28,505	6,660	28,505
East Walker River	9,785	31,410	5,340	22,855	15,125	54,265
Walker River	27,855	89,415	1,100	4,710	28,955	94,125
Total	43,240	138,800	37,060	158,010	80,300	296,810

Note: Duties do not include water appropriated under Permit 5528 and 25017

[1] Calculated from Total Acres based upon bench/bottom distribution in Sharp, Krater & Assoc. (Feb. 26, 1969)

[2] Bottom duty = acres x 3.21 AF/ac

[3] From WRID database

Decree Water

Decree 731 assigned allowable irrigation diversion rates of 0.012 cfs/acre and 0.016 cfs/acre for bottom and bench land, respectively, within the Walker River Irrigation District. Total allowable diversion rates for the WRID decree water are presented in Table 3-5. For the entire irrigation season of 245 days (March 1 to October 31), WRID irrigators are limited to a total duty of 3.21 acre-feet/acre for bottom land and 4.28 acre-feet/acre for bench. If diversions were made at the maximum allowable rates for a continuous period, the seasonal duty would be met in 135 days, about one-half the length of the irrigation season. In actual practice diversions are distributed over most of the irrigation season.

From the water rights listing in Table 3-5, annual water duties for each priority date were calculated using the following equation:

$$\textit{Annual diversion demand, in AF} = \textit{Allowable CFS} \times 135\ \textit{days} \times 1.98 \qquad (22)$$

From WRID diversions records, average monthly diversions as a percentage of annual diversions were calculated (Table 3-6). Monthly diversions demands were then calculated using the following equation:

$$\textit{Monthly demand, in cfs} = \frac{\textit{Annual demand, in AF} \times \%\ \textit{of Annual demand}}{1.98 \times \textit{No. of days in month}} \qquad (23)$$

The resulting values were used as water right demand input in the WIRSOS Model.

The water rights listed on Table 3-5 are for the irrigation of approximately 45,800 acres in WRID. These lands are irrigated with direct flow (decree water) from the river by priority. Supplemental storage water from Topaz Lake and Bridgeport Reservoir are available to those rights with priority dates later than 1872. In WIRSOS, these rights are provided supplemental storage water when insufficient decree water exists to meet the duties. WIRSOS limits the total diversion of decree and storage water for a particular right to the duty of that right.

In Mason Valley, supplemental storage can be supplied by Topaz Lake and/or Bridgeport Reservoir. Unfortunately, WIRSOS does not allow a particular water right to call for supplemental storage water from more than 1 reservoir. In order to work within the constraints of WIRSOS, the post-1872 water right demands in Mason Valley calculated from Equation 23 were divided into 2 groups, one group that calls on Topaz Lake for supplemental water, and another that calls on Bridgeport Reservoir. The Topaz Lake group was assigned 2/3 of the Equation 23 demands, and the Bridgeport group was assigned the remaining 1/3. This division of demands was

selected because historically Topaz Lake has provided about 2/3 of the storage water used in Mason Valley with the other 1/3 from Bridgeport Reservoir.

TABLE 3-5. Summary of WRID Decree Water Rights in CFS

	SMITH VALLEY						MASON VALLEY						TOTAL WRID	
	WITH COLONY		WITHOUT COLONY		EAST WALKER		WEST WALKER		EAST WALKER		WALKER RIVER			
	RIGHTS	ACCUM.	RIGHTS	ACCUM.	RIGHTS	ACCUM.	RIGHTS	ACCUM.	RIGHTS	ACCUM.	RIGHTS	ACCUM.	RIGHTS	ACCUM.
1861	0.08	0.08	0.00	0.00	0.13	0.13	1.45	1.45	0.00	0.00	0.00	0.00	1.66	1.66
1862	0.16	0.24	0.00	0.00	7.68	7.81	0.95	2.40	0.00	0.00	1.20	1.20	9.99	11.65
1863	18.71	18.95	0.00	0.00	1.28	9.09	2.95	5.35	0.00	0.00	2.85	4.05	25.79	37.44
1864	11.62	30.57	0.00	0.00	0.00	9.09	1.19	6.54	0.00	0.00	7.98	12.03	20.79	58.23
1865	4.16	34.73	0.00	0.00	5.30	14.39	0.00	6.54	21.10	21.10	4.96	16.99	35.52	93.75
1866	2.54	37.27	0.00	0.00	0.00	14.39	0.00	6.54	0.00	21.10	0.00	16.99	2.54	96.29
1867	0.00	37.27	0.00	0.00	0.14	14.53	0.00	6.54	0.00	21.10	0.00	16.99	0.14	96.43
1868	1.81	39.08	0.00	0.00	0.00	14.53	7.36	13.90	0.00	21.10	9.60	26.59	18.77	115.20
1869	0.37	39.45	0.00	0.00	0.00	14.53	1.99	15.89	0.00	21.10	6.96	33.55	9.32	124.52
1870	2.40	41.85	0.00	0.00	3.20	17.73	0.64	16.53	18.01	39.11	28.19	61.74	52.44	176.96
1871	0.00	41.85	0.00	0.00	0.00	17.73	0.00	16.53	0.80	39.91	3.33	65.07	4.13	181.09
1872	0.00	41.85	0.00	0.00	0.00	17.73	10.23	26.76	1.36	41.27	14.55	79.62	26.14	207.23
1873	0.00	41.85	0.00	0.00	0.00	17.73	0.00	26.76	0.12	41.39	8.72	88.34	8.84	216.07
1874	0.00	41.85	0.00	0.00	3.76	21.49	0.00	26.76	0.00	41.39	33.60	121.94	37.36	253.43
1875	2.24	44.09	0.00	0.00	7.30	28.79	0.43	27.19	19.71	61.10	27.09	149.03	56.77	310.20
1876	0.00	44.09	0.00	0.00	0.00	28.79	0.00	27.19	1.24	62.34	0.00	149.03	1.24	311.44
1877	9.60	53.69	0.00	0.00	1.76	30.55	7.55	34.74	1.46	63.80	7.03	156.06	27.40	338.84
1878	14.44	68.13	0.00	0.00	0.00	30.55	0.00	34.74	0.00	63.80	3.95	160.01	18.39	357.23
1879	0.00	68.13	0.00	0.00	1.57	32.12	2.89	37.63	0.24	64.04	13.89	173.90	18.59	375.82
1880	5.95	74.08	0.00	0.00	5.84	37.96	0.00	37.63	17.20	81.24	40.60	214.50	69.59	445.41
1881	0.00	74.08	0.00	0.00	1.60	39.56	0.00	37.63	0.00	81.24	0.48	214.98	2.08	447.49
1882	0.91	74.99	0.00	0.00	0.00	39.56	2.08	39.71	0.00	81.24	1.88	216.86	4.87	452.36
1883	0.93	75.92	0.00	0.00	0.00	39.56	2.77	42.48	2.40	83.64	0.36	217.22	6.46	458.82
1884	1.92	77.84	0.00	0.00	0.00	39.56	0.00	42.48	0.00	83.64	0.48	217.70	2.40	461.22
1885	3.52	81.36	0.00	0.00	4.80	44.36	2.40	44.88	6.98	90.62	12.46	230.16	30.16	491.38
1886	0.00	81.36	0.00	0.00	0.00	44.36	0.00	44.88	0.00	90.62	0.00	230.16	0.00	491.38
1887	0.00	81.36	0.00	0.00	1.44	45.80	0.00	44.88	0.00	90.62	0.81	230.97	2.25	493.63
1888	0.00	81.36	0.00	0.00	0.00	45.80	0.80	45.68	1.92	92.54	0.96	231.93	3.68	497.31
1889	0.00	81.36	0.00	0.00	0.16	45.96	0.00	45.68	0.00	92.54	0.60	232.53	0.76	498.07
1890	0.74	82.10	22.08	22.08	5.16	51.12	2.10	47.78	3.77	96.31	4.38	236.91	38.23	536.30
1891	0.96	83.06	0.00	22.08	0.00	51.12	0.00	47.78	1.12	97.43	2.83	239.74	6.91	541.21
1892	0.56	83.62	0.00	22.08	0.00	51.12	0.00	47.78	2.01	99.44	1.06	240.80	3.63	544.84
1893	0.00	83.62	0.00	22.08	0.64	51.76	0.00	47.78	0.00	99.44	0.18	240.98	0.82	545.66
1894	0.00	83.62	0.00	22.08	1.47	53.23	0.51	48.29	4.80	104.24	0.18	241.16	6.96	552.62
1895	0.00	83.62	3.36	25.44	2.29	55.52	0.00	48.29	6.81	111.05	3.08	244.24	15.54	568.16
1896	0.00	83.62	0.00	25.44	0.00	55.52	0.00	48.29	0.48	111.53	1.10	245.34	1.58	569.74
1897	3.54	87.16	0.00	25.44	2.72	58.24	0.00	48.29	1.28	112.81	0.09	245.43	7.63	577.37
1898	0.00	87.16	0.00	25.44	0.00	58.24	0.00	48.29	0.48	113.29	1.26	246.69	1.74	579.11
1899	0.00	87.16	0.00	25.44	0.00	58.24	0.16	48.45	3.04	116.33	0.14	246.83	3.34	582.45
1900	0.32	87.48	0.48	25.92	0.64	58.88	1.49	49.94	0.87	117.20	10.66	257.49	14.46	596.91
1901	0.00	87.48	0.00	25.92	0.00	58.88	0.00	49.94	0.40	117.60	0.18	257.67	0.58	597.49
1902	0.00	87.48	0.00	25.92	0.00	58.88	0.00	49.94	1.80	119.40	0.11	257.78	1.91	599.40
1903	0.00	87.48	0.00	25.92	0.00	58.88	0.43	50.37	1.44	120.84	0.00	257.78	1.87	601.27
1904	0.00	87.48	0.00	25.92	0.00	58.88	0.00	50.37	1.24	122.08	0.91	258.69	2.15	603.42
1905	0.00	87.48	1.43	27.35	0.00	58.88	1.52	51.89	0.60	122.68	8.75	267.44	12.30	615.72
1906	0.00	87.48	0.00	27.35	0.72	59.60	0.00	51.89	0.00	122.68	0.16	267.60	0.88	616.60
1907	0.00	87.48	0.00	27.35	0.00	59.60	0.00	51.89	0.32	123.00	0.00	267.60	0.32	616.92
1908	0.00	87.48	0.00	27.35	0.00	59.60	0.00	51.89	0.00	123.00	0.00	267.60	0.00	616.92
1909	0.00	87.48	1.80	29.15	0.00	59.60	0.00	51.89	0.00	123.00	0.00	267.60	1.80	618.72
1910	0.00	87.48	3.33	32.48	0.00	59.60	0.00	51.89	0.00	123.00	0.00	267.60	3.33	622.05
1911	0.00	87.48	0.00	32.48	0.00	59.60	0.00	51.89	4.37	127.37	0.00	267.60	4.37	626.42
1912	0.00	87.48	1.85	34.33	0.00	59.60	0.00	51.89	0.00	127.37	0.00	267.60	1.85	628.27
1913	0.00	87.48	0.00	34.33	0.00	59.60	0.00	51.89	0.80	128.17	0.00	267.60	0.80	629.07
1914	0.00	87.48	2.60	36.93	0.00	59.60	0.00	51.89	0.00	128.17	0.00	267.60	2.60	631.67
1915	0.00	87.48	0.00	36.93	0.00	59.60	0.00	51.89	1.91	130.08	0.00	267.60	1.91	633.58
1916	0.00	87.48	0.00	36.93	0.47	60.07	0.00	51.89	0.00	130.08	0.75	268.35	1.22	634.80
1917	0.00	87.48	0.00	36.93	1.00	61.07	0.00	51.89	0.00	130.08	0.00	268.35	1.00	635.80

Table 3-6. Average Monthly Distribution of Diversions as Percentage of Annual Total

Month	Smith Valley	E. Walker River	Mason Valley West Walker R.	Mason Valley East Walker R.	Mason Valley Walker R.
January	0.0	0.0	0.0	0.0	0.0
February	0.0	0.0	0.0	0.0	0.0
March	0.8	1.1	1.7	0.8	2.6
April	10.1	9.6	11.2	11.7	12.6
May	21.6	18.6	20.2	20.5	22.6
June	20.8	19.6	19.5	19.7	21.0
July	20.6	20.2	18.6	20.6	17.3
August	14.7	16.5	15.2	15.1	12.8
September	8.1	11.1	9.8	8.5	7.5
October	3.3	3.3	3.8	3.1	3.6
November	0.0	0.0	0.0	0.0	0.0
December	0.0	0.0	0.0	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0

Storage Water

There are approximately 34,500 acres of land within WRID that have rights to storage water but no decree river water. These lands are assigned annual duties of 3.21 AF/ac (bottom land) and 4.28 AF/ac (bench land), and can be irrigated between March 1 and October 31. At the time of this study, detailed annual duty information for storage-irrigated lands was not readily available. For the WIRSOS modeling, storage duties for the 6 WRID subareas were calculated by subtracting decree water duties from total duties (Table 3-7). A more accurate estimate of the seasonal duty would require considerable effort reviewing the water rights cards in the WRID office. This may be a necessary step as the modeling process evolves.

Using Equation 23, the monthly storage demands (in cfs) were developed for WIRSOS input.

Permit Water

In addition to the decree and storage water, WRID has rights to flood water in the basin under State of Nevada permits 5528 (priority date of June 6, 1919) and 25017 (priority date of April 11, 1969) for the irrigation of about 64,200 acres. A breakdown of these acres between the various valleys was estimated by the Division of Water Planning based upon State Engineer's records (Table 3-8).

When available, permit water can be diverted between May 1 and July 31 and applied to most of the lands irrigated with decree and storage water in WRID. The State Engineer has restricted the total combined duty of permit water and other sources (decree, storage, groundwater) to 4 AF/ac. Because of the junior priority dates, permit water is available only after the decree demands are met and Topaz and Bridgeport storage rights have been satisfied.

In WIRSOS, each water right is assigned its own demand (duty) schedule as defined by the user. WIRSOS will not allow diversions for a particular right to exceed the defined demand and annual duty for that right. Unfortunately, WIRSOS is not capable of directly limiting the diversion for 2 or more rights to a combined duty amount. One way around this limitation of WIRSOS is to assign one of the water rights a portion of the combined duty, and the other water right the remainder.

In a given year if sufficient water was available to meet all decree and storage demands for the entire year, permit water would only be available for bottom lands. Under this scenario, bench lands would be receiving 4.28 AF/ac of decree and/or storage water, an amount greater than the 4 AF/ac combined duty set by the State Engineer. Therefore, for this fictitious year, bottom lands could receive an additional 0.79 AF/ac (4 - 3.21) of permit water. Based upon the assumption that permit water is used as a supplemental source for bench land, additional permit water duties for the WRID subarea were calculated (Table 3-9). These calculations result in

an additional 29,375 acre-feet of permit water over and above the decree and storage amount of 296,810 acre-feet.

For WIRSOS input, these demands for permit water were distributed as follows:

May	30%
June	40%
July	30%

As described earlier, a limitation in WIRSOS required that only a portion of the combined duty of 4 AF/ac be assigned to the permit water rights. For this draft document, it was assumed that permit water is used as a supplemental source for only bench land with a duty of 0.79 AF/ac. This assumption is valid for the higher water years, when sufficient decree and storage water exists to satisfy the annual decree and storage duties, i.e. 296,810 acre-feet of decree and storage water is delivered to WRID lands. Using higher permit rights in the WIRSOS would result in modeled diversion amounts greater than the annual duties.

During lower years the 3.21 and 4.28 acre-feet/acre duties can not be met with decree and storage water. For these years, the assumed permit water rights (Table 3-9) result in modeled diversions lower than allowable. The impact this has upon the model results have yet to be quantified as the WIRSOS model is not complete. It is anticipated that the permit water portion of the WIRSOS model will need to be modified for the final model.

Table 3-7. Decree and Storage Lands within WRID

	Decree Land		Storage Land		Total	
	Acres[1]	Duty, AF[2]	Acres[1]	Duty, AF[3]	Acres[1]	Duty, AF[4]
Smith Valley						
South of river	6,340	23,385	7,035	30,055	13,375	53,440
North of river	2,565	9,870	4,810	19,595	7,375	29,465
East Walker	3,725	16,325	5,085	20,685	8,810	37,010
Mason Valley						
West Walker River	3,135	13,870	3,525	14,635	6,660	28,505
East Walker River	9,040	34,770	6,085	19,495	15,125	54,265
Walker River	21,000	71,730	7,955	22,395	28,955	94,125
Total	45,805	169,950	34,495	126,860	80,300	296,810

[1] From WRID database

[2] Calculated from Equation 22

[3] Storage duty = total duty - decree duty

[4] From Table 3-4

Table 3-8. Summary of Acres under Permit 5528 and 25017

	No. 5528	No. 25017	Total
Smith Valley			
North of river	10,100	----	10,100
South of river	11,100	----	11,100
East Walker River	----	3,700	3,700
Mason Valley			
West Walker River	4,200	----	4,200
East Walker River	----	13,300	13,300
Mason Valley	14,400	21,600	21,800[1]
Total	39,800	38,600	64,200

[1] Approximately 14,200 acres shared in common between 5528 and 25107

Table 3-9. .timate of Additional Perm. Water Duty and Total WRID Duty

	Bottom Acres	Permit Acres	Permit Duty, AF[1]	Degree & Storage Duty, AF	Total Duty, AF
Smith Valley					
North of river	3,560	11,100	2,810[2]	53,400	56,250
South of river	1,960	10,100	1,550[2]	29,465	31,015
East Walker River	80	3,700	65[3]	37,010	37,075
Mason Valley					
West Walker River	0	4,200	0	28,505	28,505
East Walker River	9,785	13,300	7,730[3]	54,265	61,995
Walker River	27,855	21,800[4]	17,220[4]	94,125	111,345
Total	43,240	64,200	29,375	296,810	326,185

[1] (Lesser of Bottom acres and Permit acres) x (4 - 3.21)

[2] June 6, 1919 priority (Permit 5528)

[3] April 11, 1969 priority (Permit 25017)

[4] Assumed 14,400 acres - 11,375 AFY under Permit 5528
7,400 acres - 5,845 AFY under Permit 25017

3.3.2 Schurz Subarea

Decree C-125, concluded in June 1939, entitles the United States, for the Walker River Indian Reservation, to a right of 26.25 cfs for 2,100 acres with an 1859 priority during an irrigation season of 180 days (April 15 to October 15). This gave the Walker River Indian Reservation to right to divert a total of 9,450 acre-feet from natural flows. According to Roger Bezayiff, Federal Watermaster, the river system is regulated such that a minimum of 26.25 cfs of natural flow is provided, if available, at the Wabuska gaging station (Sta. 10301500) every day of the 180 day period.

For WIRSOS input, a constant water right demand of 26.25 cfs was used for each month of the 180 day irrigation season. The WIRSOS model operates on a monthly time step so it was necessary to assume an average demand of 13.13 cfs for the months of April and October.

In addition to the decreed water, the Walker River Indian Reservation holds a State of Nevada water right for 0.32 cfs (Application 182, Certificate 98, priority date August 12, 1906). This water is for the irrigation of 8 acres with an irrigation season from April 1 to October 1.

3.3.3 Walker Lake Subarea

The Nevada Department of Wildlife has appropriated 795.2 cfs of river flow into Walker Lake for fish, game and recreation purposes (Certificate No. 10860). This right has a priority date of September 17, 1970 and the annual duty is limited to 575,870 acre-feet per year.

Permit 25712

For WIRSOS input, a constant water right demand of 795.2 cfs at the mouth of the Walker River was used for each month of the year.

3.4 Return Flow Data

WIRSOS requires input describing: 1) the percentage of irrigation diversions that is consumptively used; and 2) the pattern by which the unconsumed portion returns to the river.

3.4.1 Consumptive Use

For all surface water diversions, an irrigation efficiency of 45% was assumed (See Section 2.0 WATER BUDGET). Therefore, 55% of these diversions enter the ground water system. The only exception is Colony Ditch (north of river) diversions in Smith Valley. As described in Section 2.0, it was assumed that 75% of the Colony Ditch diversions are used for irrigation in the Artesia Lake basin. Therefore, only 25% of the Colony Ditch diversions produce return flows back to the West Walker River. Assuming an overall

consumptive use rate of 45% results in return flows to the West Walker River of about 13% of the total Colony Ditch diversions. As a result, about 87% (100% - 13%) of the Colony Ditch diversions are lost to the West Walker River drainage. Therefore for WIRSOS input, a "consumptive use" rate of 87%, instead of 45%, was used in the WIRSOS Model for Colony Ditch diversions.

For the Schurz Subarea, it was assumed that 100% of the surface water diversions are consumed by irrigation activities, phreatophytes, and other losses with no return flows. According to the average annual water budget (Section 2.0), the difference between the Schurz inflows and outflows is approximately equal to the surface water diversions. It may be desirable to modify this portion of the model in future versions.

3.4.2 Return Flow Patterns

As discussed in Section 3.1, artificial ground water "tributaries" were defined in the WIRSOS modeling network. Inflows into these tributaries include irrigation return flows. The irrigation return flows (non-consumptive portion of the diversions) for a given month enters the ground water tributary and returns to the river. Within WIRSOS, these flows are returned to the river per Pattern 7 as defined in Section 3.1.6 Inflows and Losses Calibration:

1st month 30%
2nd month 30%
3rd month 20%
4th month 10%
5th month 10%

This pattern defines the fractions of irrigation return flows for a given month that discharge to the river in the same month and in subsequent months.

3.5 Reservoir and Lake Data

Included in this category of WIRSOS input are the data describing the physical characteristics of the reservoirs, water rights, and other operational constraints. The WIRSOS input data are summarized in Tables 3-10 and 3-11.

Area-storage curves for Topaz Lake and Bridgeport Reservoir were developed by the Division of Water Planning from USGS elevation-storage rating tables. These curves were then fitted with equations suitable to meet the input requirements of WIRSOS. The area-storage curves based upon USGS data and those based upon the fitted equations are depicted on Figures 3-16 and 3-17.

Both Topaz Lake and Bridgeport Reservoir have 2 storage water rights. The first rights allow storage from November 1 to March 1, during the non-irrigation season. The refill rights allow storage

after the first storage rights have been met, and anytime there is water available in excess of downstream decreed water rights.

Topaz Lake is an off-channel reservoir. Water is diverted from the West Walker River and conveyed in a canal to Topaz for storage. In WIRSOS, Topaz was defined as an on-channel reservoir as WIRSOS does not have the ability to directly handle off-channel reservoirs. To ensure that WIRSOS does not allow water to be stored in Topaz when not in priority, the outlet works capacity was changed from 1,800 cfs to 3,000 cfs. At this capacity, all modeled West Walker River flows into Topaz can be passed through the outlet works as required to meet downstream senior rights.

Weber Reservoir on the Walker River Indian Reservation was not included in this draft version of the model. Additional data are needed before this reservoir is incorporated into WIRSOS.

Table 3-10. Bridgeport Reservoir WIRSOS Input Data

Bridgeport Reservoir

Reservoir code	10
Station number	080040
Minimum storage volume, AF	0
Maximum storage volume, AF	42,460
Maximum outlet capacity, cfs	1,600
Initial storage at beginning of study period, AF	6,540

Evaporation rate:

January	0.06 ft.	July	0.50 ft.
February	0.07 ft.	August	0.53 ft.
March	0.16 ft.	September	0.40 ft.
April	0.18 ft.	October	0.25 ft.
May	0.27 ft.	November	0.14 ft.
June	0.38 ft.	December	0.06 ft.
		TOTAL	3.00 ft.

Storage water rights:

First fill, AF 42,000
Priority date April 1919

Refill, AF 15,000
Priority date April 1919

Area-capacity relationship:

$$\text{Area, in acres} = 1.6448 \times (\text{Storage, in AF})^{0.7071} \quad (24)$$

Table 3-11. Topaz Lake WIRSOS Input Data

Topaz Lake

Reservoir code	20
Station number	150001
Minimum storage volume, AF	0
Maximum storage volume, AF	59,440
Maximum outlet capacity, cfs	1,800
Initial storage at beginning of study period, AF	6,660

Evaporation rate:

January	0.08 ft.	July	0.68 ft.
February	0.09 ft.	August	0.72 ft.
March	0.21 ft.	September	0.53 ft.
April	0.24 ft.	October	0.33 ft.
May	0.36 ft.	November	0.18 ft.
June	0.50 ft.	December	0.08 ft.
		TOTAL	4.00 ft.

Storage water rights:

First fill, AF 50,000
Priority date April 1919

Refill, AF 35,000
Priority date April 1919

Area-capacity relationship:

For storage amounts 0 to 34,325 AF:

$$\text{Area, in acres} = 0.0079 \times (\text{Storage, in AF}) + 1,526 \quad (25)$$

For storage amounts 34,325 to 40,065 AF:

$$\text{Area, in acres} = 3.1480 \times (\text{Storage, in AF})^{0.6001} \quad (26)$$

For storage amounts 40,065 to 59,440 AF:

$$\text{Area, in acres} = 49.0943 \times (\text{Storage, in AF})^{0.3499} \quad (27)$$

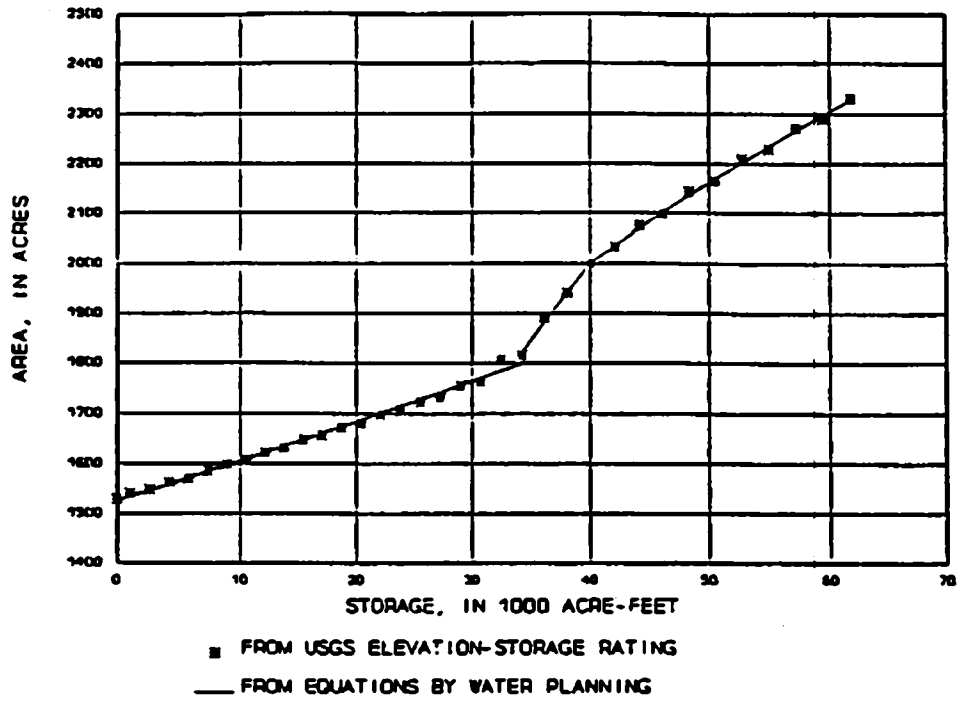

FIGURE 3-16. TOPAZ LAKE AREA-STORAGE CURVES

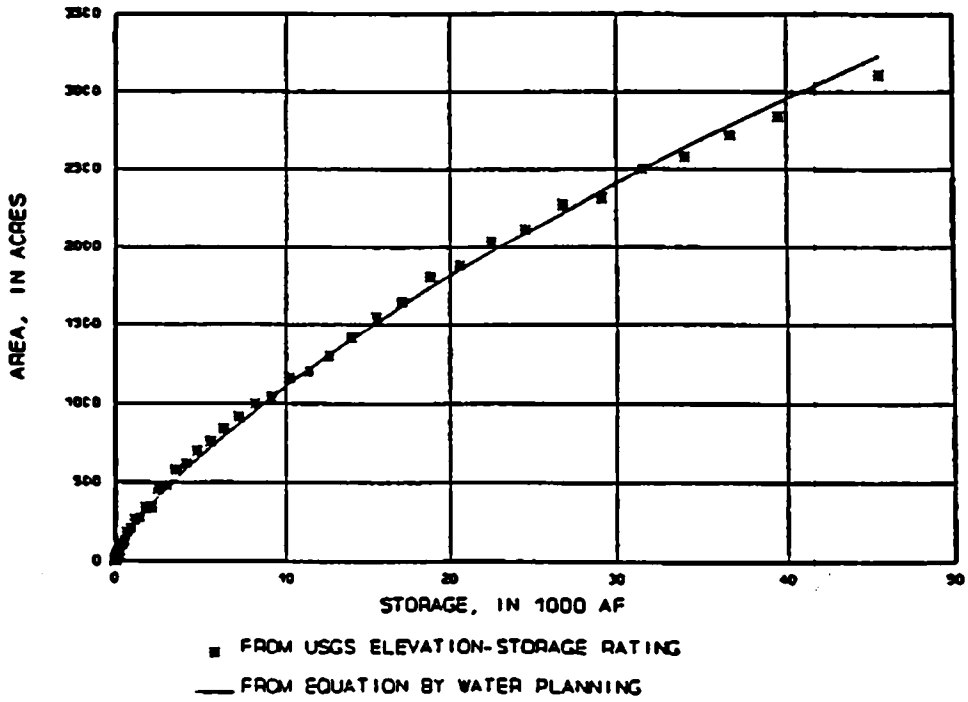

FIGURE 3-17. BRIDGEPORT RESERVOIR AREA-STORAGE CURVES

3.6 Modifications of WIRSOS Input Data

WIRSOS is a powerful tool for simulating water system operations under the prior appropriation doctrine. However, as with most models of this nature, some tailoring of the input data is required to force the model to more accurately simulate actual operations. Following is a discussion of specifics of the river operations and the input modifications needed to match as close as possible these operations.

1. In Mason Valley, there are lands irrigated with storage water (as a supplemental source and a primary source) from Bridgeport Reservoir and Topaz Lake. Under current operations, a given parcel of land with storage rights could receive water from either Bridgeport or Topaz or both. Historically, Topaz Lake has provided about 2/3 of the storage water in Mason Valley.

   WIRSOS does not allow a water right to be linked to more than 1 reservoir. For WIRSOS input, each Mason Valley right with rights to storage water was divided into 2 parts: 1) 2/3 of storage demand from Topaz; and 2) 1/3 of storage demand from Bridgeport.

2. The first fill rights in Bridgeport and Topaz allow storage to be added only during the non-irrigation season, November 1 to March 1. During the irrigation season, water can be stored under the refill rights provided water is available in excess of downstream senior rights. In addition, the reservoirs are operated for flood control. For instance if runoff much greater than normal is expected, the operator may release water in excess of downstream storage demands to provide storage space for the anticipated flood water. During runoff, the flood water is then stored to make up for the water released earlier.

   WIRSOS operates on the priority system and allows storage to occur when all downstream senior rights have been met and the reservoirs are in priority. WIRSOS will not limit reservoir diversions to a particular time period. If water is available and the reservoir is in priority, storage is allowed.

   At the time this report was written, no input modifications have been made to address this problem.

3. In WRID, storage water is the primary source of irrigation water for some of the lands. If insufficient storage water exists to meet these demands, river water is not an available source.

   WIRSOS is designed to process three different types of diversions: 1) normal diversions; 2) senior project right diversions; and 3) junior project right diversions. The

normal diversion right is comparable to the pre-1873 decree rights which receive only river water. Senior project rights are first satisfied with river water, and supplemented by storage water as available and needed. These are comparable to the post-1872 decree rights.

The closest match to the WRID storage rights are the WIRSOS junior project rights (JPR). Therefore, they were classified as JPRs for the WIRSOS input. JPRs are water rights "linked" to a reservoir where the JPR priority date is junior to the reservoir's water right. There are 2 scenarios affecting the handling of JPRs by WIRSOS.

Reservoir is not full:

> Under this condition, the JPR will be satisfied first with storage water. If there is insufficient storage water available, WIRSOS will attempt to satisfy the unfilled portion of the right with river water.

Reservoir is full and spilling:

> Under this condition, WIRSOS will attempt to satisfy the JPR rights with river water and then storage water as needed.

Neither of these WIRSOS operations accurately simulate the allocation of storage water within WRID. The desire is to force strictly storage water diversions for the WRID storage diversion rights, and not allow river water to be utilized as a supplemental source. Note that these lands may receive permit water from the river as a supplemental source, but these demands have been defined separately from the storage demands (See Section 3.3.1, subsection Permit Water).

In order to force these rights to divert only storage water under their storage right, it was necessary to assign an artificially late priority date to these rights. The actual priority date of these storage diversion rights is April 1919. As part of the WIRSOS input, the storage diversion rights were assigned priority dates in 1990. It must be noted that the priority dates for the Topaz and Bridgeport storage rights were not changed, only the priority dates of the rights diverting storage water released from the reservoirs were modified.

WIRSOS will still attempt to satisfy these storage rights with river water but with the late priority date of January 1990, there are minimal months when river water is available for diversion, especially with the large 795.2 cfs right for Walker Lake inflows (priority date of September 17, 1970).

At the time this report was written, the river water diversions (by these storage rights) as allowed by WIRSOS have not been quantified. Once the model is complete, this problem

will be examined further. It may be necessary to create a large fictitious senior water right (priority date between 1970 and 1990) below WRID to further restrict river water diversions by the storage rights.

4. For those WRID diversion rights with storage only rights, all have the same priority date (1990 - see item 3 above) and the available water is to be shared equally between all rights.

   WIRSOS does not equally apportion the available water to rights with the same priority dates. In WIRSOS, if 2 rights have the same priority date the upstream most right will be satisfied first and any remaining water is available for the downstream right. This can result in one right being fully satisfied and the other one shorted.

   To force WIRSOS to spread out the available storage deliveries more equitable between West and East Walker Rivers, and Walker River, the storage rights in each subarea were divided into 10 rights with equal diversion demands (each 10% of total) with priority dates ranging from January 1, 1990 to January 10, 1990.

5. The permit rights have one of two priority dates, either June 6, 1919 or April 11, 1969. For those rights with the same priority dates, the available permit water is to be shared equally.

   As discussed in Item 4 (above), WIRSOS does not equally apportion the available water to rights with the same priority dates. To force a more equitable distribution, the permit rights in each subarea were divided into 10 rights with equal diversion demands (each 10% of total) with priority dates ranging from June 6, 1919 to June 15, 1969 for Permit 5528 rights, and from April 11, 1969 to April 20, 1969 for Permit 21507 rights.

6. Water rights under Permit 21507 have a priority date of April 11, 1969. The Nevada Department of Wildlife (NDOW) holds a right (Walker Lake inflows) with a 1970 priority. The study period runs from 1961-90.

   WIRSOS models the system assuming Permit 21507 and the NDOW water rights are in existence during the entire study period. WIRSOS is not capable of handling water rights that are established in the middle of the modeling period. This may make it difficult to compare model results to historic operations, however does not pose a problem for modeling of future operations. At the time this report was written, the impact of this modeling limitation has not be quantified.

7. The Nevada Department of Wildlife (NDOW) right of 795.2 cfs for Walker Lake inflow is basically an instream flow requirement.

WIRSOS has the capability of handling instream flows, but trial run indicated a problem with this portion of the program. To circumvent this problem, the NDOW right was defined as a non-consumptive use diversion with all water returning to river in the same month (no return flow delay).

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WALKER RIVER IRRIGATION DISTRICT
LEGISLATIVE COMMITTEE MEETING
JANUARY 7, 1994

EXHIBIT NO. 5

Topic No. 3 - History, Organization and Background Information

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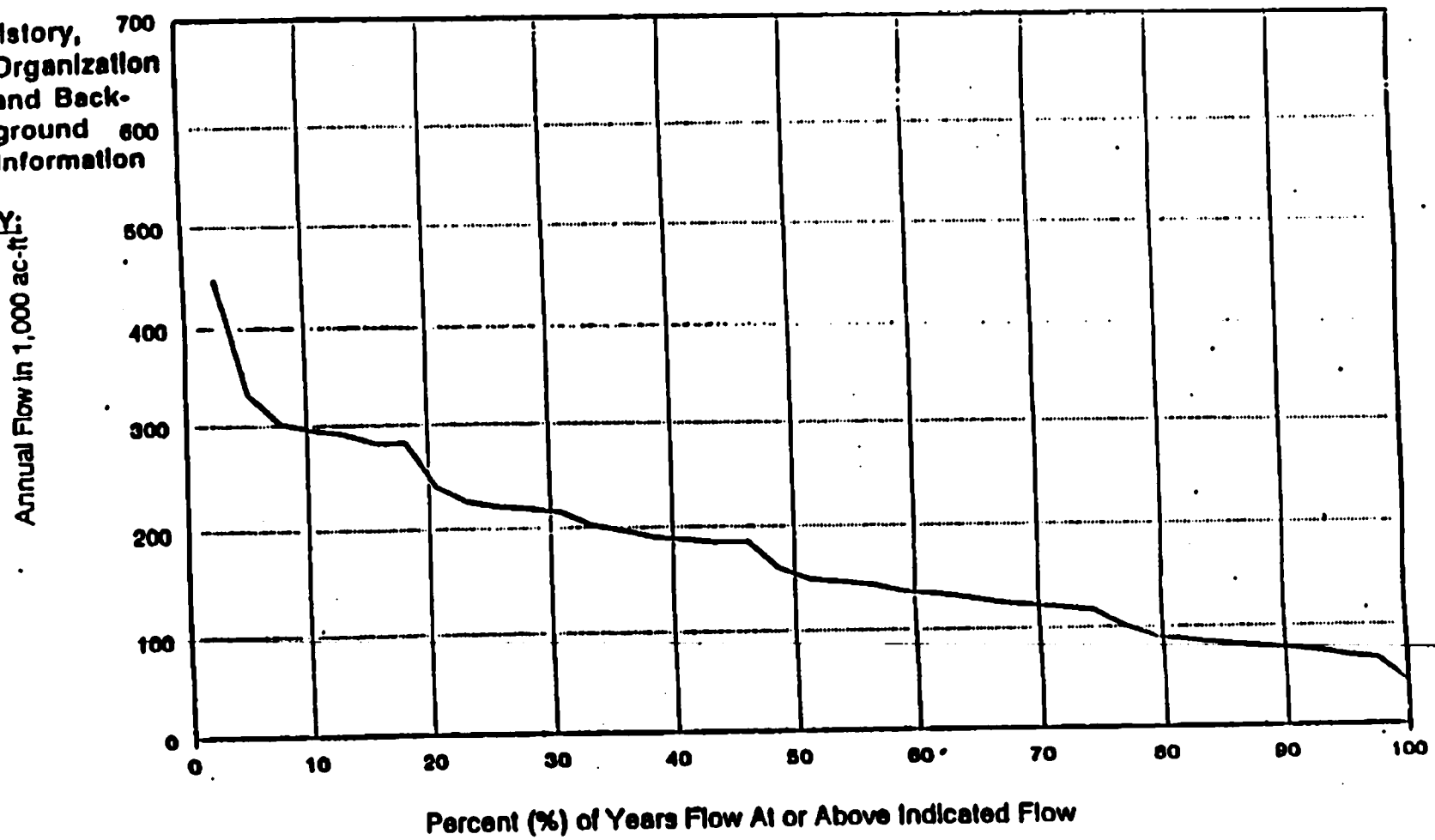

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JANUARY 7, 1994

EXHIBIT NO. 6

Topic No. 3 - History, Organization and Background Information

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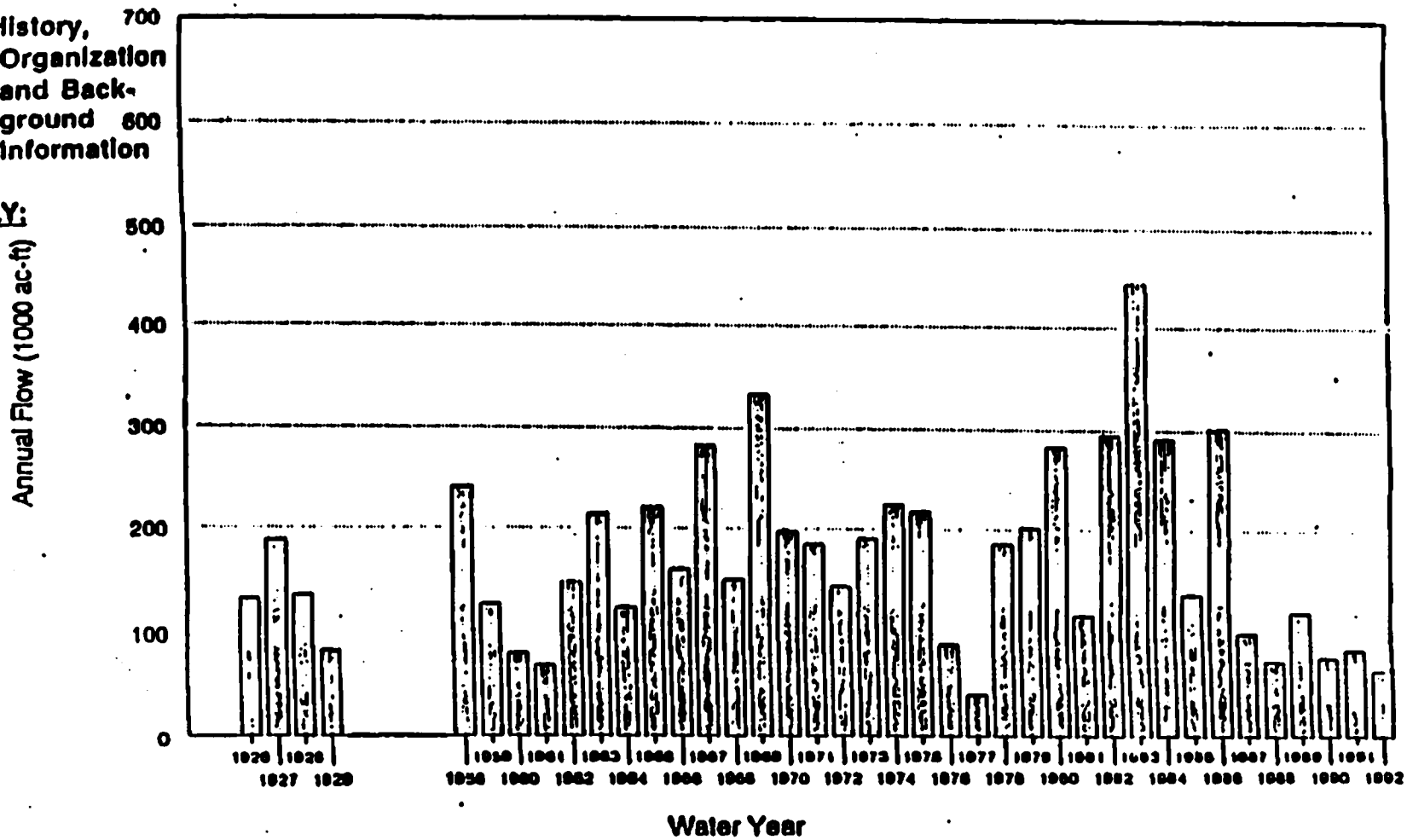

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XHIBIT NO. 7

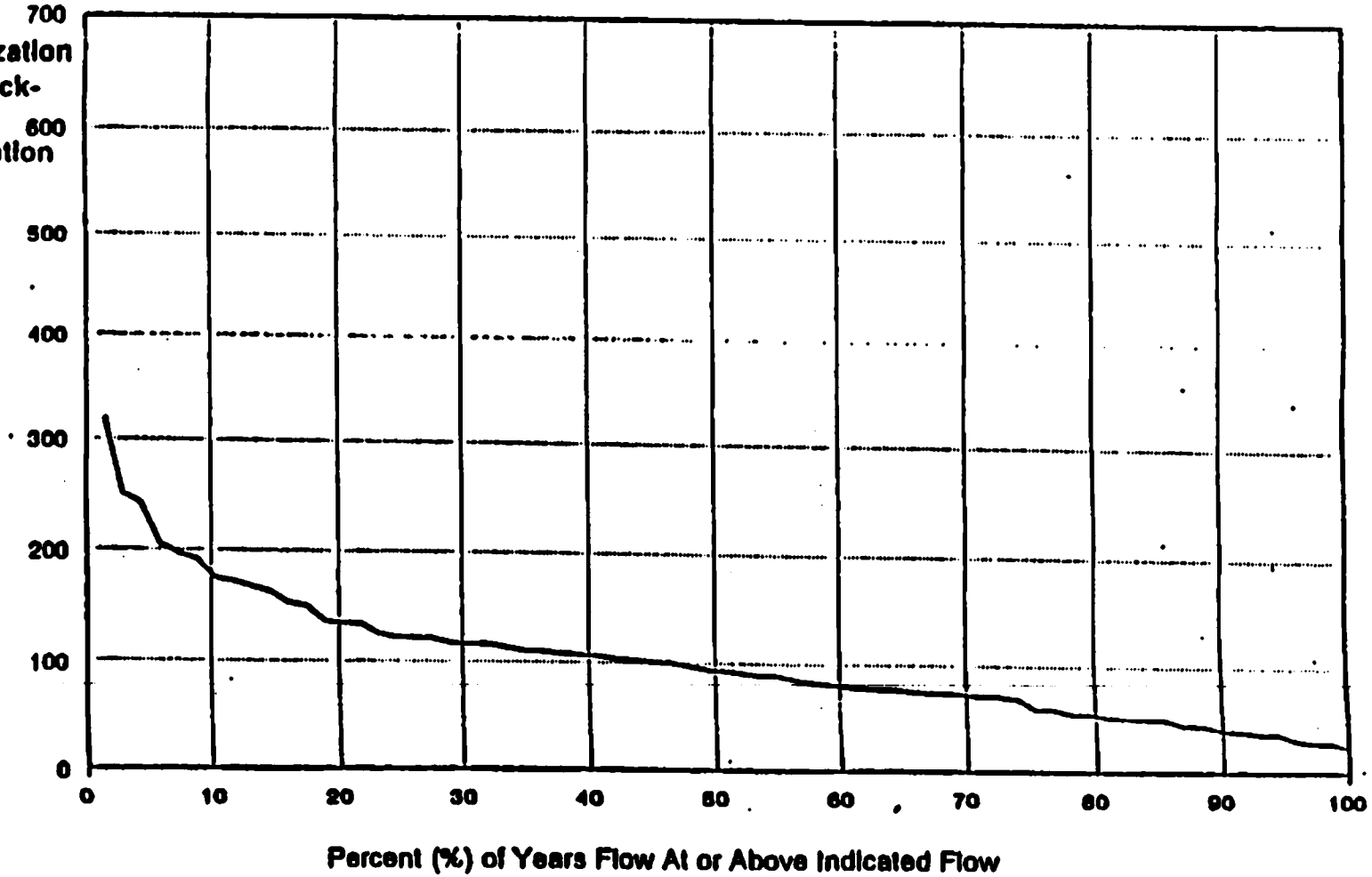
opic No. 3 - History, Organization and Background Information

/ATER SUPPLY:

East Walker River near Bridgeport, OA

Frequency Analysis of Annual Flow

Water Years 1923-24, 1926-92 (69 years)



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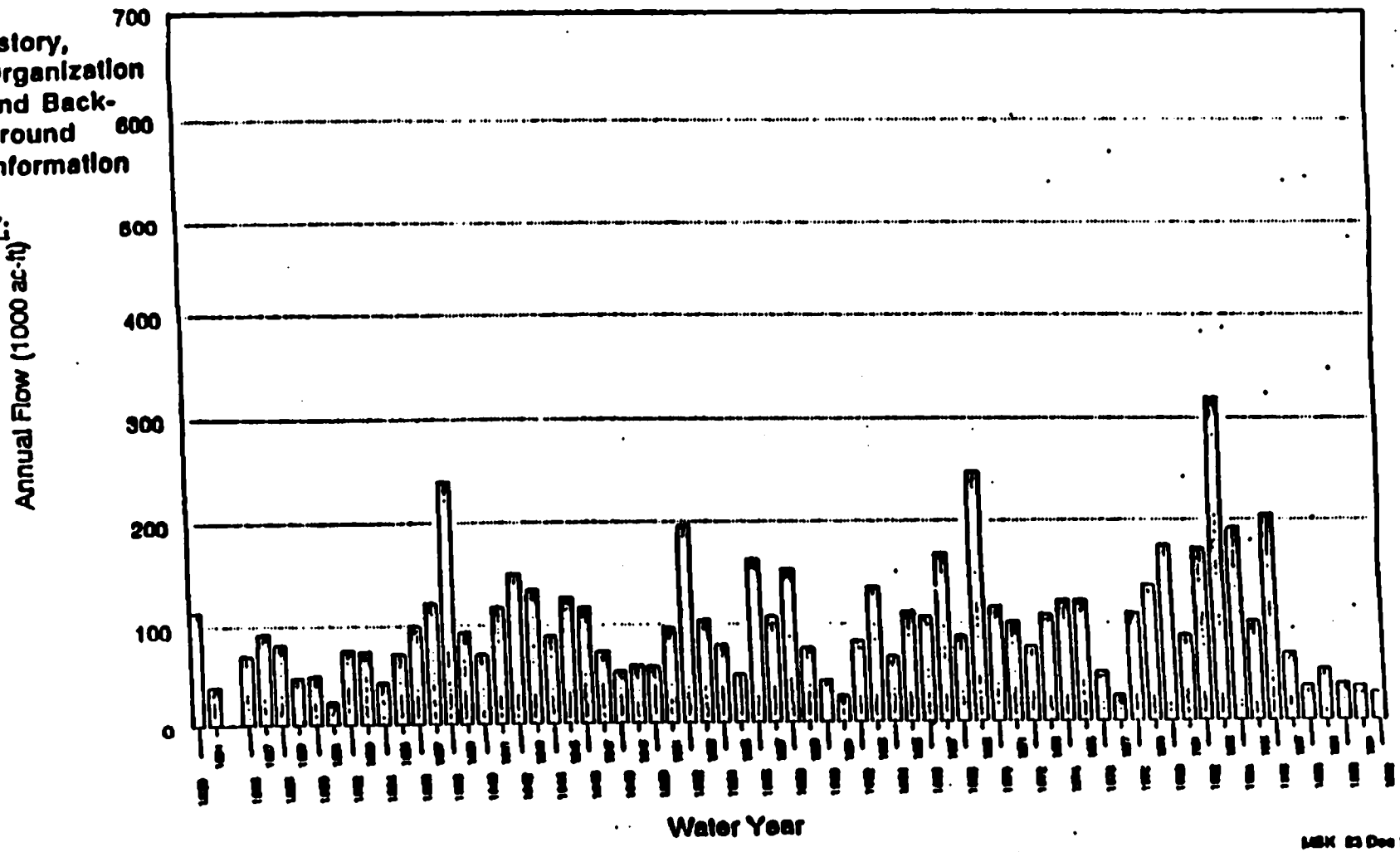
TER SUPPLY:

East Walker River near Bridgeport, OA
Annual Flow



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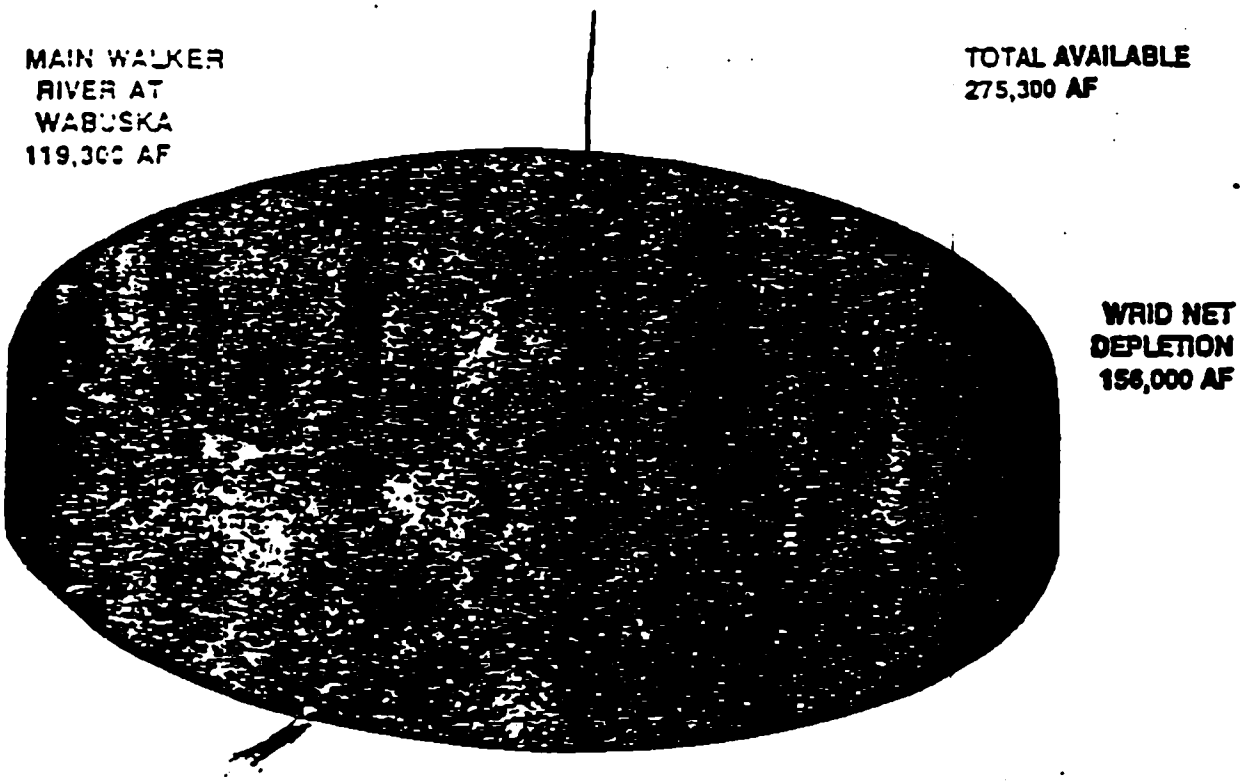
JANUARY 7, 1994

EXHIBIT NO. _____

Topic No. 3 History, Organization and Background Information

WATER SUPPLY:

WRID GROSS RIVER INFLOW/OUTFLOW*



GROSS RIVER INFLOW:

EAST WALKER RIVER BELOW BRIDGEPORT	102,900 Acre Feet
WEST WALKER RIVER AT HOYE BRIDGE	172,400 Acre Feet
	275,300 Acre Feet

GROSS RIVER OUTFLOW:

MAIN WALKER RIVER AT WABUSKA	119,300 Acre Feet

*1992 Water Resources Data - Nevada. USGS. Water Data Report NV-92-1

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HIBIT NO. 10

pic No. 3 - History, Organization and Background Information

:CREATION - Topaz Reservoir

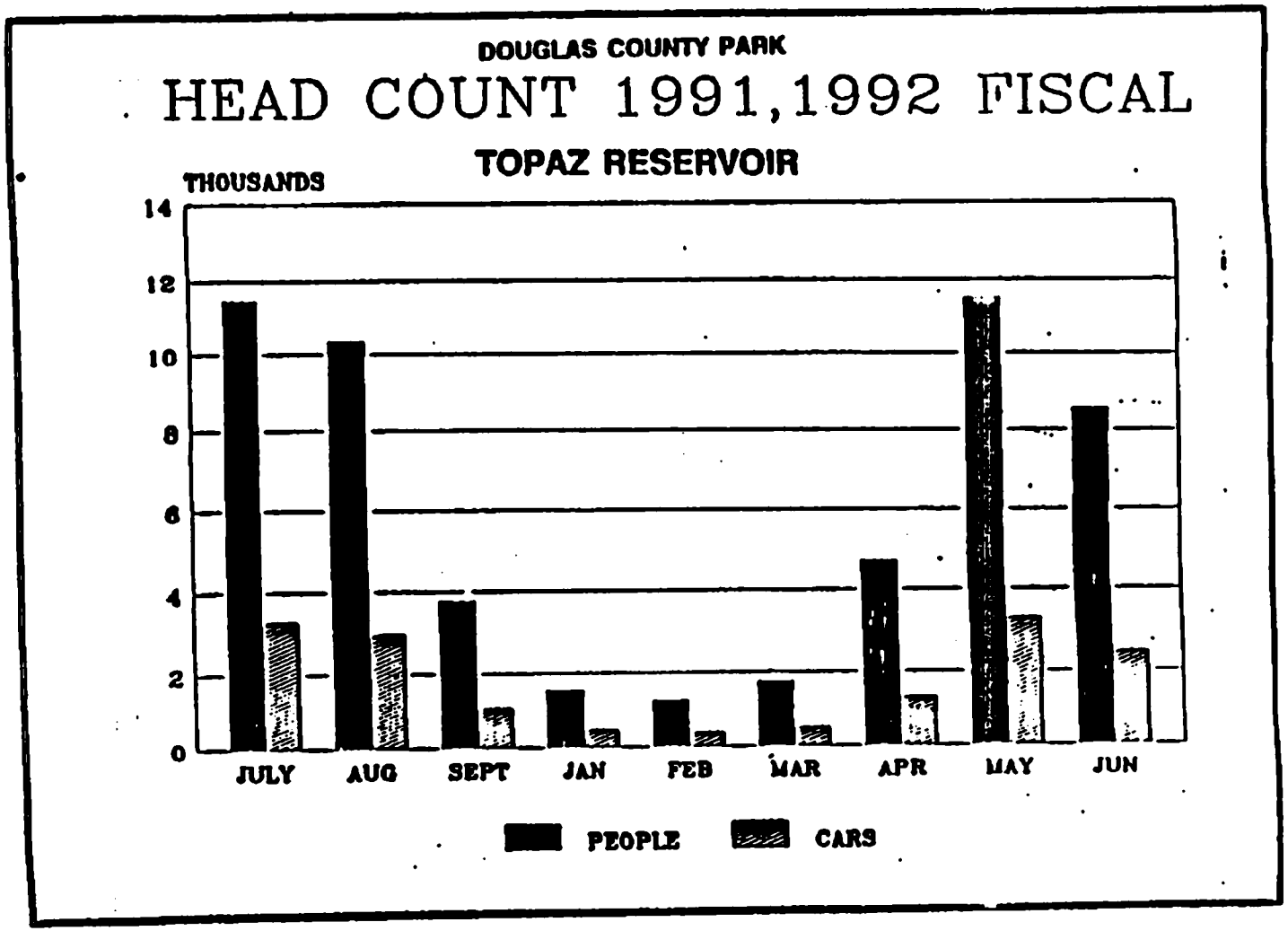

EXHIBIT NO. 10
Page 2

LEGENDS 1991 - 1992

MONTH	PEOPLE	CARS
JULY	11,466	3,276
AUGUST	10,346	2,956
SEPTEMBER	3,762.5	1,075
JANUARY	1,557.5	445
FEBRUARY	1,295	370
MARCH	1,753.5	501
APRIL	4,693.5	1,341
MAY	11,501	3,286
JUNE	8,585.5	2,453
	54,960.5	15,703

EDWARD M. KENNEDY, MASSACHUSETTS
JOHN DINGELL, MICHIGAN
ERNEST F. HOLLINGS, SOUTH CAROLINA
CLAIBORNE PELL, RHODE ISLAND
CHARLES E. GRASSLEY, IOWA
E DURENBERGER, MINNESOTA
GEORGE E. BROWN, CALIFORNIA
JOHN D. DINGELL, MICHIGAN
JIM McDERMOTT, WASHINGTON
AMO HOUGHTON, NEW YORK
MICHAEL G. OXLEY, OHIO
ROGER C. HERDMAN
ROGER C. HERDMAN
DIRECTOR

Congress of the United States
OFFICE OF TECHNOLOGY ASSESSMENT
WASHINGTON, DC 20510-8025

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August 23, 1993

MEMORANDUM

To: Ms. Mimi Guernica
Ms. Blaine Rose

From: William Westermeyer WW
Office of Technology Assessment

I have completed a brief investigation of Walker Lake and enclose my findings and recommendations with this memo. Briefly, the preservation of Walker Lake does not seem to be an insoluble problem, but neither is it one that lends itself to a quick and easy solution. Technically, solutions are available; however, in order to make progress in implementing these solutions, a continuing dialogue among the different interest groups needs to be established, and additional waterflow data needs to be acquired. OTA's suggestions, therefore, address these needs.

Although I do not mention this in the memo, I feel it is also important to point out that future site visits would likely be more valuable if such visits included discussions with representatives of the Walker River Irrigation District. (Specifically, the visit to the Mason Valley Wildlife Refuge, which resulted in no new insights, could be eliminated in favor of a meeting with irrigators). I believe an opportunity was missed on the tour in which I participated by not introducing the environmental representatives to the farmers' representatives.

WATER FOR WALKER LAKE

Background

The Walker River flows through an arid and sparsely populated part of the western United States. Water in general is scarce in this region, and even in years of above average snowpack in the Sierras, there is little water available in the watershed for all those who would like to use it. Agriculture is by far the major user of Walker River water. Water began to be diverted from the river for agriculture in the last half of the 19th century in the Smith and Mason Valleys in Nevada and Antelope Valley in California.

Several water rights decrees, culminating in Decree C-125 in 1936, have allocated water rights according to the prior appropriation doctrine. Typical of most early water rights agreements, instream beneficial uses of water were not protected. Thus, in allocating rights to Walker River water, little thought was given to the effect that diversions would have on Walker Lake at the terminus of the river. As a result largely of agricultural diversions, the level of Walker Lake has fallen more than 120 feet since the early 1900s. The Nevada Department of Conservation and Natural Resources (NDCNR) has estimated that the average annual deficit (i.e., the difference between water entering the lake and water evaporating from it) over the last 30 years has been about 33,000 acre-feet per year.[1]

Since 1930, the average annual rate of decline of the surface elevation has been about 1.4 feet, according to the Nevada Department of Wildlife (NDW).[2] However, there is some disagreement and/or confusion over the rate at which the lake is falling, and indeed, the rate calculated depends on the span of years used for the calculation. The Walker River Irrigation

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[1] See State of Nevada, Department of Conser[illegible] Natural Resources, Water River Basin Water Rights Model, June 1993 (Draft).

[2] M. Sevon, Supervising Fisheries Biologist, [illegible] Department of Wildlife, "Walker Lake, 'An Endangered Ecosystem,' How Much Time is Left for the [illegible] Cutthroat Trout Fishery?" draft report, July 1993, p. 5.

District suggests the historic rate of decline is 0.9 feet per year. Between 1987 and 1992, a period of severe drought throughout the West, the level of Walker Lake fell about 3.7 feet per year.[3]

The current maximum depth of Walker Lake is about 110 feet. The U.S. Geological Survey estimates that Walker Lake will eventually stabilize at a maximum depth of about 40 feet absent any changes in how water is allocated among competing users.[4] At that point, the lake would have a much smaller surface area, and inflow would balance evaporation. However, since minerals become concentrated in terminal lakes through evaporation, Walker Lake would slowly become saltier than seawater.[5]

Long before the lake level stabilizes, however, the concentration of total dissolved solids (TDS) will become too high for the Lahontan cutthroat trout and other fish species in the lake to tolerate. The NDW has calculated that at historic levels of decline, the fishery could be lost in from 5 to 11 years; at levels of decline experienced during the 1987-92 drought, the concentration of TDS could be too high for the fish in as few as 2 years.[6]

The potential disappearance of the cutthroat trout fishery has served as a "wake up call" to recognition of the inherent problems associated with current management practices on the Walker River. Although Walker Lake has been declining for decades, concern had been minimal, probably because no vital interests had been threatened. Now that the threshold lake

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[3] Sevon, op. cit., p. 5.

[4] See California Department of Water Resources (DWR), Walker River Atlas (Sacramento, CA: DWR, 1992), p. 34.

[5] Note that even if extra water is allocated to Walker Lake, the concentration of minerals through evaporation will continue, although this process may be stretched out over a much longer time span.

[6] Sevon, op. cit., p. 5

level, below which fish will not be able to survive, appears to be rapidly approaching, the situation has changed. As with other western water problems, different interest groups have a stake in the management of the river, and their interests are not always compatible.

Farmers in the Walker River Irrigation District. Agriculture is long-established in the Mason and Smith valleys, and towns such as Yerington depend heavily on an agricultural economy. Farmers have acquired senior rights to irrigate some 80,000 acres and to divert almost 300,000 acre-feet of water per year (afy).[7] Pasture irrigation and alfalfa production are the largest agricultural water uses. Like some other rivers in the West, water rights on the Walker have been *over*allocated. The Walker River Task Force notes that during a normal water year (i.e., when the snowpack is 100 percent of normal) only 84 percent of agricultural water rights can be satisfied. A snow pack of 120 percent of normal is required to provide the full allocation of water rights, and historically this situation has occurred only 45 percent of the time.[8] Overallocation of water rights may make finding a solution to Walker Lake's decline more difficult, since the rights of more senior water users may have to be satisfied before additional water could be made available for the lake.

Water now used in agriculture is likely the largest potential source of additional water for Walker Lake. Additional water could be made available through improvements in irrigation practices, retirement of some marginal land, and conjunctive management of ground and surface water. How much additional water might be acquired through these means has not been determined. In its Walker River Atlas, the California Department of Water Resources notes that water rights purchases sufficient to yield an average of 60,000 to 85,000 afy would be needed to maintain the lake at close to or slightly above its 1992 elevation. This represents roughly 20 to 30 percent of water currently consumed by a combination of agriculture, other

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[7] State of Nevada, op. cit. See table 3-4, p. 5[illegible]

[8] Walker River Task Force, draft discussion [illegible] 1993.

vegetation (i.e., phreatophytes), and evaporation from 3 small lakes.[9] Of the amount consumed, 60 percent is through irrigation, 34 percent through phreatophyte evapotranspiration, and 6 percent through lake evaporation.

Farmers and farming communities understandably wish to preserve their way of life and will likely resist any fundamental changes that could affect that. However, they appear willing to discuss water problems with other interest groups in the watershed. They recognize that irrigation efficiencies can be improved. They also note that some marginal agricultural land could be retired, but prefer to be compensated for doing so.

Walker River Paiute Indian Reservation: After leaving Mason Valley and just before entering Walker Lake, the Walker River flows through the Walker River Paiute Indian Reservation. The Walker River Paiutes divert a relatively small amount of water to irrigate some 2,100 acres of land on their reservation. As with the Walker River Irrigation District, accounting for water flows on the reservation is not very accurate. NDCNR has estimated inflows and outflows to the reservation, but their estimates do not accord with amounts the Indians say they are diverting nor with recent observations about the amount of water reaching Walker Lake. Lack of streamflow data in the area greatly limits an understanding of water movements on the surface and in the ground.

The Indians are concerned about the decrease in size of Walker Lake and wish to work with other groups to help stem the decrease. At the same time, they feel they have been unfairly treated by past water rights rulings and would like to expand the amount of irrigated land on their reservation. They also believe the Walker River Irrigation District, upstream, has not been delivering the amount of water specified in Decree C-125 (i.e., 26.25 cubic feet per second (cfs)) to the reservation.

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[9] State of Nevada, op. cit., Table 2-1.

Residents of Hawthorne. The residents of the town of Hawthorne, to the south of Walker Lake, are concerned about the effect the potential demise of the Walker Lake fishery could have on their local economy. Recreational boating and fishing are major sources of revenue for this small town and are seen as the key to economic development in an area that doesn't have many alternatives.

Some citizens of Hawthorne have organized into the Walker Lake Working Group. The goal of this group is to seek a guaranteed volume of water to maintain the lake at a suitable level to sustain fish life. They hope to be able to convince upstream water users to change water use practices so the lake can be saved.

The environment. Preservation of Walker Lake is deemed desirable by all interest groups. However, local habitat preservation *per se* has not, until recently, had its own champion, and offstream users have at least a partial conflict of interest with environmental concerns. Nationally, concern about environmental preservation has grown dramatically in recent years, and it has become increasingly difficult to neglect environmental (or instream) uses of water. The recent examples of water reallocation for environmental purposes in California's Central Valley, in the Mono Lake area, and in the Carson and Truckee watersheds of California and Nevada point to a trend that, to one degree or another, is likely to continue in the Walker River watershed.

Several environmental groups have recently become concerned about Walker Lake. These include the Nature Conservancy, the Sierra Club, and the Environmental Defense Fund. Members active in Walker Lake discussions have, for the most part, also been involved in the Truckee-Carson negotiations. Environmental organizations are at an early stage in assessing Walker Lake's environmental problems, and to OTA's knowledge no group has yet formulated detailed policy proposals.

Recommendations

Technically, many opportunities exist to increase the inflow of water to Walker Lake and to reduce the concentration of total dissolved solids in the lake, thus improving the habitat for the lake's threatened fish (see table 1). Some opportunities could be implemented without penalizing the water usage of any stakeholders; other opportunities would require the sacrifice of some water (although not necessarily significant amounts) on the part of one or more stakeholders, usually irrigators; still other opportunities might call for significant sacrifice on the part of certain groups and would likely be vigorously resisted. The costs to implement these opportunities have not been evaluated, but some would be less expensive than others. In its cursory investigation, OTA noted several problems that need to be addressed in order to lay the groundwork to take advantage of available opportunities.

First, the various interest groups in the watershed need to begin talking with one another 1) to develop a common understanding of the problem, 2) to more precisely identify areas of agreement and disagreement, 3) to promote development of information that can reduce factual disputes, and 4) to identify solutions and seek ways to implement them. A Walker River Task Force has been formed, but its structure and composition do not appear to be ideal for fostering trust among stakeholders. A principal concern is the fact that the chairman of the task force is the manager of the Walker River Irrigation District rather than a neutral party.

One possibility to make progress in addressing Walker Lake's problems would be to convene a workshop or forum at some neutral location in Nevada, bringing together representatives of all stakeholders and technical agencies. Ideally, the workshop should be convened, sponsored, and chaired by a neutral, mutually acceptable third party. Among those who should be included are representatives of: 1) Hawthorne and Yerington, 2) the Walker

River Irrigation District, 3) the Walker River Paiute Tribe, 4) environmental groups such as the Nature Conservancy and the Sierra Club, 5) the Nevada State Engineer, 6) the Nevada Department of Wildlife, 7) U.S. Geological Survey, 8) U.S. Soil Conservation Service, 9) U.S. Bureau of Land Management, 10) U.S. Army, 11) California Department of Water Resources, 12) U.S. Board of Water Commissioners, and 13) any others with a stake in resolving the problem. A minimal goal would be to clarify any misunderstandings among stakeholders and to share and jointly assess relevant information about the river's water budget.

If a workshop (or series of workshops) is deemed desirable, one possibility would be to utilize the services of the newly established Environmental Conflict Resolution program at the University of Arizona's Udall Center for Studies in Public Policy. Managing this program is one function of a new national foundation established by the "Morris K. Udall Scholarship and Excellence in National Environmental and Native American Public Policy Act of 1992" (P.L. 102-259). Among the foundation's purposes are to foster greater recognition and understanding of the role of the environment, public lands, and resources in the development of the United States. Congress has recently appropriated $10 million to endow the foundation, but the conflict resolution program has not yet begun operations. Among the advantages of convening a workshop under the auspices of this new foundation would be its neutrality and the substantial expertise on western water problems that currently exists at the Udall Center. The director of the Udall Center, Dr. Helen Ingram, is a nationally recognized water expert. She recently chaired OTA's Advisory Panel for its climate change adaptation study, and, as part of this study, chaired OTA's 1992 workshop on water resources and climate change.

It would be prudent to hold a workshop at the earliest possible date (e.g., in late 1993 or early 1994), since the stress on the fishery is steadily increasing, and, according to the Nevada Department of Wildlife, the fishery may collapse in 5 years or less if changes are not made soon in how the water resources in the basin are managed.

Second, some of the differences of perceptions of the problem and possible solutions that currently exist among interest groups can be accounted for by lack of good streamflow data. The State of Nevada's Department of Conservation and Natural Resources has used what data are available to estimate a budget for water inflow and outflow at various points in the watershed.[10] However, lack of streamflow gauges at key points along the river and deterioration of at least one key gauge make it impossible to know with precision what is happening in the system. Better understanding of how much water is being diverted at particular points and how much water is reentering the river after diversion is essential in order to identify and assess the best measures for managing the river.

Three data problems seem especially important to address. First, estimating inflow to Walker Lake is problematic because the nearest streamflow gauge is more than 30 miles upstream at Wabuska and significant irrigation diversions and channel losses occur along the river below this last gauge.[11] A gauge much nearer the lake would be desirable–*if*, given the meandering nature of the river along this stretch, a suitable location can be found.

Second, the key Wabuska gauge north of the Walker River Indian Reservation needs upgrading.[12] Over the years, a shifting channel and sedimentation has rendered data acquired from the gauge less and less accurate. The USGS rates the accuracy of this data as only "fair to poor." The readings at the Wabuska gauge are important because it is here that the water allocation for the Indian Reservation is measured. Indeed, the Indians prefer to move the gauge closer to the north end of Weber Reservoir (or to construct an additional gauge) because

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[10] See State of Nevada, Department of Conservation and Natural Resources, Water River Basin Water Rights Model, June 1993 (Draft).

[11] California Department of Water Resources (DWR), Walker River Atlas (Sacramento, CA: DWR, 1992), p. 32.

[12] R. Hayes, U.S. Geological Survey, Carson City, NV., personal telephone communication, August 12, 1993.

they believe significant channel losses occur between the Wabuska gauge and Weber Reservoir for which they are inappropriately being charged. Others believe--even though no streamflow data are available--that substantial losses are occurring on the reservation itself. (Note that the USGS believes that even though a gauge can be installed in this area, the accuracy of the data will be no greater than plus or minus 20 percent, given the shifting nature of the stream).

Finally, it would be extremely helpful to install small gauges at irrigation diversion points. Farmers in the Walker River Irrigation District have not been concerned with irrigation operating efficiencies and hence do not have good information about where adjustments might be made to improve efficiency. Installation of gauges would help identify where blocks of water are unnecessarily being lost.[13]

The cost of new gauges could be substantial relative to available funds. The USGS notes that upgrading the Wabuska gauging station could cost several hundred thousand dollars. It seems likely that the cost of installation of additional gauging stations on the main stem of the river would also be in this range. Installation of gauges to measure irrigation diversions would cost on the order of 3 thousand dollars each, and several dozen would likely be needed. The USGS has a small amount of money available for matching State funds budgeted for installing gauging stations. The USGS has indicated, however, that all available "co-op" funds for this program have already been committed. If new gauges are to be installed, additional funds may need to be appropriated for the USGS's Nevada district's gauging program. The State would, of course, have to come up with matching funds. Also, if a workshop is held, one topic of discussion might be how to pay for additional gauges, especially those needed at diversion sites.

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[13] Jim Weishaupt, Walker River Irrigation District, personal communication, August 5, 1993.

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It should be noted that it generally takes a number of years to develop good data from a newly installed gauge and that the longer the time series of data available, the more accurate the determination of average flow will be. USGS says, however, that it can begin publishing data 1 to 2 years after installation of a gauge. Given the precarious nature of the Walker Lake fishery, it would be prudent to install additional gauges soon.

Third, negotiations leading to an interstate compact between Nevada and California concerning allocation of water in the Walker River watershed should be reconvened. In 1990, Public Law 101-618 established a framework for an interstate allocation of waters of the Truckee and Carson rivers, the two other rivers with headwaters in California that flow into Nevada. The Walker River was not included in the final legislation, ostensibly because "pressure created by proposed water development projects [in the watershed] had abated by the 1980s."[14] Indeed, the portion of the Walker River watershed in California has very few people in it, and major increases in water use in that area are not anticipated. Nevertheless, California still has a potential right to use additional water in the Walker River watershed and could some day assert rights to a portion of the water now being used in Nevada. Any agreement concerning Walker River water reached by interest groups in Nevada could potentially be undermined if California some day claims the right to use additional water, and, as the saying goes, "a shovel upstream is better than a decree downstream." A compact would clarify the water rights of both states and ensure that efforts to protect Walker Lake and the various Walker River stakeholders in Nevada would not later be undermined.

A final comment

Saving Walker Lake, and especially doing so without affecting other longstanding interests in water from the Walker River, is not likely to be easy. In OTA's view, saving the lake will likely require more than just implementation of the relatively easy steps that could be

[14] California Department of Water Resources, op. cit., p. 70.

taken, but saving it does not appear to be a hopeless cause. The problems experienced in the Walker River watershed are similar to those that have been faced with some success in the Carson and Truckee watersheds to the north. That the Walker situation does not appear to be as complex is a hopeful sign. Other recent water rights settlements (e.g., regarding Mono Lake and California's Central Valley) are beginning to firmly estabish the principal that the environment matters, and these precedents make it increasingly difficult for major water users to conduct business as usual. The best solution attainable may well be one that entirely pleases no one—farmers may have to change water use practices more than they are currently willing to do, Indians may have to forego irrigating significantly increased acreage, and environmentalists and residents of Hawthorne may have to be satisfied with a somewhat lower lake level than they would prefer.

Table 1

Possibilities for Increasing the Flow of Water to Walker Lake

A. Relatively Easy:
- o Line diversion ditches: ditch lining would help prevent some seepage losses
- o Upgrade distribution systems: improved valving systems would also increase irrigation efficiency; installing pipes in selected parts of the system possible but more costly
- o Schedule irrigation: would regulate irrigation so crops receive water only when they need it
- o Establish a water bank: would allow water to be bought from farmers in drought years that could be used for environmental purposes; has been successful in California
- o Remove non-native plants from the stream channel: high-water-using-plants, such as salt cedar, have proliferated in the stream channel; their removal would make more water available but would also affect some (non-native) habitat
- o Manage ground water and surface water conjunctively: would help improve efficiency and flexibility of system and enhance yields through less conservative operation of storage facilities

B. More Difficult
- o Purchase existing agriculture rights (e.g., in marginal areas): a potentially important option, but funds could be a problem
- o Change crops, e.g., from alfalfa to onions: alfalfa uses much more water than crops such as onions, but the market is not large for such crops
- o Renegotiate Decree C-125: although desirable from the point of view of residents of Hawthorne and Indians, would likely be strongly resisted by farmers
- o Line river channel between Wabuska and Weber Reservoir: much water is apparently "lost" in this area, but turning the river into a canal would likely be resisted by environmentalists

C. Other types of options--not shown to be technically feasible
- o Breed a strain of hatchery trout that can tolerate Walker Lake's high alkalinity
- o Install devices on side streams to control alkaline minerals from entering Walker Lake

Groundwater / surface water

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believe that the original decree gave the upstream users the right to de-water Walker Lake. (See, Nebraska v. Wyoming, 113 S.Ct. 1689 (1993).

One of the allegations of the Mineral County position is that the waters of Walker River are allocated beyond the capacity of the River, leaving no natural flows left to enter the Lake. The instant litigation is where the issues of allocation will be adjudicated. Mineral County must be allowed to intervene in order to preserve and protect Walker Lake in the forum where reallocations can and will be determined, the instant case.

C. MINERAL COUNTY IS NOT ADEQUATELY REPRESENTED BY ANY OF THE PRESENT PARTIES TO THE LITIGATION

Mineral County may very well have interests coincident with some of the parties to the present litigation to contest the right of the SWRCB to entrap flows to protect the man-made fishery of Bridgeport Reservoir at the cost of the natural fishery in Walker Lake. But no other party to this litigation has expressed even a casual reference to the protection of the levels of Walker Lake.

> Whether a party may intervene turns, in part, upon a comparison of the adequacy of representation primarily by comparing the interests of the proposed intervenor with the current parties to the action. Sierra Club v. Robertson, 960 F.2d 83, 86 (8th Cir. 1992). To satisfy the adequacy of representation test, an intervenor . . . need only show that representation may be inadequate, not that it is inadequate. Conservation Law Foundation v. Mosbacher, 966 F.2d 39 (1st Cir. 1992). (Emphasis added.)

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The State of Nevada is required by its very position to protect all of its citizens. The interests of its citizens are not necessarily identical and may become competing. Some residents may not favor the preservation of Walker Lake, if other, more immediate, pronounced, or self-serving interests are at stake. The burden of showing inadequate representation by a political sub-entity of a State when that State is a party also, may be more than minimal; however, Mineral County can more than show why its interests differ from all of the interests that the State of Nevada must represent upstream. See, Environmental Defense Fund v. Higginson, 631 F.2d 738 (D.C. Cir. 1979). The State must protect its own decisions regarding the appropriation of the waters of the Walker River which may in large part have deprived Walker Lake of its critical recharge. Further the State of Nevada only listed its concern for protection of the Mason Valley Wildlife Preserve as any specific reason for its intervention. (See, State of Nevada Motion for Intervention, Page 3, Lines 12-15.) Walker Lake, indeed, has no protector but Mineral County.

D. MINERAL COUNTY HAS NO OTHER MEANS TO PROTECT ITS INTEREST IN WALKER LAKE THAN TO ENTER THIS PROCEEDING AND PRAY THAT THIS COURT REALLOCATE THE WATERS OF THE WALKER RIVER

The Walker River is a stream the headwaters of which rise on the eastern slopes of the Sierra Nevada mountains in California. United States v. Walker River Irr. Dist., 104 F.2d 334 (9th Cir. 1939). The River flows through lands that are arid, mostly rough or mountainous into the Walker River Paiute Reservation for a distance

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of approximately thirty miles where the stream empties into Walker Lake. See, United States v. Walker River Irr. Dist., supra at p. 335. The River has been the subject of litigation culminating in the Decree of C-125 entered on April 14, 1936, which is the basis for the continuing jurisdiction of this Court and the instant litigation. In order for Mineral County to claim minimum flows and in situ rights for the Lake, Mineral County must be a party to this action. An adjudication is a quiet title action in equity for the purpose of settling all claims to the waters of the watercourse that is the subject of the adjudication. (United States v. Truckee-Carson Irrigation District, 649 F.2d 1286, 1308 (9th Cir. 1981), United States v. Alpine Land and Reservoirs Co., supra. When the matters brought before this Court are determined and the waters of the Walker River reallocated accordingly, the fate of Walker Lake will be in the balance.

E. IN THE EVENT THAT THIS COURT DOES NOT ALLOW MINERAL COUNTY INTERVENTION AS OF RIGHT, IN THE ALTERNATIVE MINERAL COUNTY ASKS FOR PERMISSIVE INTERVENTION PURSUANT TO F.R.C.P. 24(b)(2)

1. Mineral County Meets Each and Every Element of Permissive Intervention Pursuant to F.R.C.P. 24(b)(2).[2]

Permissive intervention is allowed a party that has a claim that involves a question of law or fact that is common to the main action. In both the

[2]Rule 24. Intervention (b) Permissive Intervention. Upon timely application anyone may be permitted to intervene in an action: . . .(2) when an applicant's claim or defense and the main action have a question of law or fact in common.)

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claims presently filed, Mineral County's request for flows to Walker Lake will impact the outcome and the considerations. Because Walker Lake is located in Mineral County and comprises such an integral part of the economy and well-being of Mineral County, the County Commission considered it part of their public duty to protect and preserve the Lake as a healthy, viable recreational asset and fishery.

> It is a living tenet of our society and not mere rhetoric that a public office is a public trust. While a public official may not intrude in a purely private controversy, permissive intervention is available when sought because an aspect of the public interest with which he is officially concerned is involved in the litigation. Nuesse v. Camp, 385 F.2d 694, 702 (D.C. Dist. 1967).

2. The Intervention of Mineral County at this Stage of These Proceedings Will Not Unduly Delay the Litigation And, Moreover, Will Significantly Contribute to the Underlying Factual and Legal Issues.

No party to this litigation presently can offer the intimate knowledge of the Lake that Mineral County can. Mineral County has accumulated as much information as it can find regarding the scientific studies involving the biology, geology, hydrology and history of Walker Lake. Starting when the Bureau of Land Management indicated an interest in funding the recreational aspects of the Lake, and particularly through the last years when the loss of the Lake has been imminent, Mineral County has requested assistance in analysis from United States Senator Harry Reid, the Office of Technology Assistance, the University of Nevada at Reno, the State of Nevada Division of Wildlife, the Bureau of Land Management, the United

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States Geologic Survey and other engineers and other governmental and non-profit agencies. See, Natural Resources Defense Council v. Tennessee Valley Authority, 340 F.Supp. 400 (S.D.N.Y.1971); and Levin v. Ruby Trading Corporation, 333 F.2d 592 (2d Cir. 1964). In those cases the Court gave weight to the knowledge and expertise of those seeking intervention in its granting of their motion to intervene.

> Other factors to be considered in connection with permissive intervention are: the nature and extent of the intervenor's interest, whether the intervention will unduly delay or prejudice the adjudication of the rights of the original parties, whether the applicant will benefit by the intervention, whether the intervenor's interests are adequately represented by the other parties, and whether the intervenors will significantly contribute to the full development of the underlying factual issues in the suit and to the just and equitable adjudication of the legal questions presented. State of Utah v. Kennecott Corp., 801 F.Supp. 553, 572 (D.Utah 1992).

As discussed heretofore, granting intervention to Mineral County will in no way delay these proceedings. Granting intervention to Mineral County will add an aspect to the adjudication of the waters of Walker River that has been neglected to this point in history and is a very necessary consideration to save Walker Lake.

III.

CONCLUSION

As stated hereinabove, Mineral County seeks intervention as of right or, in the alternative, as permissive intervention pursuant to Rule 24, F.R.C.P. For the

foregoing reasons, Mineral County respectfully requests that the Court grant its motion for intervention.

DATED this 10th day of March, 1995.

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IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF NEVADA

UNITED STATES OF AMERICA, Plaintiff, WALKER RIVER PAIUTE TRIBE, Plaintiff-Intervenor, vs. WALKER RIVER IRRIGATION DISTRICT, a corporation, et al. Defendants.	IN EQUITY NO. C-125-C-ECR MOTION FOR PRELIMINARY INJUNCTION; MEMORANDUM OF POINTS AND AUTHORITIES; AFFIDAVIT OF KELVIN J. BUCHANAN, P.E.; AND AFFIDAVIT OF GARY L. VINYARD, Ph.D

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NOW COMES, Plaintiff, MINERAL COUNTY, by and through its attorneys, Zeh, Spoo and Hearne, and hereby moves the Court for a preliminary injunction, under the authority of FRCP 65(a), enjoining all Defendant users of the Walker River upstream of Walker Lake, and all those in active concert or participation with them, from retaining and using the entirety of the flows from the Walker River and to allow, specifically, approximately 260,000 acre feet of Walker River flows to reach the Walker Lake at its inlet to raise the Lake to 3,946 feet above mean sea level in calendar year 1995 and to allow, specifically, approximately 240,000 acre feet of Walker River flows to reach the Walker Lake at its inlet to raise the Lake to 3,950 feet above mean sea level, and, finally, to allow, specifically, approximately 117,000 acre feet for each year thereafter so that Walker Lake will remain at 3,950 feet above mean sea level until a final decree is entered by the Court in the present adjudication, C-125.

Unless Defendants are restrained and enjoined by order of this Court, Plaintiff will suffer immediate and irreparable injury, loss, and damage in that the fishery at Walker Lake will cease to exist without ability to rejuvenate, as more fully described and set forth in the Affidavits of Herman Statt, Marlene Bunch, and Louis Thompson previously filed with the Motion to Intervene dated October 25, 1994, and this Motion for Preliminary Injunction and accompanying Affidavits of Kelvin Buchanan and

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Dr. Gary Vinyard, attached hereto. This motion is made on the additional ground that Plaintiff has no adequate remedy at law.

DATED this 10th day of March, 1995.

LAW OFFICES OF
ZEH, SPOO & HEARNE

By _____
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MEMORANDUM OF POINTS AND AUTHORITIES

INTRODUCTION

> In April or May, the Spring trout-run up the Agai Hoop (Trout River) began. People from throughout the region gathered at the mouth of the river to fish . ... the fish runs were occasions for festivals . . . . [1]

Since the memory of man, the history of Walker Lake has always included the fishery. Walker Lake has been, until very recently, a destination for those in search of trophy Cutthroat Trout. Today the levels are so low in the Walker Lake that the fishery will be lost if immediate action is not taken.

The essence of this dispute over Walker Lake is whether a lake with its incumbent economic benefits and environmental resources can demand water based on the fact that it exists as a natural resource preserved for the public versus whether irrigation with its incumbent economic benefits and private property rights can continue to exist based upon a law that was adopted over a century ago when agricultural and mining development was the only goal. Can both interests coexist? Not as they are presently managed on the Walker River system. The basic fact is either upstream uses change or Walker Lake ceases to exist as a fishery.

While these timely issues presented in this case (*i.e.*, whether C-125 has been properly enforced, whether irrigation conducted by 1936 methods is still beneficial

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[1]Johnson, *Walker River Paiutes, A Tribal History,* Walker River Paiute Tribe, 1975, p 9.

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use, and whether the public trust allows the Court to allocate in-stream flows to Walker Lake) wait to be resolved, Walker Lake will become a moot issue. Walker Lake's existence as a viable fishery is at critical mass. Walker Lake cannot await the outcome of a decade-long adjudication.

The Nevada Department of Wildlife has already forecast Walker Lake's fate. Water to raise Walker Lake's levels is desperately needed or, according to nearly every expert's opinion, within one year fish will not be able to survive. Just because snowpack is above normal in 1995 provides no assurance that Walker Lake will receive one drop of water. Without intervention from this Court, the 1995 snowpack will be used to recharge groundwater reserves in Mason Valley, and replenish Bridgeport, Topaz, and Weber reservoirs, but none will reach Walker Lake just as has occurred since 1987.

Mineral County prays this Court to preserve Walker Lake, a natural resource and remnant from the Pleistocene era. It is part of our history, part of our environmental resources, and the mainstay of Mineral County's economy. Without immediate relief, it will no longer be a viable issue in this case.

STATEMENT OF FACTS

The level of Walker Lake is presently 3,941.2 feet above sea level. The Total Dissolved Solids are approximately 14,000 parts per million (ppm). This is approaching the level at which tui chub eggs die (approximately 15,500 ppm) and close to the level where trout will die (approximately 16,000 ppm). This dramatic

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scenario is being played out at Walker Lake as evidenced by the 93.3% of stocked fish sampled, which died in 1994. (See, Affidavit of Kelvin J. Buchanan attached.)

While some geologists debate whether or not Walker Lake did actually dry out nearly 14,000 years ago,[2] nonetheless if it did, fluvial circumstances existed immediately after that time to allow a rejuvenation of the Lake and it's fishery. Human intervention has since occurred that severs that inherent rejuvenation character of the River from the Lake. Topaz and Weber Reservoirs now exist to impede the ability of fish to reach Walker Lake to reestablish colonies. If Walker Lake ceases to be a viable fishery, no biologist can guarantee that it can ever be rejuvenated. (See, Affidavit of G. Vinyard attached.)

No meaningful flows from Walker River have reached to Walker Lake since 1987. (See, Affidavit of Kelvin J. Buchanan attached.) Upstream are three man-made reservoirs, one of which is required by the State of California to retain minimum levels, an allocation not contemplated by C-125. Good and efficient water management is hampered by present irrigation practices and facilities and Walker River Irrigation District (hereinafter "WRID") has not implemented recommended improvement projects. (U.S. Department of Agriculture, *Final Watershed Plan and*

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[2] There is some evidence that the Walker Lake basin held a deep lake between at least 32,000 and 25,000 years ago, and even better evidence that Walker Lake was not a lake at all between about 22,000 and 14,000 years ago, when the basin was occupied by a salt marsh. During this interval, it appears that the Walker river was flowing not into Walker Lake, but instead north into the Carson Basin, where a sizeable lake then existed....reconstruction has Lake Lahontan so high at 14,000 years ago that it incorporated the Walker Lake Basin. Grayson, *The Desert's Past*, Smithsonian Institution, 1993, p. 96.

Environmental Impact Statement, East Walker Watershed, August 1989.) No one would contemplate that irrigation practices would not substantially improve since 1936. Many more acres are being irrigated with the granted storage rights than were contemplated at the time of the earlier decree in C-125. (Headley, *Economic Study of Walker River Irrigation District*, October 1933 [available at UNR library]). The Walker River Paiute Tribe (hereinafter "Tribe") has constructed a non-permitted reservoir not contemplated in C-125 that inhibits any remaining waters from flowing through the reservation to Walker Lake.[3]

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LEGAL ARGUMENT

I. Mineral County Can Prove That Grave Irreparable Harm, the Loss of Walker Lake as a Viable Fishery, Will Occur Unless Preliminary Injunctive Relief Is Granted.

A. Without a Court Ordered Infusion of Water from the Walker River, Walker Lake Can Not Survive Because Walker River Is the Major Source of Water for Walker Lake.

The United States Court of Appeals, Ninth Circuit has adopted a standard employed in deciding whether to grant a preliminary injunction. These two tests for issuance of a preliminary injunction "are not separate, but rather represent the outer reaches of a single continuum." Los Angeles Memorial Coliseum v. National Football League, 634 F.2d 1197, 1201 (9th Cir.1980).

[3] Mineral County makes no allegation that the Tribe has retained more than its entitlement of reserved water rights.

> At one end of the continuum, the moving party is required to show both a probability of success on the merits and the possibility of irreparable injury. Lopez v. Heckler, 713 F.2d 1432, 1435 (9th Cir. 1983).

The retention of flows upstream have deprived Walker Lake of substantially all of the rejuvenating waters from Walker River. Walker Lake has no other source of sufficient quantity to replenish it.[4] Walker Lake, presently at a critical level of 3,941.2 feet above sea level, will suffer irreparable harm unless this Court grants Mineral County a preliminary injunction on behalf of Walker Lake mandating that a duty of approximately 260,000 acre feet reach the Lake in 1995 to bring the Lake to 3,946 feet above mean sea level, and approximately 240,000 acre feet in 1996 to bring the Lake to 3,950 feet above mean sea level, the 1992 level, and finally a duty of 117,000 acre feet for each year thereafter so that Walker Lake will survive as a fishery until the reallocation of the waters of Walker River are completed. (See, Affidavit of Kelvin J. Buchanan attached.)

> Environmental injury, by its nature, can seldom be adequately remedied by money damages and is often permanent or at least of long duration, i.e. irreparable. If such injury is sufficiently likely, therefore, the balance of

[4] As I have mentioned, Walker River provides 83% of the inflow to Walker Lake. Without that source, Walker Lake would be a puddle.
Grayson, *The Desert's Past, supra,* p. 96.

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harms will usually favor the issuance of an injunction to protect the environment. Amoco Prod. v. Village of Gambell, Alaska, 480 U.S. 531, 545, 107 S.Ct. 1396, 1404, 94 L.Ed.2d 542 (1987); see, also, Seattle Audobon Society v. Mosley, 798 F.Supp. 1484, 1491 (W.D. Wash. 1992) and Public Interest Research Group of New Jersey v. Star Enterprise, 71 F.Supp. 655 (D.N.J. 1991).

The critical nature of the levels of Walker Lake and its dependence on the Walker River provide overwhelming evidence of irreparable harm. The length of the adjudication itself, now in its fourth year, is a factor that must also be considered. Nothing would be more convenient to the upstream users than a delay until Walker Lake's fishery is gone and to thus eliminate Walker Lake as a potential party to any reallocation of the waters of Walker River.

Granting the preliminary injunction in this matter will keep the subject of the plaintiff's request "alive" until the Court has the opportunity to review important issues in Western water law that have and will continue to be reexamined based upon the necessary adjustment of an old legal system to changing public pressures.[5]

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[5] Blumm, *Public Property and the Democratization of Western Water Law: A Modern View of the Public Trust Doctrine,* 19 Environmental Law 573, Summer 1989.

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> Thus, this Court must choose the course of action that will minimize the costs of being mistaken. DiDamenico v. Employers Cooperative Industry Trust, 676 F.Supp. 903, 907 (N.D.Ind. 19877).

Allowing Walker Lake to survive is the only means to keep these important issues ripe and for the Court's decision to be meaningful.

> In the present matter, it is clear beyond peradventure of doubt that plaintiff has established that he will suffer irreparable harm absent preliminary relief. This is not a case where plaintiff can wait until after trial for a remedy. Simply put, absent some form of preliminary relief plaintiff runs the real risk of dying. DiDomenico v. Employers Cooperative Industry Trust, supra, p. 407.

Just as the patient in DiDomenico, supra, a judgment in favor of Mineral County at the close of the adjudication would be hollow if the Walker Lake fishery was already lost.

Not only would irreparable harm be suffered by the loss of such a historic and scenic remnant of the ice age gracing the Walker Lake Basin, but Mineral County, plaintiff herein, would lose fifty (50) percent of its economic base. (See, "Statement of Bunch", Mineral County's Motion to Intervene, filed 10/25/94.)

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Under some circumstances, loss of business threatening the very existence of an enterprise constitutes irreparable injury sufficient to justify the issuance of a preliminary injunction. In Doran v. Salem Inn, Inc., 422 U.S. 922,932, 95 S.Ct. 2561, 2568, 45 L.Ed.2d 648 (1975), the (U.S. Supreme) Court concluded that the district court had not abused its discretion in granting preliminary injunctive relief: "As required to support such relief, these respondents alleged... that absent preliminary relief they would suffer a substantial loss of business and perhaps even bankruptcy. Certainly, the latter type of injury meets the standards for granting interim relief, for otherwise a favorable final judgment might well be useless. Assoc. Prod. Company v. City of Independence, Missouri, 648 F.Supp. 1255, 1258 (W.D.Mo. 1986).

Mineral County has a small population, 15,000 residents, and an even smaller economic base. (See, Affidavits of Marlene Bunch and Louis Thompson, in Mineral County's Motion for Intervention, filed 10/25/94). With the considerable downsizing of the Hawthorne depot, Walker Lake has indeed become the mainstay of the economy of the citizens that Mineral County represents. With little

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else to develop, Mineral County must have a viable fishery at Walker Lake or suffer serious economic consequences to the County government.

B. Mineral County Raises Serious Legal Questions and the Balance of Hardships Tips Sharply in Favor of Granting a Preliminary Mandatory Injunction.

Mineral County has shown the requisite irreparable harm and:

> At the other end of the continuum, the moving party must demonstrate that serious legal questions are raised so that the balance of hardships tips sharply in its favor . . . .
>
> Lopez v. Heckler, supra, p. 1435. (Emphasis added.)

Serious legal questions challenge the strict application of prior appropriation in the allocation of water rights adopted in most Western States. (Beck, *Waters and Water Rights*, Vol. 2, The Miche Co., 1991). The basis of prior appropriation is to divert the water and apply it to its most beneficial use. NRS 533.380 Because priorities in national policy in the latter half of the twentieth century have supported environmental protection and preservation of our natural resources, conflicts with traditional beneficial uses (i.e. agriculture, mining, municipal), of prior appropriation are widespread.

Those challenging the private rights of appropriation have first looked to the nature of the water right. Since a party cannot possess certain

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identifiable water, the term "usufructuary"[6] best describes the right incumbent to a water certificate. The right to use water means it is a usufructuary right rather than a possessory right. However, for example, no one has a right to use water and return it so polluted as to cause a degradation to the environment. (33 USC, Section 1251, et. seq. commonly referred to as the Clean Water Act, which has been adopted by Nevada as NRS, Section 445.131 et. seq.) Just as the deposition of foreign and toxic materials causes pollution to the water, so also the excessive withdrawal of natural flows significantly diminishes the quality of the water. Mineral County will vigorously argue that but for the excessive withdrawals upstream, Walker Lake would be a viable fishery into the future.

Recently, the United States Supreme Court found that minimum stream flows could be required in order to enforce a state water quality standard. PUD No. 1 of Jefferson County and City of Tacoma v. Washington Dept. of Ecology, 114 S.Ct. 1900 (1994). This case officially memorializes the significant link between water quality as it is affected by water quantity. This concept of protecting water quality by insuring sufficient quantity is elemental to present interpretations of the public trust doctrine as it has been judicially imposed in favor of minimum flows. Some Western States have codified public trust doctrine principles or, at least

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[6]Usufructuary - "It is laid down by our law writers, that the right of property in water is usufructuary, and consists not so much of the fluid itself as the advantage of its use. (Eddy v. Simpson (1853) 3 Cal. 249, 252) Hence, the cases do not speak of the ownership of water, but only of the right to its use. (Rancho Santa Margarita v. Vail (1938) 11 Cal.2d 501, 554-555 [81 P2d. 553] [cites]. United States v. State Water Resources Control Board, 182 Cal.App.3d 82, 227 Cal.Rptr. 161, 168 (Cal.App. 1 Dist. 1986)

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expanded "beneficial use" definitions to include recreation, preservation of wildlife and minimum stream flows.[7]

One of the seminal cases upon which the public trust doctrine has developed stated that the beds of navigable water are:

> . . . held in trust for the people of the State that they may enjoy the navigation of the waters, carry on commerce over them, and have liberty of fishing therein freed from the obstruction or interference of private parties. Illinois Central Railroad v. Illinois, 146 U.S. 387, 452 (1892).

Likewise, Nevada has recognized the public's interest in water resources, "The water of all sources of water supply within the boundaries of the state whether above or beneath the surface of the ground, belongs to the public." Bergman v. Kearney, 241 F.884, 893 (D.Nev.1917); NRS, 533.025.

This concept of the public right to preservation of water resources has been expanded in many Western States as population and demands on water grew. Both the judiciary and state legislative bodies have turned to the public trust doctrine as protection for non-navigable streams and lakes as well. National Audubon Soc. v. Superior Court, 33 Ca.3d 419, 658 P.2d 709, 189 Cal.Rptr. 346 (Cal.App. 3

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[7] Cal.Water Code, Section 1243 (1971, 1989); Wash. Rev. Code Ann., Sections 90.22 and 90.54; Or. Rev. Stat., Section 537.332(2)(1987); Idaho Code, Section 36-1601(1977); NRS, Section 501.100(2) and 501.181(3)(c), 533.367.

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Dist.1981), cert. denied, 464 U.S. 977 (1983). See, also, Montana Coalition for Stream Access v. Hildreth, 684 P.2d 1085 (Mont.1984), CWC Fisheries v. Bunker, 755 P.2d 1115 (Alaska 1988), Kootenai Envtl. Alliance v. Panhandle Yacht Club, 105 Idaho 622, 671 P.2d 1088 (1983).

> The problem is really quite simple, it does not require mastery of abstruse legal doctrines to appreciate what is going on. The heart of the matter is that public values have changed, and the use of water has reached some critical limits. One result is that we need to retrieve some water from traditional water users to sustain streams and lakes as natural systems and to protect water quality. Sax, Joseph L., *The Limits of Private Rights in Public Waters*, 19 Environmental Law 473 (1989).

Both States involved in the present adjudication have begun to temper the harsh rules of prior appropriation in recognition of their public trust responsibilities.

California:

> Once the state has approved an appropriation, the public trust imposes a duty of continuing supervision over the taking and use of appropriated water. In exercising its sovereign power to allocate water resources in the public

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interest, the state is not confined by past allocation decisions which may be incorrect in light of current knowledge or inconsistent with current needs. National Audubon Society v. Superior Court, supra, p. 447.

Nevada:

Nevada law recognizes the recreational value of wildlife, NRS 501.100(2) and the need to provide wildlife with water. See, NRS 501.181(3)(c), 533.367. State v. Morros, 766 P.2d 263, 268 (Nev. 1988).

In State v. Morros the court recognized the very heart of the public trust controversy - what is beneficial use.[8] The court found that an appropriation "for public recreation and fishery purposes" was a beneficial use. State v. Morros, supra, p. 265, 266. Beneficial use is the basis of perfection of a water right. NRS 533.360 The definition of beneficial use has evolved since prior appropriation was adopted. In earlier cases and statutes, beneficial use was more or less the diversion and application of water to agriculture, mining, industrial or municipal use.

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[8]One of the primary challenges to agricultural use as "beneficial use" is whether the challenges can prove that agricultural irrigation is "waste." This is one of the critical factors in U.S. v. Alpine Land and Reservoir Co., supra at p. 855, "the issue we review is whether the district court reached a correct determination of beneficial use as of 1980." The Court went on to refer to the agricultural use as "relatively inefficient." Mineral County will vigorously argue that improved irrigation technology is "beneficial use," not outdated, inefficient, and wasteful irrigation methods.

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The Court of Appeals, Ninth Circuit, determined that although beneficial use is mainly determined by State law, that beneficial use "expresses a dynamic concept, which is a variable according to circumstances," and that " a district court in a quiet title action should determine beneficial use on the best current evidence available." U.S. v. Alpine Land and Reservoir Co., 697 F2d. 851, 855 (9th Cir.1983).

The best evidence available to the court in the instant case is that beneficial use should include public trust concepts that would allow dedication of water to in-stream flows through Walker River to Walker Lake. Mineral County will be irreparably harmed by the loss of the Walker Lake fishery and that the legal issues are so persuasive that a preliminary mandatory injunction should be granted allowing a water duty in the Walker River in favor of Walker Lake. Mineral County seeks this injunction to preserve the corpus while the parties argue the benefits of imposing a public trust in favor of the Lake.

> For the purposes of injunctive relief "serious questions" refers to questions which cannot be resolved one way or the other at the hearing on the injunction.....Serious questions need not promise a certainty of success, nor even present a probability of success, but must involve a fair chance of success on the merits. (citing National Wildlife Fed'n v. Coston, 773 F.2d 1513, 1517 (9th Cir.1985). Republic of

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the Philippines v. Marcos, 862 F.2d 1355, 1362 (9th Cir. 1988).

Mineral County has a fair chance of success on the merits of a very complicated issue. (An issue not without successful precedent.) Mineral County has met its burden and shown serious threat of irreparable harm so that the hardship tips very sharply in favor of the grant of the preliminary injunction.

II. Mineral County Has Satisfied the Criteria for Grant of a Preliminary Mandatory Injunction and the Grant Is Necessary to Prevent Injury.

Mandatory injunctive relief is "an extraordinary remedy that should be granted only under compelling circumstances and in a limited manner to restore the status quo." Golden State Transit Corp. v. City of Los Angeles, 660 F.Supp. 571, 575, (C.D.Cal. 1987). Mineral County has shown the irreparable harm of the loss of flows to Walker Lake and the threat that the fishery may not be capable of rejuvenation.

> A mandatory injunction may be issued if the status quo is a condition not of rest, but of action, and the condition of rest is exactly what will inflict the irreparable injury upon complainant. United States v. Malibu Beach, Inc., 711 F.Supp. 1301, 1310 (D.N.J. 1989).

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The court in U.S. v. Malibu Beach, supra, granted a preliminary mandatory injunction because of "irreparable harm to the environment." Much like the circumstances in the instant case the court found that "equitable relief is appropriate here because there is no adequate remedy at law to compensate the public for the harm caused . . . ." U.S. v. Malibu Beach, Inc., supra, p. 1312, 1313.

The Court of Appeals, Ninth Circuit, has applied the standards for issuance of a preliminary injunction when the sensitive environment at Lake Tahoe was threatened. "The district court has greater power to fashion equitable relief in defense of the public interest than it has when only private interests are involved." People of the State of California ex rel. Van de Kamp v. Tahoe Regional Planning Agency, 766 F2d 1319, 1324 (9th Cir. 1985).

The harm to Mineral County far outweighs the harm to defendants. Without the flows to Walker Lake, the Lake will cease to be the long standing fishery it is noted to be. The Defendants on the other hand will merely have to release waters that otherwise would replenish groundwater in Mason Valley and increase storage levels in Bridgeport, Topaz and Weber man-made reservoirs to insure that in the event next year is a low precipitation year that extra water is available. (See particularly, Ex. F. of the Affidavit of K. Buchanan) Loss of insurance for future years is much less critical a burden to bear than the total loss of a substantial economic and environmental resource such as Walker Lake that has existed for a millennium.

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The Court has the power to fashion this equitable remedy. The Watermaster can be directed to release flows, a very simple action to administer with little monitoring by the Court and the public interest will be served.

WHEREFORE the above stated reasons Mineral County, plaintiff herein, requests that this Court issue a preliminary injunction that will allow flows to reach Walker Lake to raise the Lake to 1992 levels as set out more fully hereinabove.

DATED this 10th day of March, 1995.

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IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF NEVADA

UNITED STATES OF AMERICA, Plaintiff, WALKER RIVER PAIUTE TRIBE, Plaintiff-Intervenor, vs. WALKER RIVER IRRIGATION DISTRICT, a corporation, et al. Defendants.	IN EQUITY NO. C-125-C-ECR SECOND AFFIDAVIT OF KELVIN J. BUCHANAN, P.E.

STATE OF NEVADA)
) ss.
COUNTY OF WASHOE)

I, Kelvin J. Buchanan, being duly sworn, hereby state that:

1. I am a Professional Geological Engineer registered in the State of Nevada. I have practiced in Nevada for twenty (20) years, have worked in groundwater related issues in Nevada and other states and have taken continuing education in groundwater and related subjects from time to time.

2. I have researched and compiled documents and papers authored by the U.S. Geological Survey (USGS), the Nevada Department of Wildlife (NDOW), the U.S.

Bureau of Reclamation, the Nevada State Engineers' office, the California Division of Water Resources and the U.S. Department of Agriculture, Soil Conservation Division. I have studied Federal Decree C-125, and prior decree 731 as well as reviewing scientific papers which include, but are not limited to, those authored by Alex Horne, limnologist and Mike Sevon, NDOW biologist. I have traversed the East and West Walker River systems from Upper and Lower Twin Lakes to Walker Lake. I have personal knowledge of the facts contained herein and, if called as a witness, I could testify competently hereto.

3. I have personally visited USGS gauge station sites on the Walker River system and the WRID reservoirs at Bridgeport and Topaz Lake at various times in 1994 and 1995 to familiarize myself with the visual appearance of what the reported volume of river flows at the time were. During a six (6) day period in February, 1995, three visits were made. The terminal gauging station on the Walker River is located at Wabuska, at the boundary of the Walker River Paiute Reservation. I was told (Sam Stegeman, Engineer, Walker River Paiute Tribe, personal communication) that a new gauge was being installed by the USGS on tribal land at the head of Weber Reservoir, but I have not seen it. I was also told by Mr. Stegeman that he had personally supervised the release of 5,100 acre feet of water from Weber Reservoir during November, 1993 and that to his knowledge, no river water other than this release, had to date made it to Walker Lake since 1987. Mr. Stegeman also indicated that unless he could be assured of sufficient deliveries of river water in 1995, he would be unlikely to release any water from Weber Reservoir to the Walker Lake.

4. I have personally observed and photographed irrigation (stock ditches) canals in Mason Valley flowing with water diverted from both the East and West Walker Rivers (Attachment C, Ditch Map, USDA). At least two (2) of the canals, the Greenwood and Hall ditches diverted from the East Walker, do not return to the river but terminate east and south of Yerington. A third canal, the Mickey, returns to the main Walker River channel south west of Yerington (Attachment D, Photographs). On February 2, 1995, I observed the Greenwood, Hall and Mickey Ditches running vigorously at a point near the

junction of Highway 208 and the East Walker River Road. I proceeded to follow the flow of Greenwood Ditch for approximately two miles. I observed that in addition to flowing alongside fallow fields, it also went through one small stockyard between the house and the barn. On a visit to the USDA Soil Conservation Service office in Yerington later that day, I was told that these stock ditches diverted water from the river and returned to the river (Dick Franklin, USDA Soil Conservation Service, personal communication).

On February 5, I observed that while the flow in the Mickey Ditch was not diminished, the flow to the Greenwood Ditch was diminished and the Hall Ditch had pools of standing water. On the same day (see Attachment D), I observed that diversion from the West Walker River were also occurring. The Lee-Sanders Ditch and the Tunnel Ditch had significant flows (see photographs) close to their diversion point where the West Walker River exits from Wilson Canyon. The Lee-Sanders Ditch does not return to the river system; the Tunnel Ditch crosses the south end of Mason Valley and is intercepted by the West Strosnider Ditch just before it reaches the East Walker River.

On February 7, 1995 I observed that the flow in both the Greenwood and Hall Ditches had ceased. Indeed, both ditch beds were bone dry including the section through the stock yard noted above. The Mickey , Lee - Sanders and Tunnel Ditches appeared to be contain about the same amount of water and were flowing at the same rate as on February 2, 1995. I could not discern any change in the flow of these ditches during this six day period.

Diversions of river water which do not return to the river not only serve to deprive the river of stream flow, but will augment the underlying ground water table where these flows occur. Multitude diversions from a river channel, some of which do not return to the river, create a situation analogous to a "braided stream" where groundwater capture, evaporation and phreatophyte growth rob the river of its natural flow. Unless there is equilibrium in the system, surface water will be subject to groundwater capture. Because of significant groundwater pumping over the last eight (8) drought years, no such equilibrium exists. I have been unable to find any mention of specific diversion from the

river to individual ditches, other than the general term "stock ditches", that apply from C-125 or 731. There does not appear to be a minimum or maximum amount of water that flows in these ditches or what irrigation ditches are also considered stock ditches. I have no idea why the Hall and Greenwood Ditches should be flowing and then suddenly cease to flow in early February. The livestock I observed still needed water.

I conclude that, notwithstanding the purpose of irrigation ditches flowing during the winter months, that water from these ditches, and especially no-return ditches, rob the river of its' natural flow and augment the groundwater table to the ultimate detriment of Walker Lake.

5. I concur with the *Office of Assessment Technology Memorandum, August 1993,* that the diversions in the Walker River Irrigation District (WRID) source areas are not technically efficient and that irrigation ditches should be lined with impervious material to prevent leakage. Despite this assessment, WRID has this year allowed to lapse, a matching funds project authored by the USDA Soil Conservation Service, which would have significantly improved the delivery system of irrigation water (Mark Twyeffort, USDA Soil Conservation Service, personal communication).

6. I concur with the finding of the report, *Walker River Basin Water Rights Model, Nevada Department of Conservation and Resources, June 1993,* that the readings derived for the inflow into the Walker Lake from the Walker River represent 84% of the lake's recharge during the period 1961-1990 and that if the lake continues to receive less than 84% of this recharge from the Walker River, all fish life in the lake will be poisoned by the high levels of total dissolved solids. I also concur with data collected by NDOW that this level of toxicity is imminent and that the level of Total Dissolved Solids (TDS) has reached of 14,000 parts per million (ppm). (see Attachment E, graphics derived from NDOW and personal communication, John Elliot, NDOW). The level of the lake has dropped since this report was authored to a level of 3941.2 feet above sea level in February of 1995. The average amount of water the lake received during the period 1961-1990 was 103,000 acre feet, which slowed the overall fall of the lake level, but did not halt it. To

maintain the Walker Lake at its present level, the Lake requires an average of 117,000 acre feet of water per annum to counteract yearly evaporation. To reduce the level of TDS to approximately 13,000 ppm TDS, the lake would have to rise about 15 feet to a level of 3,955 feet (see Attachment E). The amount of additional acre feet of water the Lake would have to receive in 1995 to bring the Lake to this level from 3941.2 feet is 495,000 acre feet. The total amount of water required to bring the Lake to this level by December 1995 would 612,000 acre feet. Only in the flood year of 1983 did the amount of water entering the Walker Lake from the Walker River approach this amount.

7. The Walker River has lost a number of gauge stations over the past 20 years through deactivation caused by lack of funding and additionally, there has never been a gauge station within 10 miles of the delta of the Walker Lake (personal communication, Jim Thomas, USGS). It has and will continue to be, very difficult if not impossible, to ascertain the amount of water that reaches the Lake on a yearly basis without adequate gauges. Most scientists agree that rather on relying on a variable flow which is difficult to measure, a minimum guaranteed level such as has been worked out for Mono Lake in California would be more practical to preserve Walker Lakes' viability (personal communication, Gary L. Vinyard, University of Nevada). If the guaranteed level of the Lake were brought back to 1986 levels, it could result in not only a thriving fishery, but in a return of the power boat races which brought tourist revenue to Mineral County until they were canceled three years ago because of high alkalinity in the Lake (personal communication, Lou Thompson, Walker Lake Working Group).

8. Storage rights for water on the West Walker River were originally assigned under permit number 5528 on June 6, 1919. Total acreage allowed to be irrigated under this permit is 30,000 acres. Total acre feet allowed stored is 89,612 acre feet. The permit was not issued until April 27, 1971. Certificate number 8859 proving beneficial use was issued on October 15, 1976. Water is controlled and distributed by the Walker River Irrigation District (personal communication, Steve Walmsley, Office of the State Engineer).

Most irrigated land in northwestern Nevada is granted and needs at least 4 acre feet per acre of water rights to grow crops. It is possible to irrigate with 3.5 acre feet of water per acre as is being done in Fallon, Nevada using drip irrigation (personal communication, Mark Twyeffort) on an experimental basis. 89,612 acre feet of water could effectively irrigate 22,400 acres, but could not effectively irrigate 30,000 acres because this would be less than 3 acre feet of water per acre, an amount that is not sufficient to economically irrigate cropland.

EXECUTED this 8 day of March, 1995, at Reno, Nevada.

KELVIN J. BUCHANAN, P.E.

SUBSCRIBED and SWORN to before me this 8th day of March, 1995

MARILYN MITCHELL
Notary Public - State of Nevada
Appointment Recorded in Washoe County
MY APPOINTMENT EXPIRES OCT. 1, 1998

Notary Public in and for said County and State

CHARLES R. ZEH, ESQ.
JAMES SPOO, ESQ.
TREVA J. HEARNE, ATTORNEY AT LAW
ZEH, SPOO & HEARNE
450 Marsh Avenue
Reno, Nevada 89509
702/323-4599

Attorneys for Intervenor-Petitioner
MINERAL COUNTY

IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF NEVADA

UNITED STATES OF AMERICA, Plaintiff, WALKER RIVER PAIUTE TRIBE, Plaintiff-Intervenor, vs. WALKER RIVER IRRIGATION DISTRICT, a corporation, et al. Defendants.	IN EQUITY NO. C-125-C-ECR **AFFIDAVIT OF GARY L. VINYARD, Ph.D**

STATE OF NEVADA)
) ss.
COUNTY OF WASHOE)

I, Dr. Gary L. Vinyard, being duly sworn, hereby state that:

/ / /

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450 Marsh Avenue • Reno, NV 89509
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1. I have a doctorate in Systematics and Ecology. I have taught sixteen (16) years at the University of Nevada, Reno. My special interests and research have been Aquatic Ecology.

2. My knowledge of Walker Lake includes study and personal observation. From this information I have formulated the following opinions. I have personal knowledge of the facts stated herein and, if called as a witness, I could testify competently thereto.

3. Walker Lake is a naturally occurring section of the Lake Lahontan that existed in Pliestoscene age. The only other remnants of Lake Lahontan are Pyramid Lake and Honey Lake.

4. Desert lakes have a very tenuous existence because of the vagaries of climactic change and development. If lake levels drop, the total dissolved solids increase significantly causing high concentrations of alkalinity and salts in the water. Once high concentrations of dissolved materials reach certain levels, all vertebrate fish life ceases to exist. Although the Pyramid cui-cui, Tahoe sucker, tui chub and cuthroat trout are species that tolerate higher levels of alkalinity/salinity, even these species will perish. An indication that this is already occurring in Walker Lake is the reduction in average fish size and longevity.

5. Walker Lake will shift from a vertebrate dominated community to an invertebrate dominated community. This means that fish will not continue to inhabit the Lake and it will become dominated by certain invertebrates, such as fairy shrimp, tadpole shrimp and clam shrimp.

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6. Fish are a major food source for numerous bird species, including loons, pelicans, swans, geese, grebs, ducks, etc. These migratory water fowl will cease to visit the Lake and will be forced to find other sustenance. Because these birds utilize Walker Lake as an important rest stop during migration, loss of the fishery resource could adversely affect these bird populations.

7. Hawthorne has an annual loon festival to celebrate the arrival of the loons in late winter.

8. It is widely believed that Walker Lake may have totally dried up nearly 6,000 years ago because the Walker River changed course for a time and terminated in Carson sink rather than in Walker Lake. Recolonization of Walker Lake vertebrate population was possible after this time because the Walker River, continued to retain viable fish populations necessary for recolonization. These fish then regained access to Walker Lake when the river returned to its' present channel. Recolonization for fluvial populations is no longer possible because of changes which have occurred in the lower Walker River, including construction of Weber Reservoir, dewatering of the river between Weber Reservoir and Walker Lake and alterations of fish populations in the river.

9. If fish populations disappear from the Lake, it will take several years to reestablish populations of tui chub, Tahoe suckers and cuthroat trout in the Lake. Once the existing fish-dominated community in Walker Lake is lost, reestablishment of viable fish populations capable of sustaining a recreational fishery would be dependent on several factors. First, physical and chemical conditions in the Lake

would need to be restored. Subsequently, viable populations of fishes and their food resources would need to be reestablished. No entity that I am aware of supplies tui chub or Tahoe suckers for stocking purposes at this time.

10. There are no comparable natural resources equivalent to Walker and Pyramid Lakes. These are geologic remnants of a prehistoric lake that existed over this area. Once lost, no biologist could guarantee that this Lake can be returned to its present state.

EXECUTED this 6 day of March, 1995, at Reno, Nevada.

GARY L. VINYARD, Ph.D

SUBSCRIBED and SWORN to before before me this 6th day of March, 1995

Notary Public in and for said County and State

MARILYN MITCHELL
Notary Public - State of Nevada
Appointment Recorded in Washoe County
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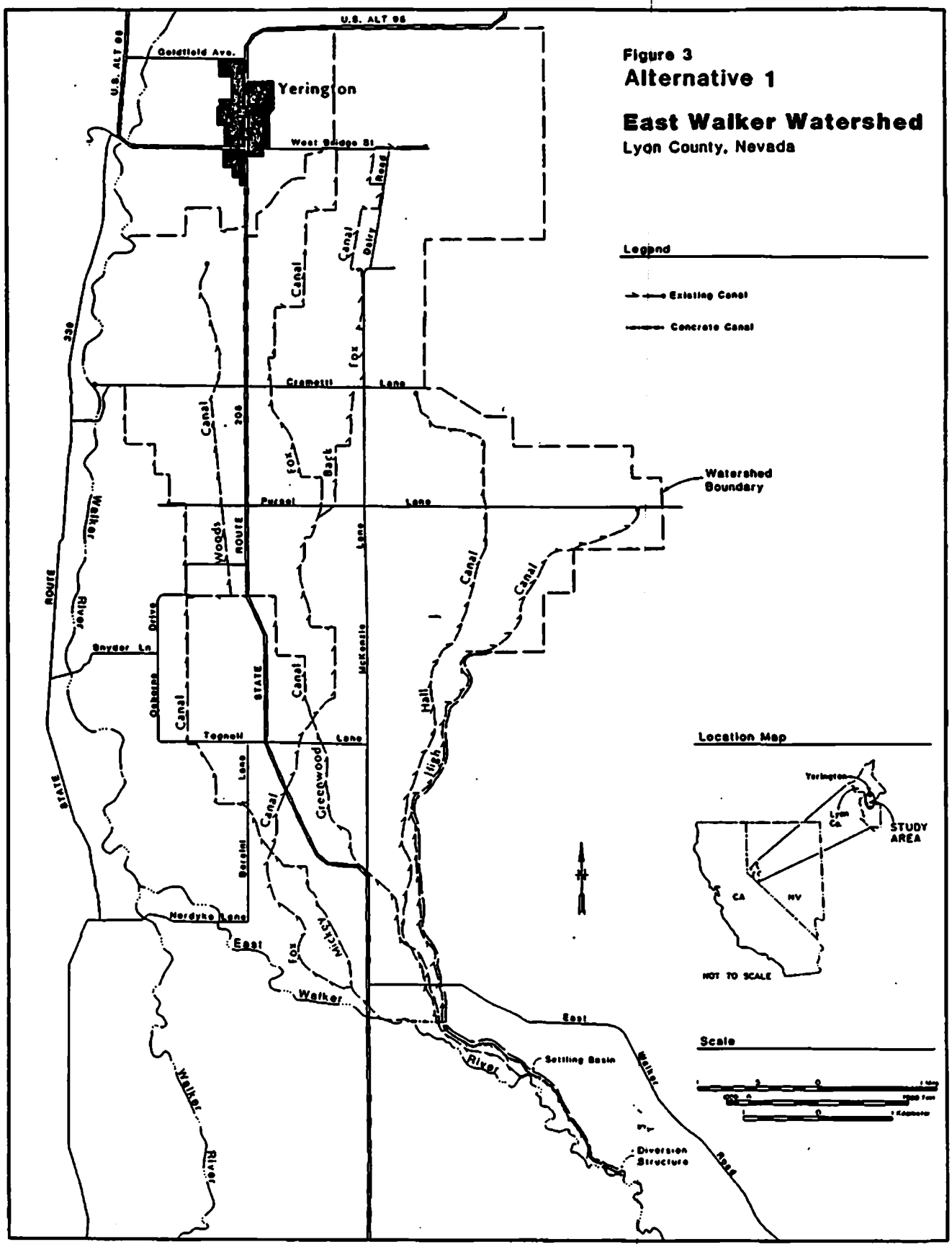
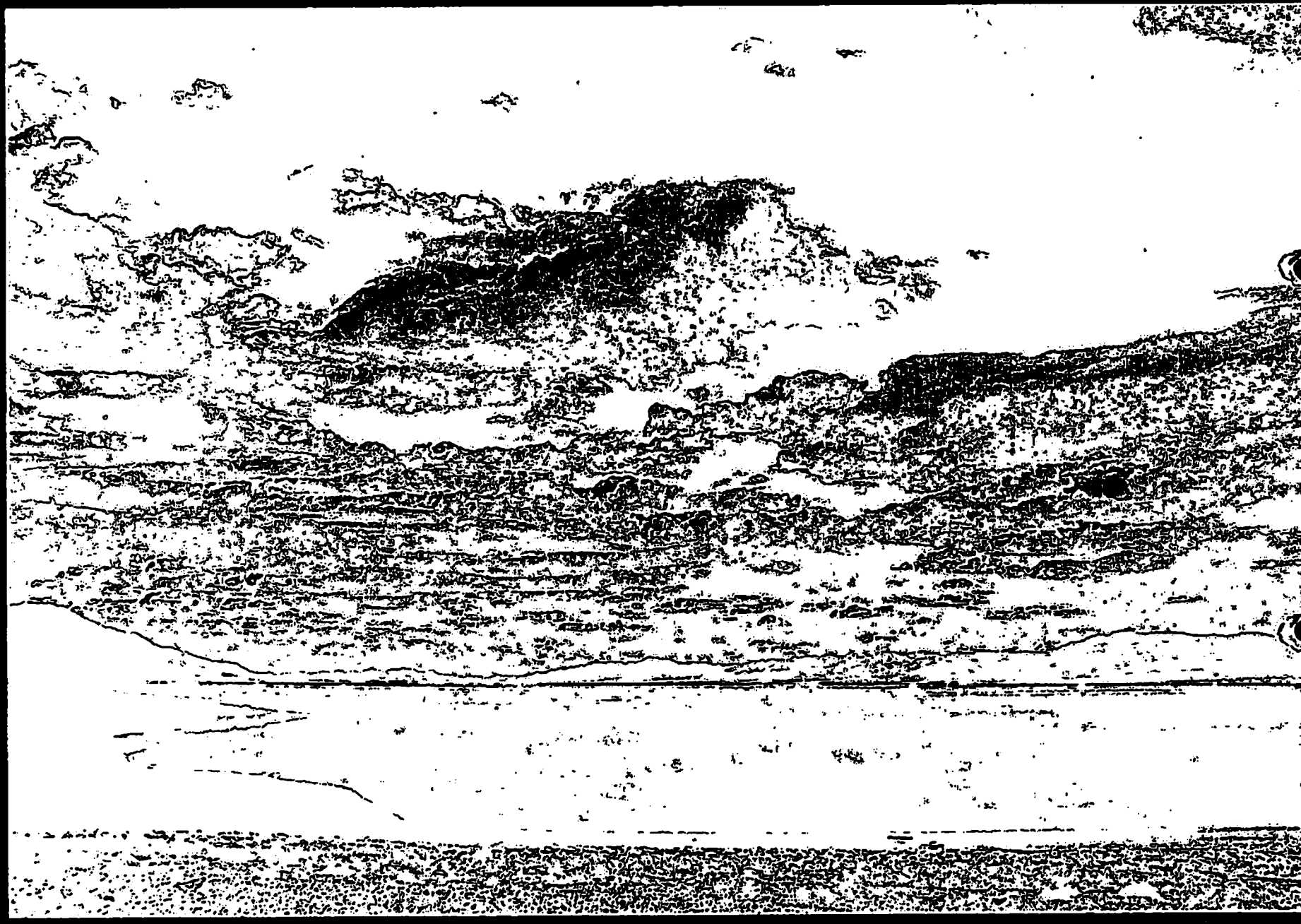


Figure 3
Alternative 1
East Walker Watershed
Lyon County, Nevada
Legend
Existing Canal
Concrete Canal
Location Map
Yerington
Lyon Co.
STUDY AREA
CA
NV
NOT TO SCALE
Scale
Watershed Boundary
U.S. ALT 95
Goldfield Ave.
Yerington
West Bridge St
Cremetti Lane
Pursel Lane
Snyder Ln
Tognoli Lane
Nordyke Lane
Dairy Road
Canal
Fox
Back
Woods
Drive
Osborne
Lane
Bereini
Greenwood
McKenzie
Hall
High
Mickey
East Walker River
Settling Basin
Diversion Structure
Walker River
STATE ROUTE 338
STATE ROUTE 208



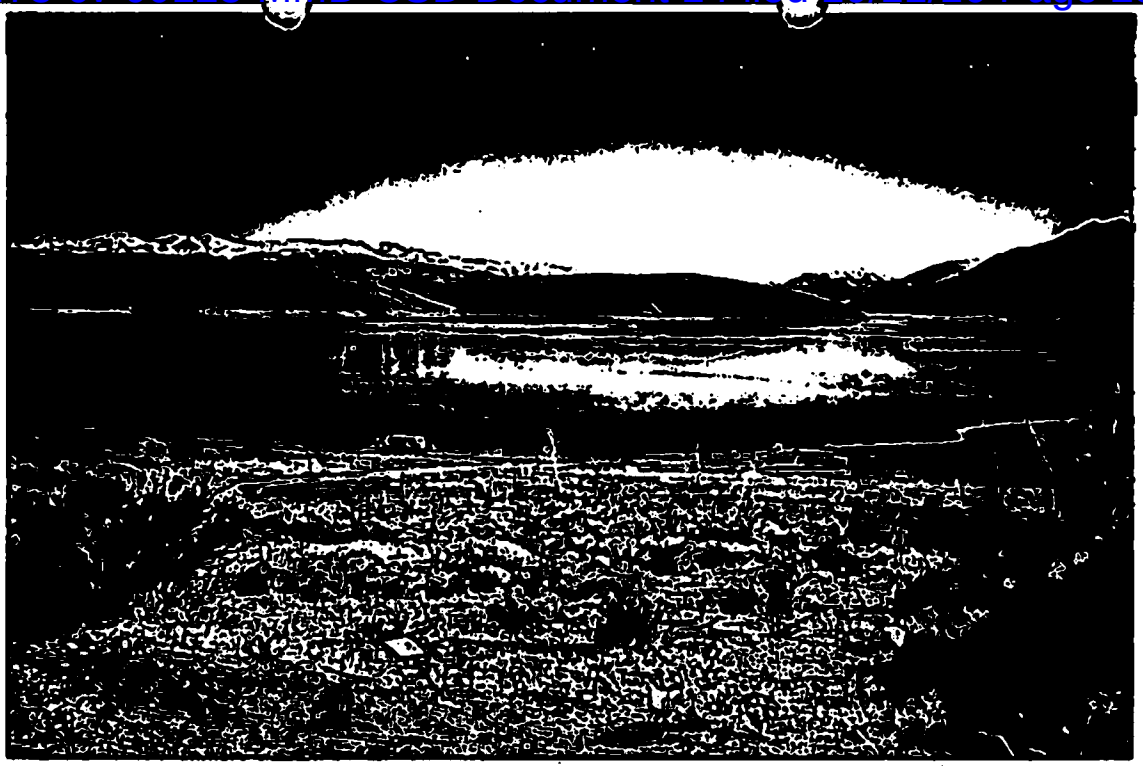
WALKER LAKE

Hall Ditch, looking south, East River Road

Mickey Ditch, looking east, Highway 208

Greenwood Ditch, looking south, East River Road

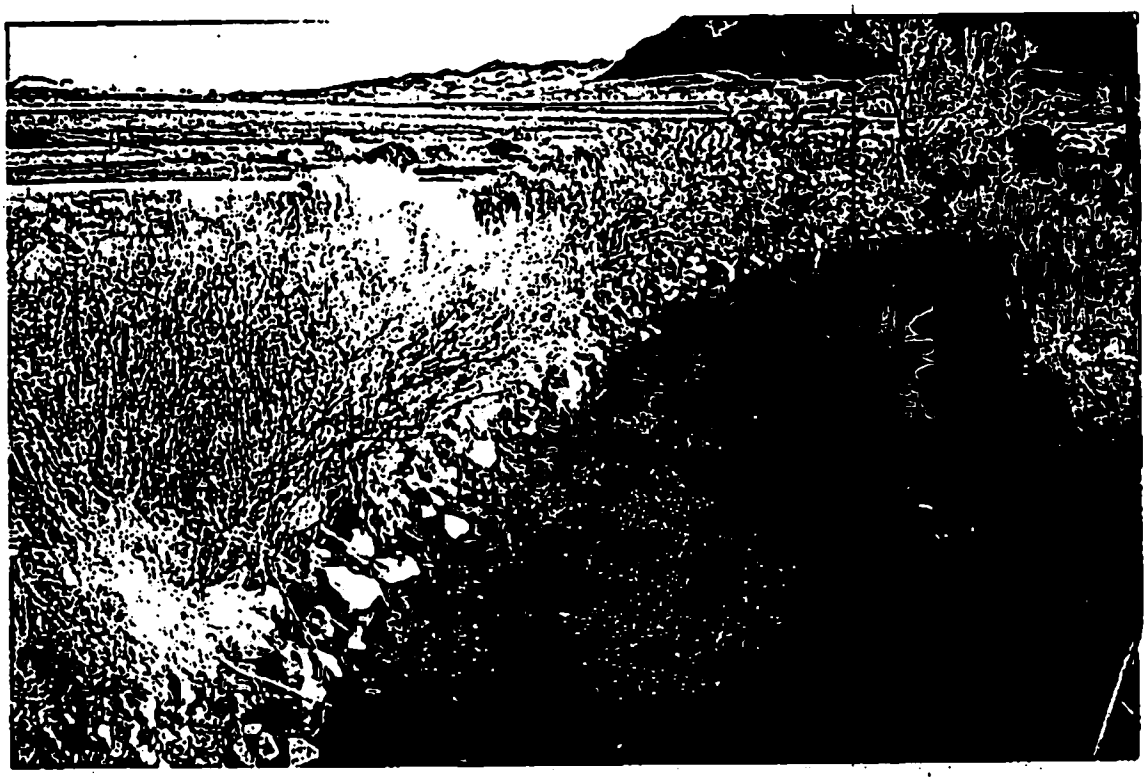
Tunnel Ditch, looking east, Highway 208



Topaz Lake, February 5, 1995. Volume is 14,000 acre feet.

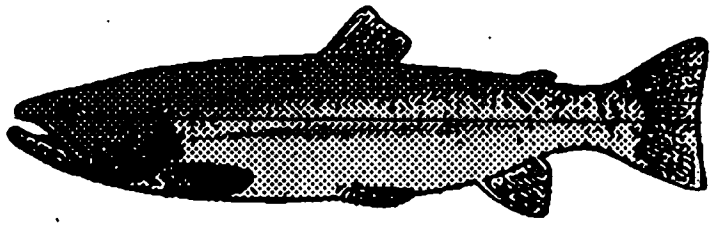
Lee Sanders Ditch at Highway 208, looking west

Lee Sanders Ditch looking north, near Highway 208

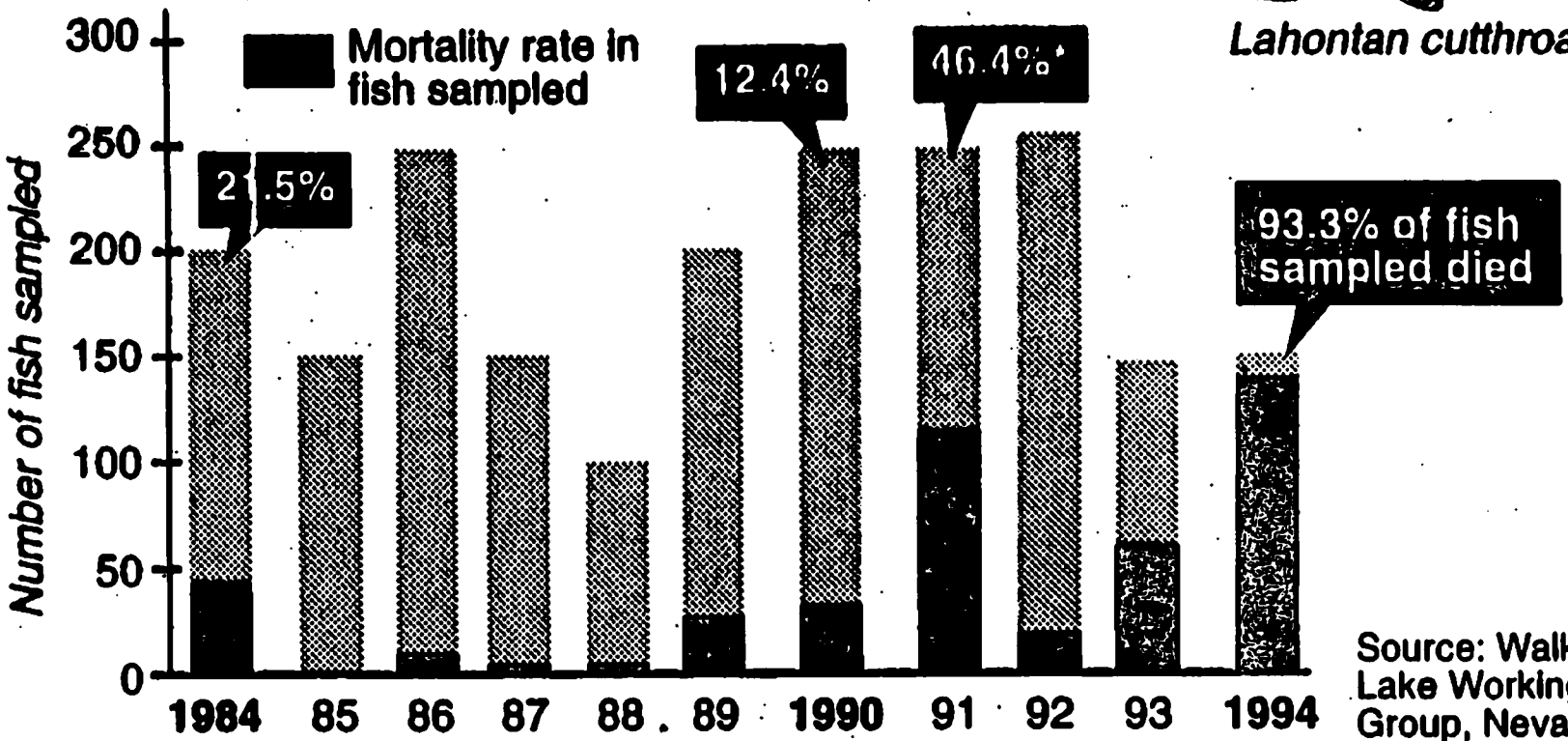


West Walker River near Lee Sanders Ditch

Cutthroat Trout bioassay summary



Lahontan cutthroat

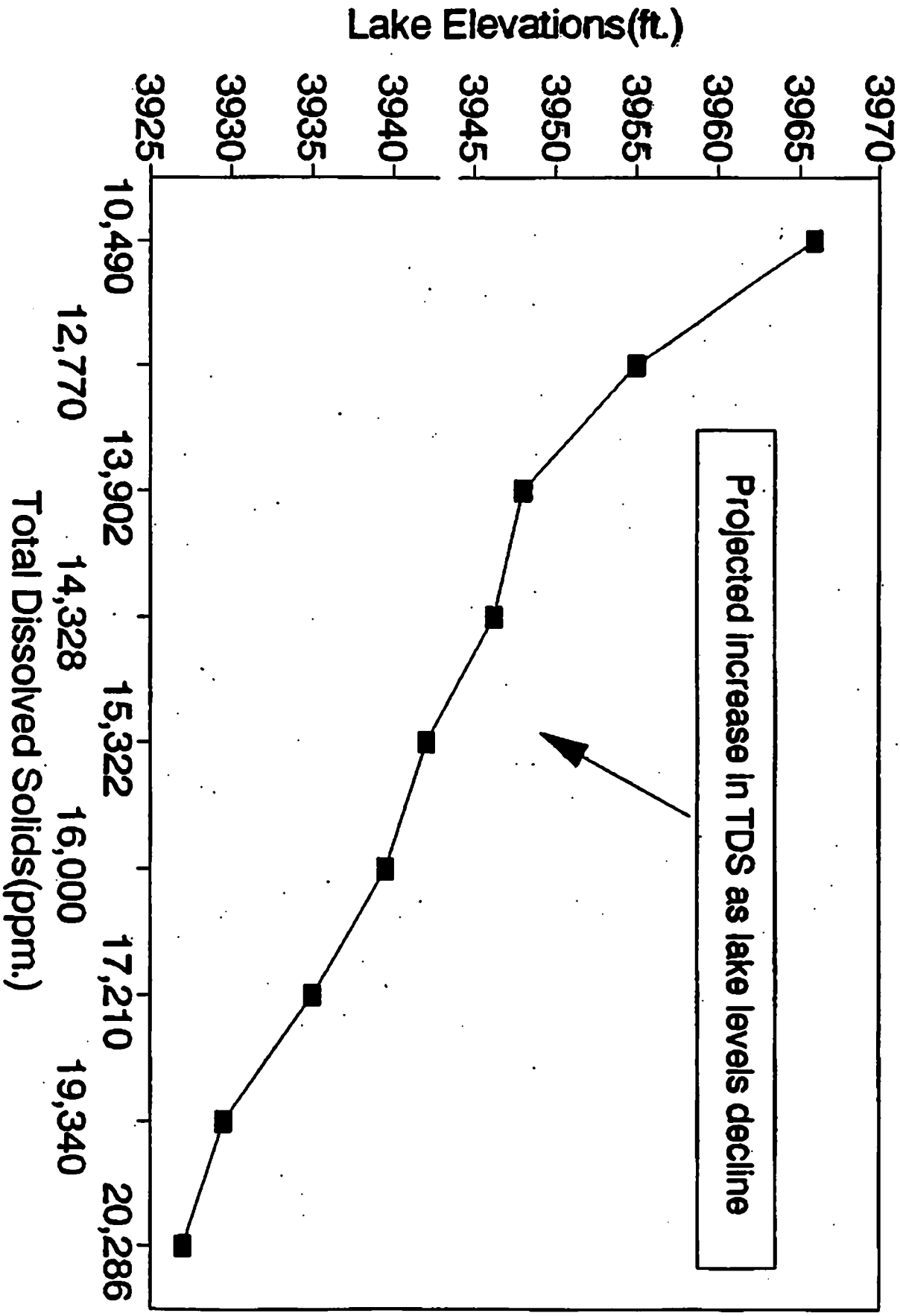


Source: Walker Lake Working Group, Nevada Department of Wildlife

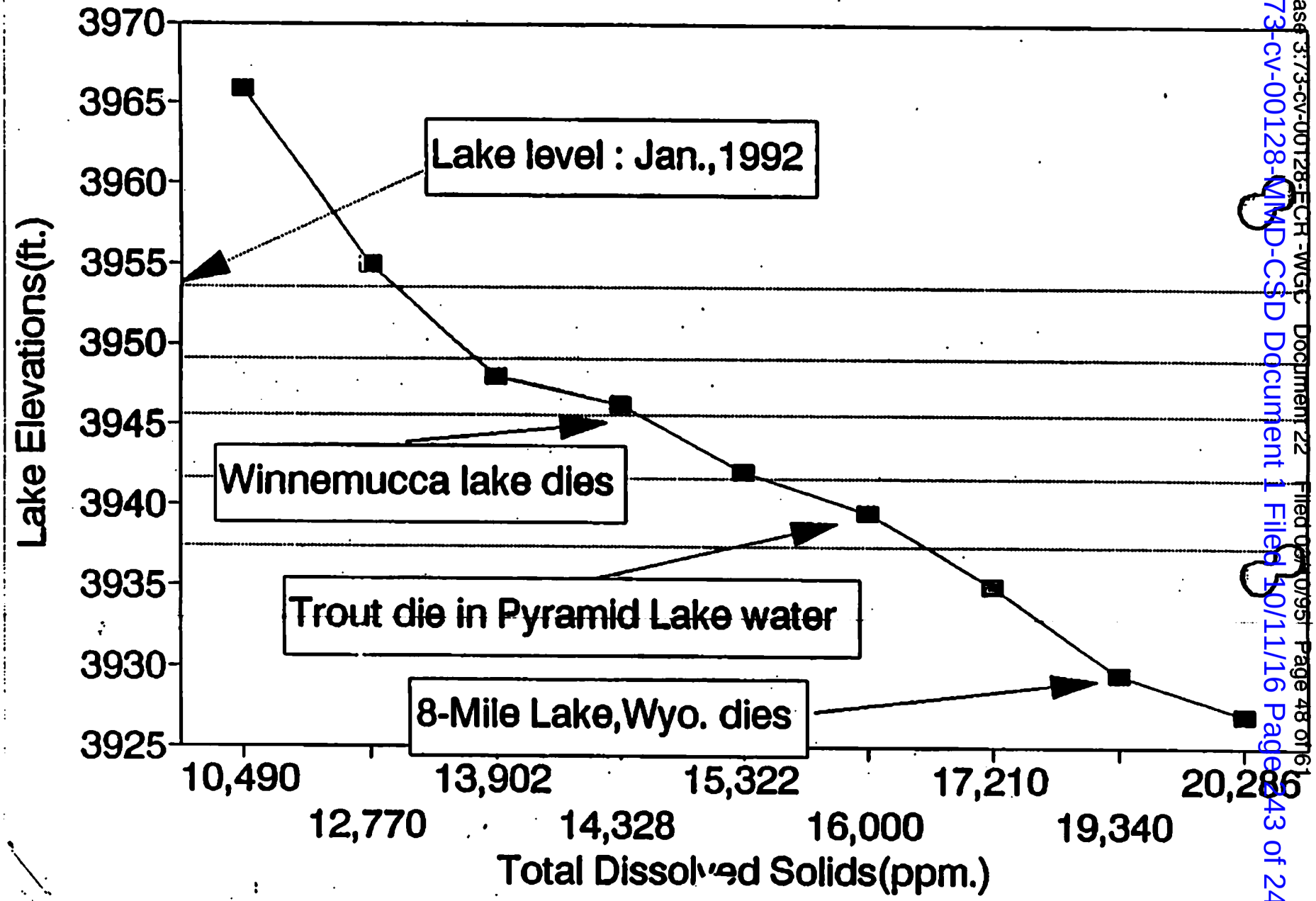
*The Heenan strain represented 82.7% of the total mortality. This less salt-tolerant strain is no longer stocked in Walker Lake.

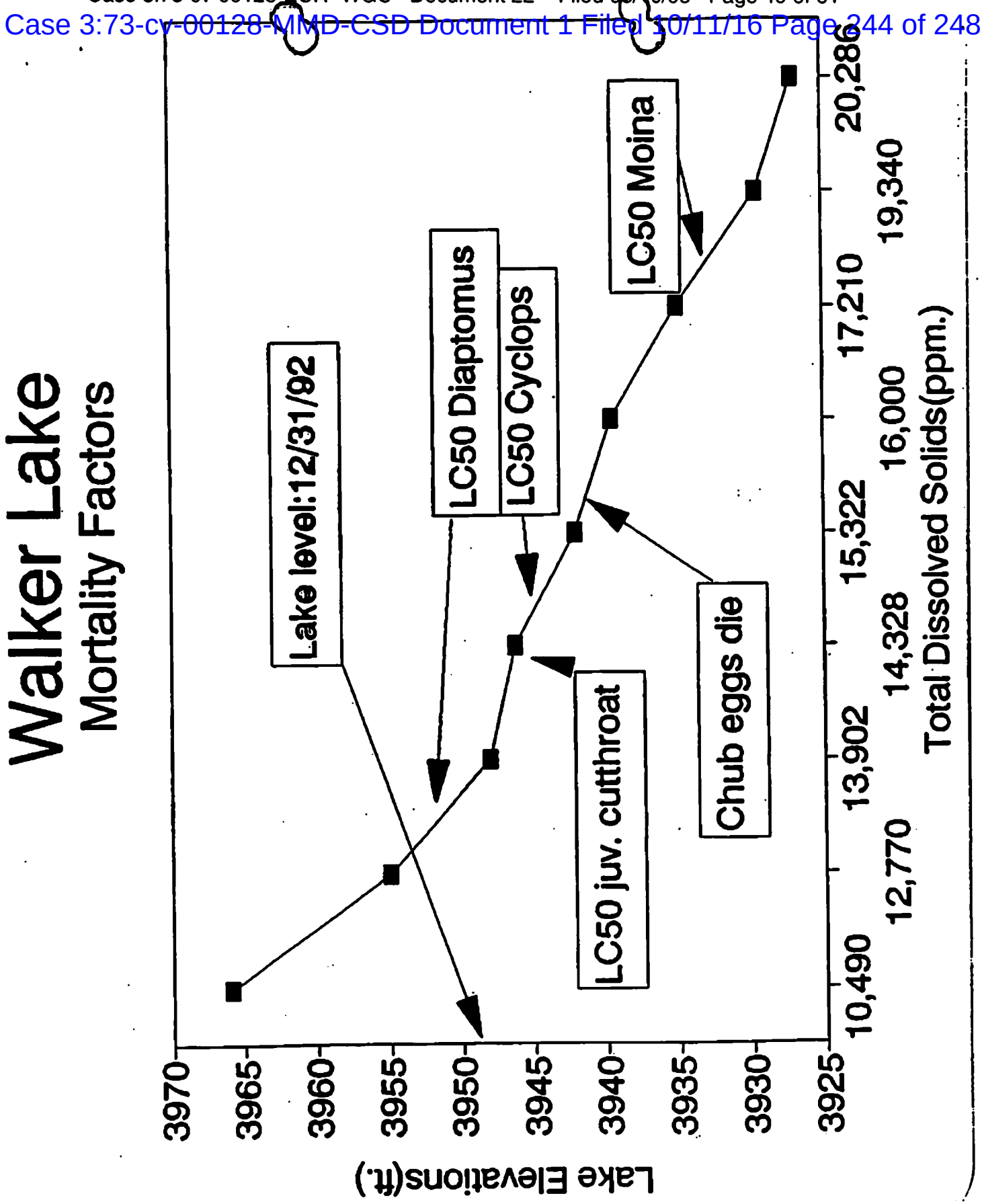
Mark Nowlin/Gazette-Journal

Walker Lake
Mortality Factors



Walker Lake
Mortality Factors




Walker Lake
Mortality Factors
Lake level:12/31/92
LC50 Diaptomus
LC50 Cyclops
LC50 Moina
LC50 juv. cutthroat
Chub eggs die
Lake Elevations(ft.)
3970
3965
3960
3955
3950
3945
3940
3935
3930
3925
10,490
12,770
13,902
14,328
15,322
16,000
17,210
19,340
20,286
Total Dissolved Solids(ppm.)

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WALKER LAKE PROPOSAL

INTRODUCTION

The purpose of this proposal is to provide in excess of 100,000 acre feet to Walker Lake during 1995.

The Walker River watershed is reported to have 113% of the average yearly snowpack water content in data collected by the USDA on February 14, 1995. The average water content of the snowpack as calculated by the USGS in the Walker River Basin in readings taken from their Coleville Gauge (55 year record) on the West Walker River and the Bridgeport Gauge (71 year record) on the East Walker River totals 287,300 acre feet. Even if there was no further precipitation between February 14 and April 1, 1995, the end of the winter season, the run-off would total 324,000 acre feet. Since the possibility of no further significant precipitation is statistically improbable, a more realistic estimation of potential run-off would be to use a model which predicts that the balance of the season would be normal. This model suggests that the Walker River basin would receive an additional 86,000 acre feet by April 1, 1995 for a total snowpack water content of 410,000 acre feet.

Walker Lake has, except for a release of 5,100 acre feet from Webber Reservoir during the spring of 1993[1], received no water from the Walker River since 1988 and is dropping at the rate of 4 feet per year. The total dissolved solids in Walker Lake are approaching toxic levels for fish life (present level 14,000 TDS) and Walker Lake has declined in elevation to 3,941.2 feet ASL. Survival rates for new hatchery fish in 1993 were estimated at less than 7% by NDW. Fish survival rates for fish presently in the lake are estimated at between 2 and 3 years; growth of fish is negligible during this time and if the TDS content rises to a count of 15,000, then all fish life will cease to exist.[2]

1. Pers. Comm., Sam Stegeman, Engineer, Walker River Paiute Tribe, February 7, 1995
2. Pers. Comm., John Elliot, Nevada Division of Wildlife, February 2, 1995

That Walker Lake is close to dying is not the question. The question is, does any entity other than Mineral County, who has lost 20% of their tax base already due to lake diminution and has potential losses of 50% should the lake die, be the only party concerned with its demise?

The proposal submitted is meant as a rescue package for the year 1995 to stabilize the lake level while having little or no impact on upstream users. Recreational users on Topaz and Bridgeport Reservoirs must be able to enjoy the facilities with no degradation as to launching facilities and sport fishing. Irrigated acres in Smith and Mason valleys should receive their full allotment. The Walker River Paiute Tribe will receive their full allotment, which has not always been the case, and unlike past years, they will release most of this water through to the lake.

A possible benefit to the town of Yerington is the controlled scouring of the Walker River channel in the Mason Valley. The concern of high sudden run-off has prompted WRID and the Lyon County Commissioners to submit a request to the Corps of Engineers requesting that they clear the channel of debris. No response has been received to this date. The last time the channel was cleared, it was by natural causes when the Walker River flooded in 1983. A controlled release could help alleviate these concerns, especially for those living in areas flooded in 1983.

PROPOSED RELEASE SCHEDULE, BRIDGEPORT AND TOPAZ RESERVOIRS

Walker Lake will receive more net water from the Walker River system if the proposed release schedule is followed for two reasons. There will be less water loss to groundwater recharge in Smith and Mason Valleys because some of the water released is prior to the effective date of the irrigation season. Additionally, there will be less water lost to evaporation over the system; the premise is that water evaporation at Walker Lake is more or less constant and there is no point waiting for water to evaporate from Bridgeport, Topaz, Artesia and Webber as well.

Henkle-Buchanan Group

The following schedule assumes an average precipitation period from February 14 through April 1, 1995.

TOPAZ RESERVOIR

Storage: 13,500 acre feet as of February 1, 1995[3]

Month	Proposed Discharge	Reservoir Storage	Acre feet Release(month)
March	200 c.f.s.	13,500 a.f.	12,000
April	250 c.f.s.	14,500 a.f.	15,000
May	850 c.f.s.	20,500 a.f.	51,000
June	850 c.f.s.	48,500 a.f.	51,000
July	750 c.f.s.	46,000 a.f.	45,000
August	400 c.f.s.	30,000 a.f.	24,000
September	300 c.f.s.	16,000 a.f.	18,000
October	150 c.f.s	11,000 a.f.	9,000

Total acre feet released from reservoirs:		225,000 acre feet
Projected Runoff (March 1-October 31)		223,000 acre feet[4]
Reservoir depletion		2,500 acre feet
	Total	225,500 acre feet

3. March 1 reservoir levels estimated at 18,000 acre feet

4. USDA projections adjusted for 1995 snowpack

Henkle-Buchanan Group