NEVADA IRRIGATION DISTRICT

GRASS VALLEY, CALIFORNIA

AGRICULTURAL WATER MANAGEMENT PLAN

NOVEMBER, 1991

PREPARED IN COMPLIANCE WITH
PART 2.8 OF DIVISION 6
OF THE CALIFORNIA WATER CODE

NEVADA IRRIGATION DISTRICT
AGRICULTURAL WATER MANAGEMENT PLAN

NOVEMBER 1991

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NEVADA IRRIGATION DISTRICT
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NEVADA IRRIGATION DISTRICT

AGRICULTURAL WATER MANAGEMENT PLAN

INTRODUCTION

With passage of Assembly Bill 1658 in September 1986, the Agricultural Water Management Planning Act was added to the Water Code as Sections 10800 through 10855. (Part 2.8 of Division 6).

This Act, a copy of which is included in Appendix A of this document, requires every water supplier providing more than 50,000 acre-feet of water annually for agricultural purposes to prepare a prescribed information report no later than December 31, 1989. If this report concludes that a significant opportunity exists to conserve water or reduce the quantity of highly saline or toxic drainage water, the water supplier must also adopt an agricultural water management plan no later than December 31, 1991.

An information report, approved by the District's Board of Directors on December 13, 1989, was transmitted to the Department of Water Resources as required. The conclusion of the report was that a significant opportunity exists to conserve water utilized for agricultural purposes thus requiring adoption of an agricultural water management plan.

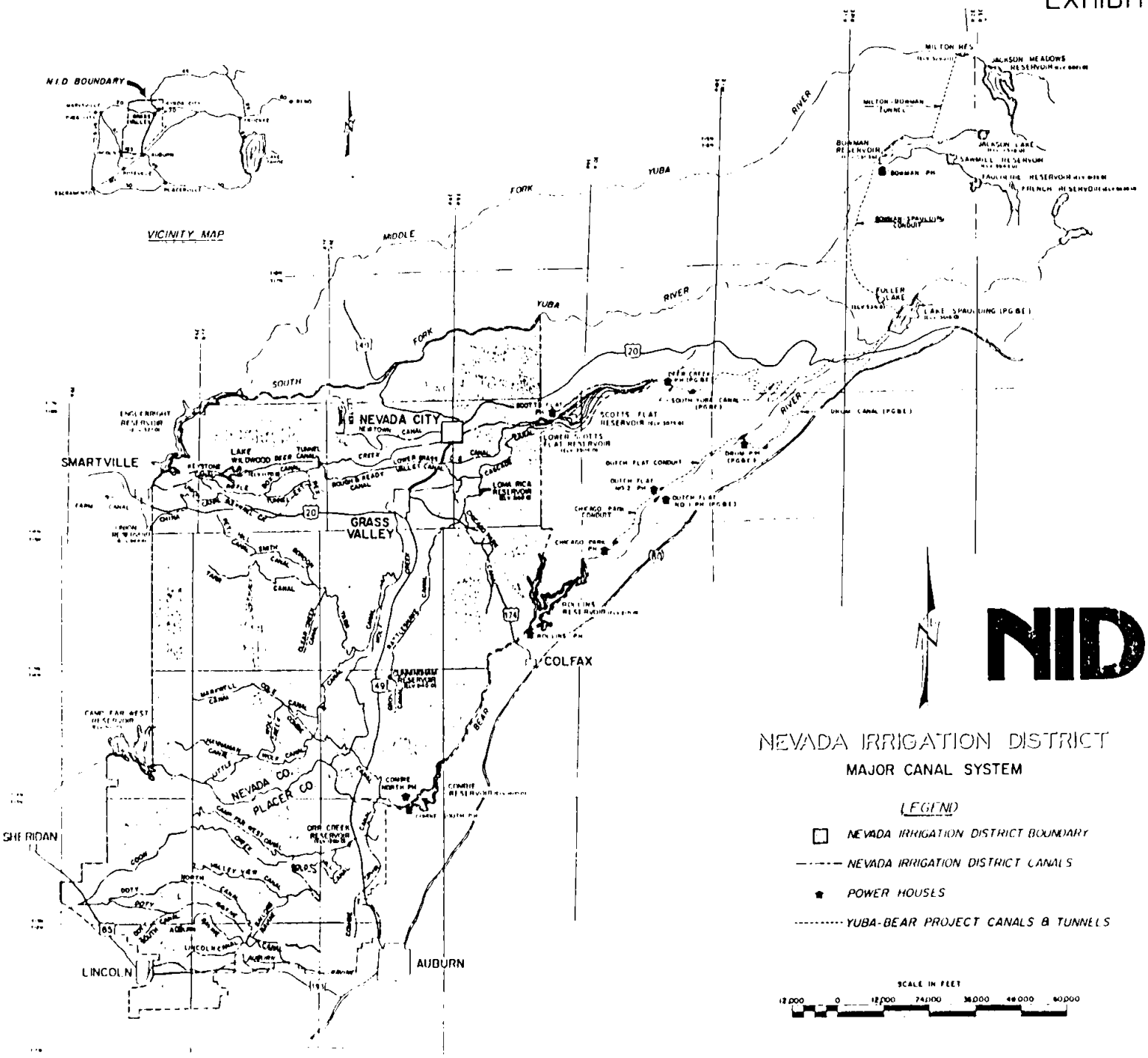
This plan is prepared pursuant to the Agricultural Water Management Planning Act and contains all available information required under Section 10826 of the Water Code. The plan was adopted by the District's Board of Directors on November 13, 1991, after holding a public hearing pursuant to Section 6066 of the Government Code.

WATER DELIVERY SYSTEM

As shown in Exhibit I, runoff from the District's mountain watershed, located northeast of the boundaries of the District, is collected in seven high country reservoirs with a storage capacity of about 160,300 acre-feet. These reservoirs are located on the watershed of the middle and south forks of the Yuba River.

Water from this area is transported via two canals, the Milton-Bowman and Bowman-Spaulding, to Pacific Gas and Electric Company's Spaulding Reservoir. An agreement with PG&E allows the District to divert water from this reservoir and transport the water down the mountains through canals and natural watercourses to three foothill reservoirs, with an additional storage of 120,100 acre-feet, located on the Bear River and Deer Creek. The District has additional water rights covering the watersheds of these two natural water courses.

EXHIBIT I


N.I.D BOUNDARY
VICINITY MAP
NEVADA CITY
SMARTVILLE
GRASS VALLEY
COLFAX
AUBURN
LINCOLN
SHERIDAN
NEVADA CO.
Pplacer CO
SOUTH FORK YUBA RIVER
MIDDLE FORK YUBA RIVER
BEAR RIVER
LAKE WILDWOOD
SCOTTS FLAT RESERVOIR
LOWER SCOTTS FLAT RESERVOIR
LAKE SPAULDING (PG&E)
JACKSON MEADOWS RESERVOIR
BOWMAN RESERVOIR
FULLER LAKE
ROLLINS RESERVOIR
CHICAGO PARK CONDUIT
DUTCH FLAT CONDUIT
NID
NEVADA IRRIGATION DISTRICT
MAJOR CANAL SYSTEM
LEGEND
NEVADA IRRIGATION DISTRICT BOUNDARY
NEVADA IRRIGATION DISTRICT CANALS
POWER HOUSES
YUBA-BEAR PROJECT CANALS & TUNNELS
SCALE IN FEET
12,000 0 12,000 24,000 36,000 48,000 60,000

The Deer Creek Service Area receives its water supply from releases into Deer Creek from PG&E's South Yuba Canal as well as from runoff from the Deer Creek watershed stored in Scotts Flat Reservoir. Major canals diverting water into this service area include the Cascade, D-S, Newtown, Tunnel, and the Tarr. Several laterals of these facilities further distribute water into this service area which includes most of the Nevada County portion of the District.

The Bear River Service Area's water supply is obtained by diversions from Spaulding Reservoir as well as from the watershed located above the Rollins and Combie Reservoirs located on the Bear River. This service area includes the Placer County portions of the District as well as the southwest portion of Nevada County. Major canals serving this service area include the Combie North, Combie-Ophir, Gold Hill and Auburn Ravine with laterals further distributing the water.

The District currently operates about 430 miles of canals to distribute water to the approximately 287,000 acres of land located within the District boundaries, as well as some areas located outside of its boundaries.

QUANTITY AND SOURCE OF WATER DELIVERED

The District's water supply originates in the upper reaches of the middle and south forks of the Yuba River, as well as from the Bear River and Deer Creek. The most recent status report covering District water rights is presented in Appendix B of this plan. The District does not utilize ground water.

The District, between 1988 and 1990, diverted an average 147,600 acre-feet annually for consumptive use within its service area, as shown below:

SOURCE	QUANTITY (AF)
Middle Yuba River	26,600
Canyon Creek	38,400
So. Yuba River	5,900
Deer Creek	35,400
Bear River	41,300
Total	147,600

BENEFICIAL USES OF WATER SUPPLY

Based on the customer water deliveries shown in Exhibit II, the three year average use of the diversions indicated above can be further broken down as follows:

USE	QUANTITY (AF)
Deliveries to treated water customers	8,500
Deliveries to raw water customers	119,900
Canal losses	19,200
Total	147,600

The average irrigated acreage, over the past three years, within the service area utilizing District supplied water is 24,815. Of this amount, about 17,200 acres are in irrigated pasture. See Exhibit III for a further breakdown on the type of crops grown. Information on water service sizes is provided in Appendix C of this plan.

The District is not involved in any conjunctive use or planned groundwater recharge programs, however, a portion of the canal water losses does provide a source for incidental groundwater recharge. No estimate of the amount of this water is available.

WATER LOSS

As indicated earlier, about 19,200 acre-feet per year of canal water is considered lost to the District. These canal losses can be attributed to operational spill, evaporation, seepage, and non-crop evapotranspiration. Operational spill, caused by the difficulty of matching upstream diversions and customer demands in an extensive open canal system, can be partially recaptured by downstream water users located outside the District boundaries. The District does not currently have adequate information to determine the portions associated with each of the four categories of water losses.

Utilizing the farm delivery requirements developed by CH_2M Hill Engineers, as part of the District's raw water master plan, it is estimated that average on farm use of water for crop evapotranspiration per year in the District is about 85,500 acre-feet. On farm water losses total about 50,600 acre-feet annually. These losses were caused by non-crop evapotranspiration, evaporation from water surfaces, surface flow runoff and percolation below the crop root zone. Some of these losses may provide a source of incidental ground water recharge, or in the case of surface flow runoff be recaptured for further use downstream. The District does not have adequate information to further break down the on farm

EXHIBIT II

NEVADA IRRIGATION DISTRICT
CUSTOMER WATER DELIVERIES

	1988		1989		1990	
CUSTOMER CLASS	**SERVICES**	**ACRE FT**	**SERVICES**	**ACRE FT**	**SERVICES**	**ACRE FT**
Metered Domestic	12,116	4,848	12,595	4,735	13,025	5,099
Metered Commercial	757	1,719	791	1,692	858	1,834
Municipal	5	1,843	5	1,810	5	1,929
Irrigation	4,470	98,736	4,513	101,061	4,669	103,966
Winter Services	1,886*	7,089	1,820*	6,901	1,868*	8,882
South Sutter W.D.	0	0	1	16,525	1	16,445
TOTALS	19,234	114,235	19,725	132,724	20,426	138,155

*Duplicated under irrigation customer class.

Exhibit III

NEVADA IRRIGATION DISTRICT
IRRIGATED ACREAGE

CROP	ACRES		
	1988	1989	1990
Corn	301	303	302
Rice	251	2,582	2,560
Hay	547	520	476
Silage	406	246	246
Irrigated Pasture	17,219	16,810	17,576
Citrus	24	31	31
Apples	195	207	210
Berries	28	29	24
Cherries	20	21	24
Grapes	227	237	258
Kiwi	111	91	41
Peaches	80	84	90
Pears	136	140	132
Plums	194	196	172
Persimmons	9	9	9
Almonds	19	19	15
Walnuts	19	19	22
Chestnuts	7	7	5
Pistachios	27	27	25
Family Gardens	2,435	2,413	2,650
Nursery	402	477	506
Golf Course/Park	645	646	655
Totals =	23,302	25,114	26,029

water losses into categories. See Appendix D for further details covering District farm delivery requirements.

CURRENT WATER CONSERVATION PRACTICES

The District currently does the following:

(1) Reclaims wastewater to reuse for agricultural purposes as allowed under Sections 1010 and 1011 of the Water Code and extensively exercises the right to recapture, reuse and resell return flows pursuant to Water Code Sections 22076, 22078 and 22430.

(2) Maintains gauging stations at the head of its canal facilities and throughout its distribution system utilizing the obtained flow data to continuously monitor canal water losses.

(3) A raw water system capital improvement list was originally adopted by the District's Board of Directors in 1986 and has been revised on several occasions. This list shows the timing of needed replacements of deteriorating major raw water facilities. A project review committee made up of District staff members meets monthly to evaluate and prioritize the upgrading of smaller facilities in order to reduce water losses and provide for system reliability.

(4) Holds system management meetings at least once a week to consider operation strategies including water exchanges with other agencies and the most efficient ways of routing water. In addition to the weekly meetings, a water management committee with representatives from contracting agencies has been established to discuss these same subjects.

(5) Maintains several snow courses to provide for improved forecasting needed for better water management. The District has also expanded its computer system that enables the collection of real time data to monitor the snow pack.

(6) District staff has attended irrigation system training courses and other water conservation related workshops.

(7) The District has enhanced its communication link with customers through a public relations consultant, local newspapers and radio stations. Customers have been kept informed on current and forecasted water supplies and the need for conservation. Water conservation publications have been circulated and District staff have made presentations in schools, community business meetings and special events.

(8) Works with Soil Conservation Service in their Soil Moisture Monitoring Program to provide District customers with soil moisture data needed to maintain a more water efficient irrigation schedule.

(9) In coordination with the local soils conservation offices offers irrigation system evaluations. A computer program can be utilized in these reviews.

(10) The District sponsors an annual water measurement/management workshop for employees and other local agencies that emphasizes water conservation.

(11) Offers District customers assistance in scheduling irrigations or in improving on farm efficiencies through the use of computer programs.

RECOMMENDED ADDITIONAL WATER CONSERVATION MEASURES

INTRODUCTION

This section of the plan identifies additional cost effective and economically feasible measurers for water conservation and discusses significant impacts relating to these measures.

Water conservation can be achieved through two concepts, supply management and demand management. Supply management is utilized to improve the efficiency and reduce waste within the water purveyor's transportation and delivery system. Demand management is used to accomplish water conservation within a customer's property.

Prior to deciding on which additional water conservation measures to implement, a series of option papers were prepared and reviewed at public workshops. These option papers are presented in Appendix F. Comments received at the public workshops are provided in Appendix G.

The following measures are adopted as part of this plan:

SUPPLY MANAGEMENT

ACCELERATED WATER LOSS PREVENTION PROGRAM

As discussed earlier in this plan, the District's staff meets periodically to recommend project priorities. These projects can be for the purpose of increasing facility reliability, providing greater flow capacities or conserving water.

In order to provide more priority for these type of projects, a separate list will be established for potential water conservation projects to be reviewed and updated at least once a year. If an

economic analysis shows that these projects are cost effective, work will be scheduled as funding becomes available. Examples on the economics of measures that can be taken to reduce canal seepage and evaporation losses are provided in Appendix E of this plan.

DELIVERY METHODS

Currently the continuous flow method of delivering purchased raw water is extensively utilized. The purchaser buys a flow rate, expressed in miner's inches, and the District delivers this flow for a certain time period. The irrigation season is normally between April 15 and October 14 of each year.

This type of operation requires less canal capacity than other delivery methods since there is no peak flow requirement during the high crop use summer months. Many of the District's canals are currently at capacity. These facilities would be expensive to enlarge if a change in delivery concept was approved.

CH_2M Hill Engineers, in studying the current District water delivery method, concluded that the total annual water demand for this method was not expected to be significantly different from that with other options.

It may be practical for many of the District's larger customers to be sold water on a volume basis as opposed to the normal flow concept. Recorders could be placed on existing parshall flumes to determine the acre-feet delivered. A significant reduction in water deliveries could be made to many District customers in this category. District staff will start reviewing larger farming operations to determine where a volume water sale would be practical.

DEMAND MANAGEMENT

ON FARM IRRIGATION EFFICIENCIES

It is estimated that increasing on farm irrigation efficiencies within the District by ten percent would save approximately 17,600 acre-feet of water per year.

As discussed in Appendix F of this plan, the District presently assists farmers by providing them access to several computer programs including "Irrigation System Evaluation", "Agricultural Water Scheduling" and "CIMIS". These programs will continue to be utilized at the current level until their effectiveness can be better established.

LANDSCAPE WATER MANAGEMENT

A computer program has now been developed, jointly by the California Polytechnic State University and the California Department of Water Resources, to provide water audit and irrigation system scheduling information for a more urban environment. Homeowners and owners of small pasture operations, golf courses, cemeteries and commercial establishments can utilize this software package. More District water customers could benefit from this program than from the previously discussed programs. District staff will attend training sessions on the use of this software package and make it available to water customers.

WATER RATES

Water rates can be utilized as an incentive for water conservation. As discussed in Appendix F of this plan, several alternative water rate concepts are available that could promote water conservation better than the existing water rate structure.

The District's Water Rate Committee will further study the need to modify the current water rates and make recommendations to the Board

SIGNIFICANT IMPACTS

The additional water conservation measures adopted as part of this plan are not expected to significantly impact downstream surface water supplies, adjacent groundwater supplies, fish and wildlife habitat, water quality, energy use or any other statewide or interstate concerns.

IMPLEMENTATION SCHEDULE

Action on the additional water conservation measures discussed above are expected to begin as follows:

Date	Measure
July 1992	Accelerated Water Loss Prevention Program, priority list
February 1992	Delivery Methods, Review larger farming operations
March 1992	Landscape Water Management, Inhouse training
April 1992	Water Rate Committee review of alternatives

APPENDIX
AGRICULTURAL WATER MANAGEMENT PLAN

A. ASSEMBLY BILL 1658

B. WATER RIGHTS STATUS REPORT

C. WATER SERVICE SIZES

D. FARM DELIVERY REQUIREMENTS

E. SAMPLE ECONOMICS, REDUCING CANAL WATER LOSS

F. OPTION PAPERS

G. SUMMARY OF PUBLIC WORKSHOPS AND CORRESPONDENCE

H. BIBLIOGRAPHY, RAW WATER STUDIES

APPENDIX A

ASSEMBLY BILL 1658

Assembly Bill No. 1658

CHAPTER 954

An act to add Part 2.8 (commencing with Section 10800) to Division 6 of the Water Code, relating to water conservation, and making an appropriation therefor.

[Approved by Governor September 20, 1986. Filed with Secretary of State September 22, 1986.]

LEGISLATIVE COUNSEL'S DIGEST

AB 1658, Isenberg. Agricultural water management planning.

(1) Under existing law, local agricultural water suppliers are not generally required to adopt and enforce water conservation plans.

This bill would enact the Agricultural Water Management Planning Act to require every agricultural water supplier supplying more than 50,000 acre-feet of water annually for agricultural purposes directly to customers to prepare a prescribed information report and, would require those suppliers that determine that a significant opportunity exists to conserve water or reduce the quantity of highly saline or toxic drainage water to prepare and adopt, in accordance with prescribed requirements, an agricultural water management plan meeting specified guidelines. The bill would require the Department of Water Resources to reimburse each supplier for the cost of preparing the informational report, not to exceed $5,000 per report and to reimburse each supplier preparing an agricultural water management plan, not to exceed $25,000 per plan, and would specify that no supplier shall be required to prepare a plan unless funds are appropriated to reimburse the supplier for its costs associated with the plans by the 1990–91 fiscal year. The bill would authorize an agricultural water supplier indirectly providing water to customers to adopt an agricultural water management plan or to participate in specified planning activities.

The bill would require the plan to be filed with the department, and would require the department to prepare and submit to the Legislature a report summarizing the status of the plans not later than January 1, 1993. The bill would specify requirements for actions or proceedings arising under the bill and would specify related matters.

The bill would impose a state-mandated local program as its requirements would be applicable to local public agencies.

The bill would make legislative findings and declarations in this connection.

The bill would remain operative only until January 1, 1993, except that if, an agricultural water supplier fails to submit its required information report or agricultural water management plan prior to January 1, 1993, it would remain operative for that supplier until it

has submitted the report or plan, or both.

(2) The California Constitution requires the state to reimburse local agencies and school districts for certain costs mandated by the state. Statutory provisions establish procedures for making that reimbursement, including the creation of a State Mandates Calims Fund to pay the costs or mandates which do not exceed $500,000 statewide and other procedures for claims whose statewide costs exceed $500,000.

This bill would provide that reimbursement for costs mandated by the bill above the limits specified in (1) above shall be made pursuant to those statutory procedures and, if the statewide cost does not exceed $500,000, shall be payable from the State Mandates Claims Fund.

(3) The bill would appropriate $250,000 from the Bosco-Keene Renewable Resources Investment Fund for payment of claims for preparation of informational reports required by the bill.

Appropriation: yes.

The people of the State of California do enact as follows:

SECTION 1. Part 2.8 (commencing with Section 10800) is added to Division 6 of the Water Code, to read:

PART 2.8. AGRICULTURAL WATER MANAGEMENT PLANNING

CHAPTER 1. GENERAL DECLARATIONS AND POLICY

10800. This part shall be known and may be cited as the Agricultural Water Management Planning Act.

10801. The Legislature finds and declares as follows:

(a) The waters of the state are a limited and renewable resource.

(b) The Constitution requires that water in the state be used in a reasonable and beneficial way.

(c) Urban water districts, which represent more than 22,000,000 Californians and use less than 12 percent of the water consumed in the state, are required by Part 2.6 (commencing with Section 10610) to submit water management plans.

(d) More than 84 percent of the water used in the state is used for agricultural purposes.

(e) The conservation of agricultural water supplies are of great statewide concern.

(f) There is a great amount of reuse of delivered water, both inside and outside the water service areas.

(g) Significant noncrop beneficial uses are associated with agricultural water use, including streamflows and wildlife habitat.

(h) Significant opportunities exist in some areas, through improved irrigation water management, to conserve water or to reduce the quantity of highly saline or toxic drainage water.

(i) Changes in water management practices shall be carefully planned and implemented to minimize adverse effects on other beneficial uses currently being served.

(j) Agricultural water suppliers that receive water from the federal Central Valley Project are required by federal law to develop and implement water conservation plans.

(k) Agricultural water users applying for a permit to appropriate water from the State Water Resources Control Board are required to develop and implement water conservation plans.

10802. The Legislature finds and declares that it is the policy of the state as follows:

(a) The conservation of water shall be pursued actively to protect both the people of the state and their water resources.

(b) The conservation of agricultural water supplies shall be an important criterion in public decisions on water.

(c) Agricultural water suppliers, who determine that a significant opportunity exists to conserve water or reduce the quantity of highly saline or toxic drainage water, shall be required to develop water management plans to achieve conservation of water.

CHAPTER 2. DEFINITIONS

10810. Unless the context otherwise requires, the definitions of this chapter govern the construction of this part.

10811. "Conservation" means the use of cost-effective measures that reduce evapotranspiration, evaporation, or flows to unusable water bodies in order to prevent the waste, the unreasonable use, or the unreasonable method of use of water.

10812. "Customer" means a purchaser of water from a water supplier who uses water for agricultural purposes.

10813. "Person" means any individual, firm, association, organization, partnership, business, trust, corporation, company, public agency, or any agency of such an entity.

10814. "Plan" means an agricultural water management plan prepared pursuant to this part. A plan shall describe and evaluate reasonable and practical efficient uses and conservation activities. The components of the plan may vary according to an area's characteristics and its capabilities to conserve and use water efficiently. The plan shall address measures for agricultural water management as set forth in Article 2 (commencing with Section 10830) of Chapter 3. In addition, a strategy and time schedule for implementation shall be included in the plan.

10815. "Public agency" means any board, commission, county, city and county, city, regional agency, district, or other public entity.

10816. "Agricultural water supplier" or "supplier" means a supplier, either publicly or privately owned, supplying more than 50,000 acre-feet of water annually for agricultural purposes. An

agricultural water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers.

CHAPTER 3. WATER MANAGEMENT PLANS

Article 1. General Provisions

10820. (a) The requirements of this part shall be satisfied by any water management or conservation plan prepared to meet federal or state laws or regulations which substantially include the contents of a plan required under this part if that plan was prepared after January 1, 1981.

(b) Those suppliers that have prepared, or are preparing, an alternate plan as described in subdivision (a) shall submit that plan to the department not later than December 31, 1991.

10821. (a) Every agricultural water supplier serving water directly to customers shall prepare an informational report based on information from the last three irrigation seasons on its water management and conservation practices in the manner set forth in Article 2 (commencing with Section 10825) and shall submit the report to the department not later than December 31, 1989.

(b) The informational report shall include a determination of whether the supplier has a significant opportunity to conserve water or reduce the quantity of highly saline or toxic drainage water through improved irrigation water management in the manner set forth in subdivision (g) of Section 10825.

(c) Suppliers may consult with appropriate state agencies or the Agricultural Experiment Station to help determine whether significant opportunities exist. State agencies shall cooperate with agricultural water suppliers in any reasonable manner.

(d) Those suppliers that determine that a significant opportunity exists to conserve water or reduce the quantity of highly saline or toxic drainage water in the manner set forth in subdivision (g) of Section 10825 shall prepare and adopt an agricultural water management plan based on information from the last three irrigation seasons in the manner set forth in Section 10826 and shall submit the plan to the department not later than December 31, 1991.

10822. Every person that becomes an agricultural water supplier after December 31, 1988, shall comply with the requirements of this part within two years after becoming an agricultural water supplier to an area.

10823. An agricultural water supplier indirectly providing water to customers may adopt an agricultural water management plan or participate in areawide, regional, watershed, or basinwide agricultural water management planning.

10824. An agricultural water supplier may satisfy the requirements of this part by participation in areawide, regional, watershed, or basinwide agricultural water management planning where those plans will reduce preparation costs and contribute to the achievement of conservation and efficient water use and where those plans satisfy the requirements of this part.

Article 2. Contents of Reports and Plans

10825. To the extent information is available, the reports shall address all of the following:

(a) The quantity and source of water delivered to and by the supplier.

(b) Other sources of water used within the service area, such as groundwater and other diversions.

(c) A general description of the supplier's water delivery system and service area, including a map.

(d) Total irrigated acreage within the service area.

(e) The amount of acreage of trees and vines grown within the service area.

(f) An identification of all of the following:

(1) Current water conservation practices being used.

(2) Plans for changing current water conservation plans.

(3) Conservation educational services being used.

(g) A determination of whether the supplier, through improved irrigation water management, has a significant opportunity to do one or both of the following:

(1) Save water by means of reduced evapotranspiration, evaporation, or reduction of flows to unusable water bodies that fail to serve further beneficial uses.

(2) Reduce the quantity of highly saline or toxic drainage water.

10826. To the extent information is available, the plans shall address all of the following:

(a) The quantity and source of surface and ground water delivered to and by the supplier.

(b) A description of all of the following:

(1) The water delivery system used in the area supplied.

(2) The beneficial uses of the water supplied, including noncrop beneficial uses.

(3) Conjunctive use programs.

(4) Incidental and planned groundwater recharge.

(5) The amounts of the delivered water that are lost to further beneficial use to unusable bodies of water or moisture-deficient soils through the following:

(A) Crop evapotranspiration.

(B) Noncrop evapotranspiration.

(C) Evaporation from water surfaces.

(D) Surface flow or percolation.

(c) An identification of cost-effective and economically feasible measures for water conservation, their resulting detriments and

benefits, and the impacts on amounts of downstream surface water supply and immediately adjacent groundwater supply.

(d) An evaluation of other significant impacts, including impacts within the service area and downstream on fish and wildlife habitat, water quality, energy use, and other factors of either local or statewide concern or interstate concern, where applicable. Alternatives should be designed to minimize impacts on other beneficial users currently being served both within and without the service area and to result in improved overall water management.

(e) A schedule prepared by the supplier to implement those water management practices that it determines to be cost-effective and economically feasible. Priority shall be given to those water management practices, or combination of practices, that offer lower incremental costs than expanded or additional water supplies.

Article 3. Adoption and Implementation of Plans

10840. Every agricultural water supplier required to prepare a water management plan pursuant to subdivision (d) of Section 10821 shall prepare its plan pursuant to Section 10826.

10841. (a) An agricultural water supplier required to prepare a plan may consult with, and obtain comments from, any public agency or state agency or any person who has special expertise with respect to water conservation and management methods and techniques.

(b) In order to assist agricultural water suppliers in obtaining needed expertise as provided for in subdivision (a), the department, upon request of an agricultural water supplier, shall provide the supplier with a list of persons or agencies having expertise or experience in the development of water management plans.

(c) The department shall prepare by July 1, 1988, an outline of model informational reports and water management plans which an agricultural water supplier may use in complying with the requirements of this part.

10842. Prior to adopting a plan, the agricultural water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

10843. An agricultural water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan, as determined by the governing body of the agricultural water supplier.

10844. An agricultural water supplier shall file with the department a copy of its plan no later than 30 days after adoption.

Copies of amendments or changes to the plans shall be filed with the department within 30 days after adoption.

Not later than January 1, 1993, the department shall prepare and submit to the Legislature a report summarizing the status of the plans adopted pursuant to this part.

10845. The adoption of a plan or submission of a report as specified in subdivision (d) of Section 10821 satisfies any requirements of state statute, regulation, or order, including those of the State Water Resources Control Board, for the preparation of water management plans. If the board requires additional information concerning water conservation to implement its existing authority, nothing in this part limits the board in obtaining that information.

CHAPTER 4. MISCELLANEOUS PROVISIONS

10850. (a) Any actions or proceedings to attack, review, set aside, void, or annul the acts or decisions of an agricultural water supplier on the grounds of noncompliance with this part shall be brought pursuant to Section 1085 of the Code of Civil Procedure, and the court's review of compliance or noncompliance with this part shall extend to whether the water conservation plan, or portion thereof, or revision thereto, substantially complies with the requirements of this part.

(b) An action or proceeding alleging failure to adopt a plan shall be commenced within 18 months after that adoption is required by this part, or within 18 months after commencement of agricultural water service by a supplier commencing that service after January 1, 1988.

(c) Any action or proceeding alleging that a plan, or action taken pursuant to the plan, does not comply with this part shall be commenced within 120 days after filing of the plan or amendment thereto pursuant to Section 10844 or the taking of that action.

(d) In an action or proceeding to attack, review, set aside, void, or annul the acts or decisions of an agricultural water supplier made pursuant to this part at a properly noticed public hearing, the issues raised shall be limited to those raised in the public hearing, or in written correspondence delivered to the public agency prior to, or at, the public hearing, except where the court finds either of the following.

(1) The issue could not have been raised at the public hearing by a person exercising reasonable diligence.

(2) The body conducting the public hearing prevented the issue from being raised at the public hearing.

10851. The California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) does not apply to the preparation and adoption of plans prepared and adopted under this part. Nothing in this part exempts projects for

implementation of the plan or for expanded or additional water supplies from the California Environmental Quality Act.

10852. If any provision of this part or the application thereof to any person or circumstances is held invalid, that invalidity shall not affect other provisions or applications of this part which can be given effect without the invalid provision or application thereof, and to this end the provisions of this part are severable.

10853. The department, from funds appropriated for this purpose, shall reimburse each supplier preparing an informational report pursuant to this part for the cost incurred in preparing the report up to an amount, not to exceed five thousand dollars ($5,000) per report. The department shall reimburse each supplier preparing an agricultural water management plan pursuant to this part for the costs incurred by the supplier in preparing the plan up to an amount, not to exceed twenty-five thousand dollars ($25,000) per plan.

10854. No agricultural water supplier shall be required to prepare an agricultural water management plan pursuant to this part unless funds are appropriated by the Legislature for the 1990–91 fiscal year, or before, to reimburse the agricultural water supplier for its costs associated with the plans.

10855. This part shall remain operative only until January 1, 1993, except that, if an agricultural water supplier fails to submit its information report or agricultural water management plan prior to January 1, 1993, this part shall remain operative with respect to that supplier until it has submitted its report or plan, or both.

SEC. 2. Reimbursement to local agencies and school districts for costs mandated by the state pursuant to this act above the five thousand dollars ($5,000) per report and twenty-five thousand dollars ($25,000) per plan specified in Section 10853 of the Water Code shall be made pursuant to Part 7 (commencing with Section 17500) of Division 4 of Title 2 of the Government Code and, if the statewide cost of the claim for reimbursement does not exceed five hundred thousand dollars ($500,000), shall be made from the State Mandates Claims Fund. The provisions of paragraph (4) of subdivision (a) of Section 17556 of the Government Code shall not be applicable to claims filed pursuant to this act.

SEC. 3. The sum of two hundred fifty thousand dollars ($250,000) is hereby appropriated from the Bosco-Keene Renewable Resources Investment Fund to the Department of Water Resources for payment of claims for preparation of informational reports pursuant to Section 10821 of the Water Code for expenditure without regard to fiscal year. Reimbursement shall not be made under this section for reports prepared pursuant to any law other than Part 2.8 (commencing with Section 10800) of Division 6 of the Water Code.

O

APPENDIX B

WATER RIGHTS STATUS REPORT

NEVADA IRRIGATION DISTRICT
WATER RIGHT SUMMARY
JANUARY 1991

Application Number	Permit Number	License Number	Date Filed	Purpose	Source	Amount CFS	Amount Ac. Ft.	Place of Storage or Diversion	SEASON Direct Diversion	SEASON Storage	Remarks
(A) 1270	2082		05/17/90	Mining Domestic Irrigation	Jackson Creek Canyon Creek Canyon Creek Canyon Creek Texas Creek Fall Creek Trap Creek		1,060 615 63,325	Jackson Reservoir Sawmill Reservoir Bowman Reservoir B. S. Conduit B. S. Conduit B. S. Conduit B. S. Conduit	Apr 15 - Sept 30 Apr 15 - Sept 30 Apr 15 - Sept 30 Apr 15 - Sept 30	Jan 1 - Dec 31 Jan 1 - Dec 31 Jan 1 - Dec 31	Request for license submitted to State 6/29/89. As of 11/28/90, the requests were being reviewed by the States Environmental Section.
(B) 1614	1481		01/08/20	Mining Domestic Irrigation	Deer Creek		60,000	Scotts Flat		Jan 1 - Dec 31	As of 11/28/90 under water use analysis by Murray, Burns and Kienlen Corp. in preparation for request of license.
1615	5801	8808	01/08/20	Irrigation Domestic	So. Fk. Deer Crk & Deer Creek	100		Cascade Ditch Snow Mt. Ditch D S Canal Rough & Ready Newtown Ditch Tunnel Ditch China Ditch	Apr 1- Oct 1		License Granted 1/22/64
(A) 2275	2084		03/25/21	Power	Middle Fork Yuba		60,000 15,000	Jackson Reservoir Milton Reservoir Bowman Reservoir		Jan 1 - Dec 31	Same as Application 1270.

(A) Included in first phase of permits to be licensed. These are permits upstream of Lake Spaulding without downstream storage and they are currently in States final review stage prior to licensing (11/28/90).

(B) Included in second phase of permits to be licensed. Work began in August 1989, and permits are in the first stages of review (11-28-90).

NEVADA IRRIGATION DISTRICT
WATER RIGHT SUMMARY
JANUARY 1991

Application Number	Permit Number	License Number	Date Filed	Purpose	Source	Amount CFS	Amount Ac. Ft.	Place of Storage or Diversion	SEASON Direct Diversion	SEASON Storage	Remarks
(A) 2276	2085		03/25/21	Mining Domestic Irrigation	Mid Fork Yuba		60,000 15,000	Jackson Reservoir Milton Reservoir Bowman Reservoir		Dec 1 - Jul 15	Same as Appl. 1270
(A) 2372	2087		06/3/21	Power	Jackson Creek Canyon Creek Canyon Creek Canyon Creek Texas Creek Fall Creek Trap Creek	 250 30 15 5	1,060 615 63,325	Jackson Reservoir Sawmill Reservoir Bowman Reservoir B.S. Conduit B.S. Conduit B.S. Conduit B.S. Conduit	 Jan 1 - Dec 31 Jan 1 - Dec 31 Jan 1 - Dec 31 Jan 1 - Dec 31	Dec 1 - Jul 15 Dec 1 - Jul 15 Dec 1 - Jul 15	Same as Appl. 1270
2652A	5803	10350	11/22/21	Irrigation Domestic Power Recreation	Bear River		5,555 6,945	Combie Reservoir Rollins Reservoir		Nov 30 - Jun 1 Nov 30 - Jun 1	License Granted 11/26/68 Power added as purpose of use 2/14/84
(B) 2652B	11626		11/22/21	Irrigation Domestic Recreation	Bear River		65,000	Rollins Reservoir		Nov 30 - Jun 1	Same as Appl. 1614

(A) Included in first phase of permits to be licensed. These are permits upstream of Lake Spaulding without downstream storage and they are currently in States final review stage prior to licensing (11/28/90).

(B) Included in second phase of permits to be licensed. Work began in August 1989, and permits are in the first stages of review (11-28-90).

NEVADA IRRIGATION DISTRICT
WATER RIGHT SUMMARY
JANUARY 1991

Application Number	Permit Number	License Number	Date Filed	Purpose	Source	Amount CFS	Amount Ac. Ft.	Place of Storage or Diversion	SEASON Direct Diversion	SEASON Storage	Remarks
4309	2935	4544	11/7/34	Power	Mid. Fork Yuba Canyon Creek Others Not Listed	135		Drum Canal	Jan 1 - Dec 31		License Granted 2/11/57
4310	2936	1707	11/7/24	Power	Mid. Fork Yuba Canyon Creek Others Not Listed	126		So. Yuba Canal	Jan 1 - Dec 31		License Granted 12/15/36
(B) 5193	13770		09/8/26	Domestic Irrigation Recreation	Mid. Fork Yuba		50,000	Jackson Mdw Res Milton Reservoir Bowman Reservoir Scotts Flat Res. Rollins Reservoir Combie Reservoir		Jan 1 - Jun 30 Oct 1 -Dec 1	Same as Appl. 1614
6229	5804	8809	03/26/29	Irrigation Domestic	Bear River	120		Bear River Canal	Apr 1 - Oct 31		License Granted 1/20/64
6529	5805	4403	01/9/30	Irrigation	Auburn Ravine	8		Hemphill Ditch	Apr 1 - Nov 1		License Granted 7/22/55
(A) 6701	5806		06/16/30	Power	Clear Creek Fall Creek Trap Creek	5 10 5		B. S. Conduit B. S. Conduit B. S. Conduit	Jan 1 - Dec 31 Jan 1 - Dec 31 Jan 1 - Dec 31		Same as Appl. 1270

(A) Included in first phase of permits to be licensed. These are permits upstream of Lake Spaulding without downstream storage and they are currently in States final review stage prior to licensing (11/28/90).

(B) Included in second phase of permits to be licensed. Work began in August 1989, and permits are in the first stages of review (11-28-90).

NEVADA IRRIGATION DISTRICT
WATER RIGHT SUMMARY
JANUARY 1991

Application Number	Permit Number	License Number	Date Filed	Purpose	Source	Amount CFS	Amount Ac. Ft.	Place of Storage or Diversion	SEASON Direct Diversion	SEASON Storage	Remarks
(A) 6702	5807		06/16/30	Irrigation	Clear Creek	5		B. S. Conduit	Apr 15 - Sept 30		Same as Appl.
					Fall Creek	10		B. S. Conduit	Apr 15 - Sept 30		1270
					Trap Creek	5		B. S. Conduit	Apr 15 - Sept 30		
(A) 8177	5812		11/27/34	Irrigation	Wilson Creek	25	3,000	Milton-Bowman	Jan 1 - Dec 31	Nov 1 - Jun 30	Same as Appl.
				Domestic	Poison Creek	25	3,000	Milton-Bowman	Jan 1 - Dec 31	Nov 1 - Jun 30	1270
								Bowman Reservoir			
								Scotts Flat Res.			
								Anthony House			
								Parker			
(A) 8178	5813		11/27/34	Power	Texas Creek	70		B. S. Conduit	Jan 1 - Dec 31		Same as Appl
					Clear Creek	30		B. S. Conduit	Jan 1 - Dec 31		1270
					Fall Creek	85		B. S. Conduit	Jan 1 - Dec 31		
					Trap Creek	15		B. S. Conduit	Jan 1 - Dec 31		
					Rucker Creek	25		B. S. Conduit	Jan 1 - Dec 31		
(A) 8179	5814		11/27/34	Power	Wilson Creek	25	3,000	Milton-Bowman	Jan 1 - Dec 31	Nov 1 - Jun 30	Same as Appl.
					Poison Creek	25	3,000	Milton-Bowman	Jan 1 - Dec 31	Nov 1 - Jun 30	1270
								Bowman Reservoir			
								Scotts Flat Res.			
								Anthony House			
								Parker			

(A) Included in first phase of permits to be licensed. These are permits upstream of Lake Spaulding without downstream storage and they are currently in States final review stage prior to licensing (11/28/90).

(B) Included in second phase of permits to be licensed. Work began in August 1989, and permits are in the first stages review as of (11-28-90).

NEVADA IRRIGATION DISTRICT
WATER RIGHT SUMMARY
JANUARY 1991

Application Number	Permit Number	License Number	Date Filed	Purpose	Source	Amount CFS	Amount Ac. Ft.	Place of Storage or Diversion	SEASON Direct Diversion	SEASON Storage	Remarks
(B) 8180	5815		11/27/34	Irrigation Domestic	Clear Creek Texas Creek Fall Creek Trap Creek Rucker Creek	30 70 85 15 25	6,000 14,000 17,000 3,000 5,000	B. S. Conduit B. S. Conduit B. S. Conduit B. S. Conduit B. S. Conduit Scotts Flat Res. Anthony House Parker	Jan 1 - Dec 31 Jan 1 - Dec 31 Jan 1 - Dec 31 Jan 1 - Dec 31 Jan 1 - Dec 31	Nov 1 - Jun 30 Nov 1 - Jun 30 Nov 1 - Jun 30 Nov 1 - Jun 30 Nov 1 - Jun 30	Same as Appl. 1614
15525	13771	10016	09/3/53	Power	So. Fork Yuba	200		Spaulding Res.	Sept 1 - Jun 30		License Granted 3/5/73
(B) 20017	13772		03/6/61	Domestic Irrigation	So. Fork Yuba	200	18,000	Rollins Res. Scotts Flat Res	Sept 1 - June 30	Nov 1 - Jun 30	Same as Appl. 1614
(B) 20072	13773		04/6/61	Power	Mid. Fork Yuba		50,000	Jackson Mdw Res. Bowman Reservoir		Oct 1 - Jun 30	Same as Appl. 1614
21151	14799	9903	02/5/63	Power	Bear River	1,056		Bear River (Chi Pk Pw House)	Jan 1 - Dec 31		License Granted 4/19/72
21152	14800	9902	02/5/63	Power	Bear River	550		Bear River (Dutch Fl Pw Hse)	Jan 1 - Dec 31		License Granted 4/19/72
(B) 24983	16953		01/9/76	Power	Bear River	700	62,080	Rollins Res.	Jan 1 - Dec 31	Nov 30 - Jun 1	Same As Appl. 1614

(A) Included in first phase of permits to be licensed. These are permits upstream of Lake Spaulding without downstream storage and they are currently in States final review stage prior to licensing (11/28/90).

(B) Included in second phase of permits to be licensed. Work began in August 1989, and permits are in the first stages of review (11-28-90).

NEVADA IRRIGATION DISTRICT
WATER RIGHT SUMMARY
JANUARY 1991

Application Number	Permit Number	License Number	Date Filed	Purpose	Source	Amount CFS	Amount Ac. Ft.	Place of Storage or Diversion	SEASON Direct Diversion	SEASON Storage	Remarks
(B) 26866	18757		06/3/81	Power	Bear River	1,000		Combie Reservoir	Jan 1 - Dec 31		Same As Appl. 1614
(B) 27132	18608		12/3/81	Power	Deer Creek	85	60,000	Scotts Flat Res.	Jan 1 - Dec 31	Jan 1 - Dec 31	Same as Appl. 1614
(B) 27559	19158		10/14/82	Power	Canyon Creek	322	65,000	Bowman Reservoir	Jan 1 - Dec 31	Dec 1 - Jul 31	Same as Appl. 1614
28852			06/6/86	Domestic Irrigation Power	Bear River		6,000	Rollins Res.		Nov 1 - Jun 30	On 11/31/90 District requested a time extension until 1/1/91 to complete Environmental Documentation

(A) Included in first phase of permits to be licensed. These are permits upstream of Lake Spaulding without downstream storage and they are currently in States final review stage prior to licensing (11/28/90).

(B) Included in second phase of permits to be licensed. Work began in August 1989, and permits are in the first stages of review (11-28-90).

NEVADA IRRIGATION DISTRICT
WATER RIGHT SUMMARY
JANUARY 1991

Application Number	Permit Number	License Number	Date Filed	Purpose	Source	Amount CFS	Amount Ac. Ft.	Place of Storage or Diversion	SEASON Direct Diversion	SEASON Storage	Remarks
	Statement	# S4716	02/2/69	Domestic Irrigation Power	Canyon Creek			Sawmill Reservoir			Pre 1914 Water Rights
	Statement	# S4717	02/2/69	Domestic Irrigation Power	Canyon Creek			French Reservoir			Pre 1914 Water Rights
	Statement	# S10591	11/13/81	Domestic	Damfine Spring			Jackson Meadows Campgrounds South Side			Riparian Water Right
	Statement	# S10592	11/13/81	Domestic	Unnamed Stream Tributary to Pass Creek			Jackson Meadows Campgrounds North Side			Riparian Water Right
	Statement	# S10794	06/6/82	Domestic Irrigation Stock Wtr	Orr Creek Coon Creek			Gold Hill Canal Camp Far West Canal			Pre 1914 Water Rights
	Statement	# 12949	03/2/87	Irrigation Stock Wtr	Deer Creek			Keystone Canal			Pre 1914 Water Rights

NEVADA IRRIGATION DISTRICT
WATER RIGHT SUMMARY
JANUARY 1991

Application Number	Permit Number	License Number	Date Filed	Purpose	Source	Amount CFS	Amount Ac. Ft.	Place of Storage or Diversion	SEASON Direct Diversion	SEASON Storage	Remarks
	Statement	# 12950	3/2/87	Domestic Irrigation Stock Wtr Fire Prtec Recreation	Deer Creek			Tunnel Canal			Pre 1914 Water Rights
	Statement	# 12951	3/2/87	Domestic Irrigation Stock Wtr Fire Prtec Recreation	Deer Creek			Newtown Canal			Pre 1914 Water Rights
	Statement	# 12952	3/2/87	Domestic Irrigation Stock Wtr Fire Prtec Recreation Municipal Industrial	Deer Creek			D S Canal			Pre 1914 Water Rights
	Statement	# 12953	3/2/87	Industrial Domestic Irrigation Stock Water Fire Protect Recreation	Deer Creek			Cascade Canal			Pre 1914 Water Rights

NEVADA IRRIGATION DISTRICT
WATER RIGHT SUMMARY
JANUARY 1991

Application Number	Permit Number	License Number	Date Filed	Purpose	Source	Amount CFS	Amount Ac. Ft.	Place of Storage or Diversion	SEASON Direct Diversion	SEASON Storage	Remarks
	Statement	# 13330	11/14/89	Mining Domestic Irrigation Power Recreation Stock Wtr Fire Prtect	Middle Yuba			Milton			Pre 1914 Water Rights

NUMEROUS STATEMENTS WILL BE FILED UPON COMPLETION OF ON GOING DOCUMENTATION OF DISTRICTS PRE 1914 WATER RIGHTS

APPENDIX C

WATER SERVICE SIZES

NEVADA IRRIGATION DISTRICT
RAW WATER SERVICE SIZES*

Miners Inches	Irrigation	Winter	Annual
0.5	1074	311	981
1.0	848	25	255
1.5	171	3	21
2.0	320	6	49
2.5	55	0	0
3.0	147	1	0
3.5	12	0	0
4.0	94	0	0
4.5	6	0	0
5.0	62	1	1
5.5	2	0	
6.0	60	1	
6.5	1	0	
7.0	19	0	
7.5	1	0	
8.0	25	0	
9.0	9	0	
10.0	47	1	
11.0	4		
12.0	21		
13.0	5		
14.0	8		
15.0	19		
16.0	4		
17.0	1		
18.0	3		
20.0	36		
21.0	2		
22.0	3		

Miners Inches	Irrigation	Winter	Annual
23.0	2		
24.0	2		
25.0	6		
26.0	1		
27.0	2		
28.0	1		
29.0	1		
30.0	9		
33.0	1		
35.0	2		
40.0	6		
43.0	3		
44.0	1		
45.0	5		
49.0	1		
50.0	8		
55.0	1		
60.0	3		
65.0	1		
75.0	1		
81.0	1		
84.0	1		
85.0	2		
90.0	1		
100.0	3		
120.0	2		
125.0	1		
150.0	1		
TOTALS=	3,128	349	1,307

*Includes in and out of District customers as of June 20, 1991.

APPENDIX D

FARM DELIVERY REQUIREMENTS

Table C-1
ESTIMATED MONTHLY FARM DELIVERY REQUIREMENTS
DEER CREEK SERVICE AREA
(acre-inches/acre)

	Avg Precip	Irrigated Pasture			Orchards			Field Crops			Misc Crops		
		Est ET	Crop Rqmnt[a]	Fm Del Rqmnt[b]	Est ET	Crop Rqmnt[a]	Fm Del Rqmnt[b]	Est ET	Crop Rqmnt[c]	Fm Del Rqmnt[c]	Est ET	Crop Rqmnt[a]	Fm Del Rqmnt[b]
Mar	8.4	3.0	0	--	1.8	--	--	--	--	--	--	--	--
Apr	4.7	4.4	0.9	1.5	3.1	--	--	--	--	--	3.1	--	--
May	2.5	5.8	3.9	6.5	4.9	3.0	5.0	--	--	--	4.9	3.0	5.0
June	0.6	7.3	6.9	11.5	6.5	6.1	10.2	4.5	2.1	3.5	6.5	6.1	10.2
July	0.1	7.9	7.8	13.0	7.6	7.5	12.5	9.5	9.4	15.7	7.6	7.5	12.5
Aug	0.1	6.7	6.6	11.0	6.4	6.4	10.7	7.2	7.1	11.8	6.4	6.4	10.7
Sept	0.5	5.2	4.8	8.0	4.8	4.4	7.3	3.4	3.0	5.0	4.8	4.4	7.3
Oct	2.8	3.4	1.3	2.2	2.8	0.7	1.2	--	--	--	2.8	0.7	1.2
Total		43.7	32.2	53.7	37.9	28.1	46.9	24.6	21.6	36.0	36.1	28.1	46.9

[a] Assumes 1 inch available from winter soil moisture for first crop-month and 75 percent of subsequent rainfall is effective, except for rice where 100 percent of rainfall is considered effective.

[b] Assumes on-farm irrigation efficiency of 60 percent.

[c] Assumes no available soil moisture at planting.

Table C-2
ESTIMATED MONTHLY FARM DELIVERY REQUIREMENTS
BEAR RIVER AND SOUTHWEST PLACER COUNTY SERVICE AREAS
(acre-inches/acre)

		Irrigated Pasture			Orchards			Field Crops			Rice			Misc Crops		
	Avg Precip	Est ET	Crop Rqmnt[a]	Fm Del Rqmnt[b]	Est ET	Crop Rqmnt[a]	Fm Del Rqmnt[b]	Est ET	Crop Rqmnt[c]	Fm Del Rqmnt[b]	Est ET	Crop Rqmnt[a]	Fm Del Rqmnt[d]	Est ET	Crop Rqmnt	Fm Del Rqmnt
Mar	5.0	3.0	0	0	1.8	0	0	--	--	--	--	--	--	--	--	--
Apr	3.3	4.4	0.9	1.2	3.1	0	0	--	--	--	2.2	6.0[e]	12.0	3.1	0	0
May	1.3	5.8	4.8	6.4	4.9	3.9	5.2	--	--	--	6.8	5.5	11.0	4.9	3.9	5.2
June	0.4	7.3	7.0	9.3	6.5	6.2	8.3	4.5	4.2	5.6	9.2	8.8	17.6	6.5	6.2	8.3
July	0.0	7.9	7.9	10.5	7.6	7.6	10.1	9.5	9.5	12.7	9.1	9.1	18.2	7.6	7.6	10.1
Aug	0.1	6.7	6.6	8.8	6.4	6.3	8.4	7.2	7.1	9.5	7.8	7.7	15.4	6.4	6.3	8.4
Sept	0.3	5.2	4.9	6.5	4.8	4.5	6.1	3.4	3.2	4.2	5.6	5.3	10.6	4.8	4.6	6.1
Oct	2.1	3.4	1.8	2.4	2.8	1.2	1.6	--	--	--	1.3	0	0	2.8	1.2	1.6
Total		43.7	33.9	45.1	37.9	29.7	39.7	24.6	24.0	32.0	42.0	42.4	84.8	36.1	29.8	39.7

[a] Assumes 1 inch available from winter soil moisture for first crop-month and 75 percent of rainfall is effective in each current month except for rice where 100 percent is assumed effective.

[b] Assumes on-farm irrigation efficiency of 75 percent.

[c] Assumes no available soil moisture at planting.

[d] Assumes on-farm irrigation efficiency of 50 percent.

[e] Includes 6-inch requirement for initial flooding of field.

APPENDIX E

SAMPLE ECONOMICS, REDUCING CANAL WATER LOSS

SAMPLE ECONOMICS
NEVADA IRRIGATION DISTRICT
CANAL ENCASEMENT TO REDUCE WATER LOSS

Canal Capacity	Canal Length	Water Loss %	Water Loss GPM	Encasement[1] Cost	AF/yr[2] Saved	Value of Water Saved[5] Resale[3]	Value of Water Saved[5] Replacement[4]
10 cfs	500 ft	.25	11.2	$ 60,000	9	$ 12,150	$ 45,000
10	500	0.5	22.5	60,000	18	24,300	90,000
10	500	1.0	45.0	60,000	36	48,000	180,000
10	1,000	0.5	22.5	120,000	18	24,300	90,000
10	1,000	1.0	45.0	120,000	36	48,000	180,000
10	1,000	2.0	90.0	120,000	72	96,000	360,000
10	2,500	1.0	45.0	300,000	36	48,000	180,000
10	2,500	2.0	90.0	300,000	72	96,000	360,000
10	2,500	6.0	270.0	300,000	216	288,000	1,080,000
50	500	0.1	22.5	100,000	18	24,300	90,000
50	500	0.2	45.0	100,000	36	48,600	180,000
50	500	0.4	90.0	100,000	72	97,200	360,000
50	1,000	0.2	45.0	200,000	36	48,600	180,000
50	1,000	0.4	90.0	200,000	72	97,200	360,000
50	1,000	0.8	180.0	200,000	144	194,400	720,000
50	2,500	0.4	90.0	500,000	72	197,200	360,000
50	2,500	0.6	135.0	500,000	108	145,800	540,000
50	2,500	2.0	450.0	500,000	360	486,000	1,800,000

1) Based on 30" diameter pipe for 10 cfs and 54" diameter pipe for 50 cfs available head = 2.6 ft/mile.
2) Irrigation season only.
3) If water resold in 1 MI increments value of acre-foot equals $27.00.
4) Cost of new water sources estimated at $100 per acre-feet.
5) Over a 50 year period, the estimated pipe life.

NOTE: Maintenance cost savings for pipeline replacing an open canal have not been considered in above comparison.

Prepared 6/19/91

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SAMPLE ECONOMICS
NEVADA IRRIGATION DISTRICT
CANAL GUNITING TO REDUCE WATER LOSS

Canal Capacity	Canal Length	Water Loss %	Water Loss GPM	Lining[1] Cost	Af/yr[2] Saved	Value of Water Saved[5] Resale[3]	Value of Water Saved[5] Replacement[4]
10 cfs	500 ft	.25	11.2	$15,800	9	$ 3,650	$ 13,500
10	500	.50	22.5	15,800	18	7,290	27,000
10	500	1.0	45.0	15,800	36	14,580	54,000
10	1,000	.5	22.5	31,600	18	7,290	27,000
10	1,000	1.0	45.0	31,600	36	14,580	54,000
10	1,000	2.0	90.0	31,600	72	29,180	108,000
10	2,500	1.0	45.0	79,000	36	14,580	54,000
10	2,500	2.0	90.0	79,000	72	29,180	108,000
10	2,500	6.0	270.0	79,000	216	87,540	324,000
50	500	.05	11.2	25,800	9	3,650	13,500
50	500	0.10	22.5	25,800	18	7,290	27,000
50	500	0.40	90.0	25,800	72	29,160	108,000
50	1,000	0.1	22.5	51,600	18	7,290	27,000
50	1,000	0.2	45.0	51,600	36	14,580	54,000
50	1,000	0.8	180.0	51,600	144	58,320	216,000
50	2,500	0.4	90.0	129,000	72	29,160	108,000
50	2,500	0.5	112.5	129,000	90	36,450	135,000
50	2,500	2.0	450.0	129,000	360	145,800	540,000

1) Based on $3/sf and typical canal cross section for capacity indicated.
2) Irrigation season only.
3) If water resold in 1 MI increments value of acre-foot equals $27.00.
4) Cost of new water sources estimated at $100 per acre-foot.
5) Over a 15 year period, the estimated lining life.

Prepared 6/19/91

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APPENDIX F

OPTION PAPERS

NEVADA IRRIGATION DISTRICT
AGRICULTURAL WATER MANAGEMENT PLAN
CANAL DELIVERY OPTIONS

INTRODUCTION

The District currently uses the continuous flow method of delivering purchased raw water. The purchaser buys a flow rate, expressed in miner's inches, and the District delivers this flow for a certain time period. The irrigation season is normally between April 15 and October 14 of each year.

This method of operation requires less canal capacity than the other methods since there is no peak flow requirement during the high crop use summer months. Inherent in this method of water delivery is an excess of water early and late in the season and a crop water deficiency during mid-season. In many cases, this deficiency is made up by using on-farm storage. CH_2M Hill Engineers, in studying the current District water delivery method, concluded that the total annual water demand for this operation method is not expected to be significantly different from that with the other options.

SUPPLY ON DEMAND

Under this option the water is diverted into the canal system and delivered in a manner as desired by the user. The user calls for the water in accordance with the crop water demand. This technique would result in a low delivery early and late in the irrigation season and a relatively high delivery during the peak crop use period. To accommodate these deliveries, the canals would need to have the capacity to transport the peak amounts, which would be significantly As discussed in the Water Rate Options Paper, it would be feasible on certain canal systems to deliver water on a modified supply on demand concept to larger water users. A customer's peak flow may need to be limited, but water could be sold by the acre foot in these cases.

ROTATION

The rotation operation is merely a variation of supply on demand. Under the rotation operation, a water user on a canal system will receive a water supply for a predetermined number of days and then will not receive it again until the customers next turn. The principal advantage over continuous flow, in addition to having more water during peak periods, is having a larger head of water which is more efficient to use. A potential disadvantage compared to supply on demand is the possibility of not having the water during critical short-term peak crop use periods. Under current District policy, a

few of the users on some canals are currently rotating their deliveries with neighboring users.

CONTINUOUS

This current method of operation could be maintained. As discussed in the Water Rate Options Paper, some modifications to this technique could be made without causing any significant problems. The continuous delivery method could be used with different length irrigation seasons for various crops as discussed under the water rate options entitled, Water Allocation and Irrigation Season Variations.

NEVADA IRRIGATION DISTRICT
AGRICULTURAL WATER MANAGEMENT PLAN
WATER RATE OPTIONS

INTRODUCTION

In March of 1981 a water rate study was completed for the District by CH_2M Hill Engineering. Based on the assumptions and criteria used in this study, it was concluded that raw water rates were set significantly less than the cost of service to this class of customer. Irrigation waters in larger quantities were being sold at about fifty percent of cost in 1981. Although changes in rate structures have taken place in recent years, the District currently sells irrigation water for as low as about $10 per acre-foot. In 1985 the District, through use of a computer program, started to track operation and maintenance cost on each of its raw and treated water facilities. Based on the six years of accumulated cost information obtained to date, a similar conclusion can be reached as to the lower than cost of service rates being charged for irrigation water.

As pointed out in the CH_2M Hill study, it is common practice to grant irrigation water customers a water rate to maintain agriculture in the area. If high water rates price commercial farmers out of business, the impact on water rates to remaining customers could be more severe than if select rates are granted the farmers.

Selling raw water, however, at low rates does not provide any incentives to conserve water. Utilizing current water rates, it is estimated that a farmer irrigating by gravity twenty acres of pasture, who increases on farm irrigation efficiency by ten percent, would have a water cost savings over a ten year period of about $40 per acre. This amount of savings would probably not interest the farmer in making any significant operational changes related to conserving water.

Recent studies have indicated that only a limited amount of additional irrigation water is available in the District for sale without obtaining new water supply sources. A water supply reconnaissance study, completed in 1985, concluded that development of new reservoir sites or enlargement of existing reservoirs would require at least a $100 per acre-foot water sale price to break even. Providing pricing incentives to reduce current water use would allow additional customers to purchase raw water at more reasonable rates.

CUSTOMER CLASSES

Prior to discussing water rate options, it would be beneficial to classify the different classes of raw water customers being served by the District. The classes below take into consideration grouping customers by reliability and economic factors.

SUBURBAN HOME

This type of customer utilizes water for purposes incidental to residential properties such as for landscaping, lawns, fountains, small ponds and family gardens.

COMMERCIAL-INDUSTRIAL

Uses under this classification would include nursery stock, processing water, and landscaping.

RECREATION

This classification covers parks, golf courses, and subdivision reservoirs.

PUBLIC

Uses include irrigation of roadside landscaping and deliveries for fish and wildlife enhancement.

SMALL FARM

This type of customer would include small farming operations where the income derived does not provide a substantial portion of family income.

AGRICULTURAL

Includes commercial farms where a substantial portion of family income is derived from crops grown on irrigated land.

TYPE I

This type of customer utilizes water for irrigating perennial crops such as orchards and grapes.

TYPE II

Customers utilizing water for irrigating annual crops such as pasture, corn, rice, hay, oats and silage would be in this grouping of agricultural water use.

WATER RATE OPTIONS

Various options relating to the District's raw water rate structure are discussed below. Portions of these options could be combined. Some of the options will require significantly more staff time to administer as compared to the current rate structure.

CURRENT RATE STRUCTURE

The current rate structure could be maintained. As discussed earlier, however, little incentive to conserve water would be present.

SELECT RATES BY CUSTOMER CLASSES

As discussed earlier in this option paper, all raw water rates are set at less than cost of service. The reason for establishing select rates is to not price out of business commercial farmers since a reduction of water sales to this group could adversely effect overall water rates. Should these select rates, however, be uniformly provided regardless of the ability of various customer types to pay higher water rates?

As an example, suburban, commercial and small farm customers may not require select rates. Agricultural customers may require some varying rates based on the type of crop. Perennial crops (Type I customers) generally have a higher water payment capacity than annual crops. (Type II) In the past during periods of water shortages, perennial crop growers have also been given higher priority in water deliveries.

SELECT RATES BY SIZE OF SERVICE

Rather than using customer classes in establishing rates, it would require less administration time to utilize size of service as a basis for determining these rates. A certain size service could be established as indicating the existence of a commercial farming operation and a select rate allowed. Smaller size services would not receive a select rate.

WATER ALLOCATION

This option would allocate so much water for each acre of irrigation based on the type of crop and possibly the area within the District. Any additional requested water would carry a much higher price.

Reasonable amounts of water needed at the farm headgate for various types of crops were presented in the District's Raw Water Master Plan prepared in 1983 by CH_2M Hill Engineers:

	Irrigated pasture	Orchard	Field Crops
Placer County	3.8 AF	3.3 AF	2.7 AF
Nevada County	4.5 AF	3.9 AF	3.0 AF

Variations in the length of the irrigation season for various crops could be utilized to deliver the different amounts of water indicated.

IRRIGATION SEASON VARIATIONS

Different crops require varying irrigation periods. The District could allow the farmer more flexibility in selecting the length of time for irrigation by breaking the current irrigation season into separate periods. Water rates could be established for each period. As an example:

Early Irrigation - April 15 to April 30

Basic Irrigation - May 1 to September 14

Late Irrigation - September 15 to October 14

The tailoring of the delivery of water to individual farmer needs could reduce the operational spill prevalent in the District's water system, especially in the latter part of the irrigation season.

COST OF SERVICE

Each group of customers, under this option, would pay a water rate which was based on the District's cost to serve those customers.

OTHER CONSIDERATIONS

Other areas of the District's current raw water rate structure that should be reviewed include the following:

INCREMENTS OF SALE

Currently 1/2 M.I. increments are only provided to a maximum of 5 M.I. In some of the larger purchases a farmer may be buying more water than needed due to a lack of smaller increments.

1/4 M.I. PURCHASES

This size service was first initiated in 1977 during a drought and was eliminated the beginning of 1990. The capacity of this service, at less than 3 gpm, caused some operational problems. Many annual customers, however, with proper storage do not require a larger size service.

VOLUME PURCHASES

It may be practical for many of the District's larger customers to be sold water on a volume basis as opposed to the normal flow concept. Recorders could be placed on existing parshall flumes to determine the acre-feet delivered. A significant reduction in water deliveries could be made to many District customers in this category.

NEVADA IRRIGATION DISTRICT
AGRICULTURAL WATER MANAGEMENT PLAN
ON FARM IRRIGATION EFFICIENCIES

INTRODUCTION

Prior to discussing the availability of various programs relating to on farm irrigation efficiencies it would be beneficial to outline some basic related concepts.

Evapotranspiration (ET) is crop water requirement and is calculated by combining the direct evaporation of water from the soil surface around the plant and transpiration which is the loss of water vapor from plant leaves.

The on farm irrigation water delivery requirement can be determined by subtracting from the crop ET the effective rainfall and adding irrigation system losses. These losses are caused by non-crop evapotranspiration, evaporation from water surfaces, surface flow runoff and percolation below the crop root zone.

It is estimated that on farm irrigation efficiencies average about fifty-eight percent in the District. This percentage represents the ratio of the irrigation water beneficially utilized to meet the crop ET requirement over the on farm irrigation water delivery. An increase in average efficiencies to sixty-eight percent would save approximately 17,600 acre-feet of water per year within the District.

Several programs are available to District customers which are intended to help increase on farm irrigation efficiencies. These programs are discussed further below.

IRRIGATION SYSTEM EVALUATION

This computer program, developed jointly by the California Polytechnic State University and the California Department of Water Resources, allows a farmer to determine how well the grower's irrigation system is operating and makes recommendations for improvements.

A large amount of data needs to be imputed into this program. The Soil Conservation Service has an instructional video and a field kit to assist the farmer in gathering the necessary information. District staff has recently assisted in some field surveys. The

Soil Conservation Service has expressed interest in jointly financing with the District a mobile lab to provide for the gathering of more accurate data.

The computer program has only been on line at the District since April 1991. The effectiveness of the program cannot be determined until additional farm irrigation systems are analyzed and feedback is received on the program's effectiveness. A sample computer output covering a permanent under-tree sprinkler system survey is attached.

The District's assistance to farmers in utilizing this program should continue, however, possibly at a non-accelerated rate until a determination can be made of the value of this effort. Operations Department personnel have indicated that with current staffing about one field survey per week could be performed to assist farmers in utilizing this program.

AGRICULTURAL WATER SCHEDULING

This program was also developed by the same entities as the Irrigation System Evaluation Program and has been designed to assist in preseason projections of irrigation cycles. Reference evaporation (ET) rates developed for irrigated pasture in different areas of California are utilized in this program to determine specific crop ETs. The program is not intended to provide "real time" irrigation scheduling. District staff has included localized information in the program to provide better results. The District has been broken down into 14 sub-areas with 8 typical soil types and 13 common crops being incorporated. See example output for a grape vineyard utilizing a micro/drip irrigation system in the attached material.

This program was recently placed on line by the District. Staff will gain experience with the software during the summer of 1991 by selecting three operations, one each utilizing drip, under-tree and permanent set sprinklers, to provide water scheduling data.

There is some concern over the usefulness of this program due to the wide variations in elevations and weather conditions within the District and therefore its use should stay limited until the accuracy of the results can be determined.

SOIL MOISTURE MONITORING PROGRAM

The Soil Conservation Service has established a program to determine the moisture content in the root zone of various plants by utilizing gypsum blocks. These blocks, each containing two electrodes, are buried at several locations and depths in a farmer's field. Once implanted in the root zone, a block absorbs and loses moisture at a rate close to that of the surrounding soil. A pocket size impedance

meter plugs into wires running from the electrodes to the surface and measures the electrical current passing through the completed circuit. More current passes through a wet than a dry block. Farmers use this site - specific information to find out where they are irrigating unevenly or too frequently.

It may be possible to utilize this technique with other programs such as the Agricultural Water Scheduling to provide a more "real time" scheduling concept. District staff plans to experiment with this idea during the summer of 1991.

CIMIS

The California Irrigation Management Information System (CIMIS) was developed by the Department of Water Resources. This "real time" program uses computer technology to provide information on current weather and crop water needs to the irrigation water user. Farmers utilizing this program can develop water budgets to determine when to irrigate and how much water to apply. It is a bookkeeping procedure for continually determining the amount of water in the soil that is available to a crop and when irrigations should occur so the amount of water in the soil never gets low enough to be harmful to the crop or turf.

The backbone of CIMIS is a network of 50 automated weather stations located throughout California linked to a central computer. These weather stations measure wind speed and direction, solar radiation, net radiation, temperature, precipitation, and relative humidity. Utilizing information from each weather station, the computer estimates the evapotranspiration rate of irrigated pasture. The District has a computer terminal with access to this data. An example on an output from this program is attached.

District staff feels that for this program to become effective at least two weather stations would need to be established in the District's service area. The Department of Water Resources has estimated a District cost of $3,500 to establish a station.

It is suggested that this program not be emphasized at this time until the effectiveness of some of the other programs discussed above can be determined. Individual farmers desiring access to CIMIS data can be accommodated through the District's terminal, however, finding an existing weather station which would be representative of the District's service area may be difficult.

LANDSCAPE WATER MANAGEMENT

A program has been developed to provide water audit and irrigation system scheduling information for a more urban environment. Homeowners and owners of small pasture operations, golf courses, cemeteries, and commercial establishments can utilize this software

package. More District water customers could benefit from this program than from the others previously discussed.

District staff, through classroom education and on-site training, should become more proficient in the use of this software presently available and that which will be available in the future.

EXAMPLE OUTPUT

IRRIGATION SYSTEM EVALUATION

Job No: S101
Evaluator: SWS
Date: 03/18/85

P E R M A N E N T U N D E R T R E E
S P R I N K L E R S Y S T E M S U R V E Y

FARM DESCRIPTION

Name: EXAMPLE FARMER
Address: BLYTHE CA
Age of trees (years): 10

SPRINKLER DESCRIPTION

Type of sprinkler used (choose letter from below): A
A - Impact
B - Gear-driven
C - Spinner
D - Other (e.g.,Dan)

Type of nozzle used: B
A - Regular
B - Low trajectory

Height of sprinkler base above ground surface (inches): 12
What percentage of the sprinkler pattern is affected by tree branch or leaf interference? : 30

SYSTEM DESCRIPTION

Tree and sprinkler spacing differences between areas.
(If only one spacing is used, assign zeros to columns 2 and 3)

		1	2	3
Distance between trees in a row (feet)	:	20	20	15
Distance between rows (feet)	:	20	18	20
Number of trees per sprinkler	:	4	4	4
Acres of this block	:	60	40	20
GPM/sprinkler	:	1	1.2	1.4
Set duration, minutes	:	1440	1440	1440

SYSTEM FILTRATION

Water source (0 = well, 1 = surface, or 2 = both): 0

Type of filtration used prior to the mainline entrance -
None (Y or N): N
Perforated stainless steel screen (Y or N): Y
Media filters (Y or N): N
Sand separators (Y or N): N
Other type of screen filter (e.g., overflow, fine mesh) (Y or N): N

Job No: S101
Evaluator: SWS
Date: 03/18/85

PERMANENT UNDERTREE SPRINKLER SYSTEM SURVEY

SYSTEM OBSERVATIONS

What percentage of the applied water runs off the field? (%): 20
What percentage of the sprinklers have uneven
or hampered rotation speeds? (%): 10
Are there obvious sprinkler "donut" patterns? (Y or N): Y
What percentage of the ground surface receives water? (%): 80

What is the cause of sprinkler nozzle plugging?
(choose a letter from below): A

A - Sand or gravel only
B - Aquatic growth (algae, fish)
C - Mixture of sand and aquatic growth
D - Insects
E - Plastic parts
F - None (no plugging observed)

Uneven drainage check.
Time sprinklers run after system shuts off (min): 20
Percentage of sprinklers that do this (%): 10
Set duration (hours/block): 24

SYSTEM SCHEDULING

Soil type (choose one from below): SIL

SA - Sand
SL - Sandy loam
SIL - Silty loam
LS - Loamy sand
L - Loam
CL - Clay loam
C - Clay

Root zone depth (feet): 4
Frequency of irrigation during middle of summer (days): 6
ET rate during middle of summer (inches/day): .2

VALVE LOCATIONS FOR PRESSURE CONTROL

How many automatic pressure control valves are there near the
filter and pump (0 = none)?: 2
Is there a throttled manual valve at the pump? (Y or N): Y
Are submain pressures regulated individually? (Y or N): N
Are lateral inlet pressures regulated individually? (Y or N): Y

Do individual sprinklers have flow control nozzles? (Y or N): N
Do individual sprinklers have flow control bases? (Y or N): N
Do individual sprinklers have pressure regulators? (Y or N): Y
Is there a flow meter? (Y or N): Y

PUMP STATION MEASUREMENTS

Pump discharge pressure (psi): 57
PSI into mainline downstream of filters,
control valves, etc (psi): 40

Optional pressure values if difference looks excessive.
Total filter loss (psi): 3
Total pump control valve loss (psi): 7
Loss from throttled manual valves (psi): 5

Job No: S101
Evaluator: SWS
Date: 03/18/85

PERMANENT UNDERTREE SPRINKLER SYSTEM SURVEY

LOSSES ACROSS FIELD VALVES (downstream of pumping plant)

Determine if water must pass through a series of pressure regulation valves enroute from the pump station to the LOW pressure point, and if there is an excessive pressure loss through those valves. Automatic valves at the pumping station itself are not included.

Number of regulation valves in series, including sprinkler pressure regulator, if used (#): 1

Pressure loss across each valve
Valve #1 (psi): 5
Valve #2 (psi):
Valve #3 (psi):

FIELD FLOW MEASUREMENTS

- To be done in one set only. All sampled sprinklers must have the same nozzle size. Two sprinklers per location are sampled.

		Sprinkler 1	Sprinkler 2
Location No.1 - Downstream end of most distant lateral in set			
Milliliters caught	:	6000	6500
Seconds (min. of 120)	:	120	120
Pressure (psi)	:	35	35
Visible plugging? (Y or N)	:	N	N
Sand wear? (Y or N)	:	Y	N
Location No.2 - Upstream end of first lateral			
Milliliters caught	:	7000	6900
Seconds (min of 120 sec)	:	120	120
Pressure (psi)	:	40	39
Visible plugging? (Y or N)	:	N	N
Sand wear? (Y or N)	:	N	N
Location No.3 - Middle of set			
Milliliters caught	:	6600	6550
Seconds (min of 120 sec)	:	120	120
Pressure (psi)	:	38	37
Visible plugging? (Y or N)	:	N	Y
Sand wear? (Y or N)	:	Y	N

Job No: 5101
Evaluator: SWS
Date: 03/18/85

PERMANENT UNDERTREE SPRINKLER SYSTEM SURVEY

FIELD PRESSURE MEASUREMENTS

**Enter a zero as data if the location does not apply to the system
Do not obstruct sprinkler flow rate while using pitot tube.

Submain No. 1 - Submain (manifold) closest to the pump

Closest lateral to the submain inlet
First sprinkler pressure (psi): 40
Downstream end sprinkler P uphill (psi): 37
Downstream end sprinkler P downhill (psi): 41

Most distant lateral from the submain inlet
First sprinkler pressure (psi): 42
Downstream end sprinkler P uphill (psi): 39
Downstream end sprinkler P downhill (psi): 40

Submain No. 2 - Most distant from the pump. or where the pressure is lowest.

Closest lateral to the submain inlet
First sprinkler pressure (psi): 40
D/S end sprinkler P uphill (psi): 41
D/S end sprinkler P downhill (psi): 40

Most distant lateral to the submain inlet
First sprinkler pressure (psi): 37
D/S end sprinkler P uphill (psi): 36
D/S end sprinkler P downhill (psi): 39

Submain No. 3 - Intermediate location manifold or submain

Closest lateral to the submain inlet
First sprinkler pressure (psi): 39
D/S end sprinkler P uphill (psi): 37
D/S end sprinkler P downhill (psi): 38

Most distant lateral to the submain inlet
First sprinkler pressure (psi): 37
D/S end sprinkler P uphill (psi): 33
D/S end sprinkler P downhill (psi): 36

Job No: S101
Evaluator: SWS
Date: 03/18/85

P E R M A N E N T U N D E R T R E E
S P R I N K L E R S Y S T E M S U R V E Y

RESULTS FROM A SINGLE EVENT

FARM DESCRIPTION

Name: EXAMPLE FARMER
Location: BLYTHE CA

DISTRIBUTION UNIFORMITY (LQ)
(MINIMUM INFILTRATED/AVERAGE INFILTRATED) X 100.....: 75

DISTRIBUTION UNIFORMITY PROBLEMS

PERCENT OF TOTAL NON-UNIFORMITY DUE TO EACH PROBLEM

-VARIABLE SPRINKLER AND TREE SPACING.....: 76

-SPRINKLER FLOW RATE VARIATION
(DUE TO SAND WEAR AND/OR
REGULATOR VARIATION).....: 19

-UNEVEN DRAINAGE AFTER SHUTOFF.....: 5

ESTIMATE OF RUNOFF (PERCENT OF APPLIED WATER).....: 20
ESTIMATE OF EXCESSIVE PRESSURE (PSI).....: 9

PROBLEMS NOTED:

-BRANCH INTERFERENCE - EXAMINE LOWER BRANCH PRUNING
-DUPLICATE PRESSURE REGULATION VALVES
-EXCESS PRESSURE LOSS ACROSS FILTER
-EXCESS PRESSURE LOSS ACROSS PUMP CONTROL VALVE
-EXCESS PRESSURE LOSS ACROSS MANUAL VALVE AT PUMP DISCHARGE
-SAND PROBLEMS, AND NO SAND SEPARATOR USED

RECOMMENDATIONS

JOB NO: S101
EVALUATOR: SWS
DATE: 03/18/85

BRANCH INTERFERENCE - PRUNING

Some of the branches and leaves are interfering with the sprinkler pattern. You may be able to modify your pruning practices on the lower branches and eliminate this problem.

DUPLICATE PRESSURE REGULATION VALVES

It appears that you have duplicate pressure regulation, meaning that you have too many regulators in the field. In this case, the best solution may be to use the regulators closest to the sprinklers, and disconnect those closer to the pump.

Duplicate pressure regulation usually costs extra money in two ways:

1. Extra pressure requirement at the pump to push the water through the extra regulators.
2. Extra hardware.

HIGH PRESSURE LOSS ACROSS FILTER

The loss across your filter seemed high. You may want to check the design capacity. Many filter types also have high pressure losses if they are not cleaned or flushed properly.

HIGH PRESSURE LOSS ACROSS CONTROL VALVE

The loss across your pump control valve seemed high. This may be due to the size of the valve (possibly small, which is less expensive initially but costs extra each year because of the high power requirement). It may also be due to the pressure setting. If your pump consistently delivers too much pressure, the pump should be modified to save energy costs.

RECOMMENDATIONS

JOB NO: S101
EVALUATOR: SWS
DATE: 03/18/85

REDUCING PRESSURE WITH A MANUAL VALVE

Throttling pressure near the pump usually wastes energy and dollars. If system pressures are always too high, the pump impellers should be trimmed or changed to deliver a lower pressure. The same motor or engine can be used, but the horsepower required will drop.

SAND

Sand (centrifugal) separators are widely used to remove sand (not silt, clay, or algae) from irrigation water. They can be installed down in a well to protect both the well pump and sprinklers, or above ground to protect just the sprinklers. In order to operate properly, they usually require a constant pressure differential of 5 to 10 psi. If they are sized too large (with a low pressure drop) there is not enough centrifugal action to remove the sand.

INFREQUENT IRRIGATION

Based upon a rough estimate of the root zone depth, soil water holding capacity, and sprinkler catch can uniformity, it seems possible that your irrigations may be too infrequent. Some spots may be receiving more water than the soil can hold. The solution to operate the system more like a drip system (irrigate each spot at least every week, but for less hours per irrigation) than like a hand move aluminum system (which irrigates a point only once every 10 - 15 days, and for a heavy irrigation each time). The total hours of operation per month would remain the same.

EXAMPLE OUTPUT

AGRICULTURAL WATER SCHEDULING

```
AGWATER                                  version 1.1                                    [illegible]

AGWATER provides a means to increase fertilizer, water irrigation
scheduling and crop returns. It can be used as a [illegible] decision
tool to identify viable practices for [illegible] and water
efficiency. AGWATER is not designed to provide recommendations
scheduling, but is designed for assistance as a [illegible] of
of irrigations.

All recommendations and calculations are estimates only and should be
field checked by a qualified irrigation specialist before use on crops.
Cal Poly and DWR make no warranty, stated or implied, in the
performance of AGWATER recommendations or calculations, including without
limitation the warranties of merchantability and fitness for a particular
purpose.

Please enter a name or other identifier. Your name or identification
will appear on your printed results.

Name: _____
```

```
AGWATER Region selection                                          [illegible]

Region: [illegible]          Use: [illegible]          Crop: GRASS [illegible]

   BIT RIVERSIDE
   CEDAR RIDGE
   CEMENT HILL
   CHILCOO AREA
   [illegible] AREA
   [illegible] BAR
   LAKE OF PINES
   LAKE WILLOWCREEK
   LITTLEDOG AREA
   M.I. AREA
   NORTH AUBURN
   PENN VALLEY
   SACRAMENTO
   THERMOLAKES
```

[illegible] the region has been [illegible] the user name [illegible].

```
AGWATER Soils selection                                   Soils Menu, AGW 2.0

Primary soil Clay Loam            Secondary soil -NONE-

   Clay
   Clay Loam
   Coarse Sand
   Fine Sand
   Loam
   Loamy Sand
   Sandy Loam
   Silt Loam
   -NONE-
```

Press the tab key to indicate your selection. Press the end key to continue.

```
Is there a "hard pan" that restricts root development
   or creates high water tables?                          Yes  No
      How deep is the start of the restrictive layer.        2.00 ft
       How thick is the restrictive layer (if known).        0.50 ft

Have you observed any water permeability problems on
   your irrigated soil(s)?                                Yes  No
            Are permeability problems  constant  or  change with time?

Have you observed any salinity problems?                  Yes  No

Do you know your irrigated water quality?                 Yes  No

Do you have a high water table?                           Yes  No
```

Answer all questions on the screen. Press the end key to continue.

```
AGWATER Crop Selection
```

```
   Almonds
   Apples
   Peaches
   Citrus
   Grapes
   Corn
   Cherries
   Kiwi
   Pasture Grass
   Pears
   Plums
   Pistachios
   Walnuts
```

Press the tab key to indicate your selection. Press the end key to continue.

WSWMTSR Crop selection	Crop Data, Row 7.12
Viewing: Grapes	
Do you have an active cover crop	Yes No
What is your vine's full irrig. root depth	5.1 ft
How much of the field area is planted to vines	1. %
What is your row spacing	8.0 ft
What is your vine spacing	3. ft
	mm dd, yr
When is leafout	5 1 91
When is leafdrop (5% of the leaves fall off vines)	11 15 91
Do you irrigate off season (after leafdrop, and prior to leafout)	Yes No
Do you know the soil moisture deficiency just prior to leafout	Yes No

Answer all questions on the screen. Press the end key to continue.

WSWMTSR Crop selection	Crop Data, WSW 7.12:
When was your last irrigation during the previous season	8 11 9. mm dd, yr

Answer all questions on the screen. Press the end key to continue.

WSWMTSR Irrigation system selection	System Data, WSW 4..
Your irrigation system type: Microsprinkler Drip	
Hand move side roll Permanent Underthree Microsprinkler Drip Furrow Border strip	
Do you know your irrigation system distribution uniformity. For hand move, side roll, permanent underthree, micro drip, or furrow, there would be one value for the entire season. For furrow or border strip, there would be a unique value for each irrigation.	Yes No

AGWATER Micro-spray/Drip — Emitters/Sprayers #2, AGW 4C.2

Which of the following emitter/sprayer types do you have:
- Micro-sprayer (stationary or moving)
- Fogger
- Pressure compensating emitter
- Vortex emitter
- Other type of emitter or sprayer

What percentage of the trees/vines have the same number of emitters/sprayers per plant (assuming the plants are about the same age)? 100 %

What percentage of the emitters/sprayers are completely plugged at one time or another during the year? 5 %

What percentage of the emitters/sprayers are noticeably partly plugged at one time or another during the year? 5 %

AGWATER Micro-spray/Drip — Emitters/Sprayers #3, AGW 4C.3

How severe are the following problems?

Ants eating the insides of emitters: None
None Rare Slight Moderate Severe

Coyote/rabbit/squirrel damage to emitters or hoses: None
None Rare Slight Moderate Severe

Wasps/insects plugging the emitters/sprayers: None
None Rare Slight Moderate Severe

Plugging due to mineral deposits: Rare
None Rare Slight Moderate Severe

Plugging due to bacteria/algae: Slight
None Rare Slight Moderate Severe

Plugging due to sand: None
None Rare Slight Moderate Severe

AGWATER Micro-spray/Drip — Source and System, AGW 4C.4

Where does your water come from?
- Directly from a well.
- From a well via a reservoir.
- District water or other surface supply.

What is the flow rate into your system? 12 gpm

How many acres are irrigated at the same time with the same flow rate? 1.5 acres

What percentage of the water runs off the field? 0 %

How old is your system? 6 years

How many hoses are there for each tree/vine row? 1

AgWaTER Microsprinkler Grid — Pressure and Elevation, Row 41.0

What type of pressure regulators do you have at the emitter to each hose? Turns Adjustable Nonadjustable

What is the actual inlet pressure at the grid of the hose? [illegible] psi

How much elevation change is there along an given hose? [illegible] ft

How would you describe the elevation change? Always uphill Always downhill In both directions

Do you have pressure regulators at lateral entrance? Yes No

How much elevation change is there along an average manifold? [illegible] ft

How would you describe the elevation change? Always uphill Always downhill In both directions

AgWaTER Microsprinkler Grid — Filtration and Chemical Treatment, Row 41.0

Which of the following types of filters are installed on your system? (You can have more than one.)

- Overflow screen
- Tubular screen
- Sand tank/media filter
- Sand separator
- None

How often do you flush your filters? If automatic, enter 0 days

How often do you inject acid into the system? Enter [illegible] days

How often do you inject chlorine into the system? Enter [illegible] days

AgWaTER Seasonal Water Usage Summary — Management Period, Row 41.0

Irrigation period number: 1 — Irrigation System ID: [illegible]
Start of irrigation period: [illegible] — End of irrigation period: [illegible]
Irrigation applied: [illegible] in
Irrigation evaporation: [illegible] in — Irrigation runoff: [illegible]
Irrigation infiltrated: [illegible] in — Rainfall irrigation: [illegible]

Infiltrated Water Observations	Weather	Crop Water	Irrigation
Net gain of water since the last period (in):	[illegible]	[illegible]	[illegible]
ET deficit since previous period (in):	[illegible]	[illegible]	[illegible]
Irrigation need estimation (in):	[illegible]	[illegible]	[illegible]

% Soil Water Deficits	Weather	Crop Water	Irrigation
Soil water deficit at period start (%):	[illegible]	[illegible]	[illegible]
Soil water deficit at period end (%):	[illegible]	[illegible]	[illegible]
The soil water deficit since previous period (%):		[illegible]	
Soil water deficit at start of period (%):		[illegible]	

Previous screen — Next screen

IW Tip #4: Plugging of emitters by bacteria.

IW Tip #17: Selection of an "irrigation expert."

IW Tip #21: There is a runoff problem.

IW Tip #32: Selection of filter type.

IW Tip #33: CIMIS

AGWATER Normal Year Irrigation Schedule AGW SB. 1

User ID: des
Irrigation System: Micro-spray/drip
Crop: Grapes

NORMAL YEAR VALUES			ADJUSTED VALUES	
Week Ending (approx)	Event	Irrigation Duration (hours/week)	ETo Var (%)	Irrigation Duration (hours/week)
5/ 4	Lf-out	0		
5/11		95		
5/18		0		
5/25		95		
6/ 1		0		
6/ 8		95		
6/15		0		
6/22		0		
6/29		95		
7/ 6		0		
7/13		0		
7/20		0		
7/27		95		
8/ 3		95		
8/10		95		
8/17		0		
8/24		95		
8/31		0		
9/ 7		0		
9/14		95		
9/21		0		
9/28		0		
10/ 5		0		
10/12		0		
10/18	Lf-drop	[illegible]		
[illegible]		0		
11/ [illegible]		[illegible]		
11/ 9		0		
11/16		0		

11/30			
12/ 7			
12/14			
12/21			
12/28			
1/ 4			
1/11			
1/18			
1/25			
2/ 1			
2/ 8			
2/15			
2/22			
2/29			
3/ 7			
3/14			
3/21			

Homeater Normal Year Irrigation Details — Page 2

Lawn ID: 088
Irrigation System: Micro-spray, drip
Crop: Grasses

Normal Year Values			Adjusted Values	
Week Ending (month)	Event	Irrigation Duration (hours/week)	ETo (cm)	Irrigation Duration (hours/week)
3/25		0		
4/ 4		0		
4/11		0		
4/18		0		
4/25		0		

EXAMPLE OUTPUT
CIMIS

Station # : 13 Station name : Camino
Nearby City/Town : Placerville County : El Dorado
Latitude : 38D45'13"N Longitude : 120D43'57"W Elevation : 2780 ft
Owner : DWR
Maintenance : M-DWR Central District
Start Date : 10/19/82 Ending Date : N/A

Description of Site :

The site is located on the USFS nursery facility in Sierra Foothills. It is located in the corner of conifer seedling field which is intermittently rotated with a cover crop of vetch. The station is in the middle of a 50' by 50' irrigated lawn. The site has few constraints: to the North lie several utility buildings within 100' of the site: paved access road to the East about 30' away; conifers to the South and West.

Enter 'RETURN' to continue :
Help F1 Option Menu F2 NUM CAPS Connect: 00:07:3
Daily Weather Data for Station # 13 Camino CIMIS Project
1991

DATE	ETo in.	PRECIP in.	SOLAR RAD Ly/dy	VAPOR AVE mBars	AIR TEMP. MAX --Fahrenheit--	MIN	AVE	REL. HUM. MAX ------%------	MIN	AVE	DEW PT F	WIND AVE mph	WIND RUN mi	SOIL AVE F
5/ 2 Th	0.01	0.00	!118	8.3	49	39	43	100	72	90	40	4.2	101	53
5/ 3 Fr	0.16	0.00	!579	8.0	61	37	49	97	46	67	39	4.9	117	53
5/ 4 Sa	0.20	0.00	!610	8.3	69	42	56	76	38	54	40	6.0	144	55
TOTALS:			!--AVERAGES:											
WEEK	0.38	0.00	!436	8.2	59	39	49	91	52	70	39	5.0	121	54
5/ 5 Su	0.20	0.00	!514	8.8	72	49	60	71	30	49	41	6.0	144	56
5/ 6 Mo	0.23	0.00	!613	8.5	71	51	62	66	34	45	40	5.5	131	58
5/ 7 Tu	0.21	0.00	!563	9.6	73	49	61	68	39	53	42	6.3	156	59
5/ 8 We	0.15	0.00	!434	9.5	61	39	50	100	37	73	42	3.1	196	59
TOTALS:			!--AVERAGES:											
WEEK	0.79	0.00	!531	8.9	69	47	58	74	35	55	42	6.5	157	56

Ly/day*.484=W/sq.m in.*25.4=mm (F-32)*5/9=C mph*.447=m/s mBars*.1=kPa

----------SEVERE FLAGS---------- ----------INFORMATIVE FLAGS----------
N/A-not avail S-not in service Y-out of range H-hourly flagged severe
noc-no calc R-out of range Q-all QC not done F-estimated
N/C-not collected
Enter 'RETURN' to continue :
Help F1 Option Menu F2 NUM CAPS Connect: 00:09:3

```
COUNTY                  CITY/LOCATION                     NORMAL PRECIP (IN INCHES)
          JAN    FEB    MAR    APR    MAY    JUN    JUL    AUG    SEP    OCT    NOV    DEC
------------------------------------------------------------------------------------------

NEVADA                  GRASS VALLEY
          [illegible]   1.24   2.56   4.12   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]

NEVADA                  NEVADA CITY
          [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]

PLACER                  AUBURN
          [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]

PLACER                  BLUE CANYON
          [illegible]   [illegible]   2.14   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]

PLACER                  COLFAX
          [illegible]   1.24   2.56   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]

PLACER                  SODA SPRINGS
          [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]

Enter (RETURN) to continue :
Help F1  Option Menu F2                                    NUM CAPS Connect: [illegible]

COUNTY                  CITY/LOCATION                     NORMAL PRECIP (IN INCHES)
          JAN    FEB    MAR    APR    MAY    JUN    JUL    AUG    SEP    OCT    NOV    DEC
------------------------------------------------------------------------------------------

PLACER                  TAHOE CITY
          [illegible]   [illegible]   1.71   [illegible]   4.27   [illegible]   [illegible]   [illegible]   [illegible]   1.44   [illegible]   [illegible]

PLACER                  TRUCKEE
          [illegible]   [illegible]   1.71   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   [illegible]   1.44   [illegible]   [illegible]




Enter (RETURN) to continue :
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APPENDIX G

SUMMARY OF
PUBLIC WORKSHOPS AND CORRESPONDENCE

Prepared 6/19/91

APPENDIX.WORDPRO.NID9

HEARING ON AGRICULTURAL WATER MANAGEMENT PLAN
HELD AT NEVADA IRRIGATION DISTRICT
10836 Rough & Ready Hwy
Grass Valley, CA 95945
JULY 24, 1991

Mr. Chatigny - This is a workshop to discuss an agricultural water management plan that is required to be performed and to be produced by the end of the year December 31, 1991, under Assembly Bill 1658, which passed in 1986 and indicted that any agency that delivers more than 50,000 acre feet a year annually for agricultural purposes would prepare a Water Management Plan. We have done the first step in regards to that, and we are now prepared to present to you today this ag water draft plan. Today we are holding a workshop and on August 14, we will have a workshop in Placer County when we have the Board meeting at the Placer office. The WHO Committee will discuss the draft on October 1. Another workshop will be held on October 23. The WHO Committee will recommend some adoption of the plan on December 3, and then come back to the Board on December 11. Today we are going to discuss it among the staff and Board, and we would like to have written input from the public and from any affected agencies presented to us or the staff by August 30. They will be reviewed and included into the plan.

Bob Singleton - We developed three option papers. There are also copies of AB 1658 which tells you wnat is required under

law and what the District does. The three are canal delivery, water rates, and on-farm irrigation efficiencies. The options we have in water conservation fall in one of those categories. There may be some other options that may be added to the list. The only part of the plan that has been prepared is the information portion. This is early input by the public and the Board in terms of what direction you want us to go on this thing, what options you want us to consider, and that is the purpose of today's meeting and workshop.

Les Nicholson - We'll discuss the first option - canal deliveries. District currently uses the continuous flow method delivering purchased raw water. If you buy water from the District, it is on a miners inch basis. You receive that flow continuously from April 15th through October 14. There are other times you can buy water, which we call "supply on demand". This allows you to buy a block of water for a shorter period of time outside the normal irrigation season. Also, we have a rotation schedule, but not everyone in the District utilizes this program. We have looked at this as an option that we may be able to expand in the future. Rotation currently is when two or more customers that live close on the canal facility, buy like amounts of water (actually trade water between the two of them). With the current method of operation, we could just maintain it, stay with what we are

doing, and make no changes whatsoever. Delivery method could be as beneficial as far as looking at conserving water; however, District has a broad span, from the very small miners inch user (half miners inch being the smallest increment that we sell in the District) to the largest amount of water, up to 100 to 200 miners inches. We may not be able to make all of these options available to everyone, which will be discussed later in the option papers.

On Farm - The problem in the distribution system is canal capacity water delivery may not be a real issue as far as being able to make all the supplies, but canal capacities are becoming critical in many areas of our District and so what we are hoping to achieve through this plan is on-farm irrigation efficiency. Perhaps when you can take water and move it when you are not using it from one part of your farm, or water that you have in the early part of the season and move it to some other crop, maybe a winter crop later on or earlier in the spring. We also are looking at different types of programs throughout the District and throughout the State. What are the crop requirements, what does a crop really take, are we delivering more water to you than your crop really needs, and do we need to go to some other supply or demand method in order to supply what the crop needs. Are we stressing crops in some respects throughout our District where crops require more water at peak times and less water

at the early part of the season. It is estimated that on farm irrigation efficiencies average about 58% in the District. This percentage represents the ratio of the irrigation water beneficially utilized to meet the crop ET. An increase in average efficiency to 68% would save approximately 17,600 feet of water per year it has been estimated. Relate that to a total delivery in our agricultural community of 90,000 acre feet; that would be a substantial savings. It may not be available for all types of crops.

Irrigation system evaluations that are available. We are now putting together a complete computer program. We can sit down with you and see if you are as efficient as you can be with your crops. This would be based on if you have sprinkler systems or are you flooding. Through the Resources Conservation District, they have been able to provide gypsum blocks. They tell you what the soil moisture is and what time to apply water to that specific crop. Farmers have been pleased with the gypsum blocks. The computer program has only been on line at the District since April of 1991. We haven't had a chance to evaluate the effectiveness of the system at this time, so feedback during this time is going to be critical. And after the meeting here today, if you are interested, we would be happy to show you what we've got set up. There are examples in your packet on what is available.

We can't take on everyone at once because of staff time, but we will be putting the program out more and more as we become familiar with it.

There is also a program for agricultural water scheduling. This program has been developed by the same entities as the irrigation system evaluation program and has been designed to assist in pre-season projects of irrigation cycles. Reference to ET rates developed in irrigation pasture in difference areas of California are utilizing the program to determine specific crop ET's. We're not sure how effective it will be within our District; however, we do have that program available. We would put in a mobile lab so we can actually do more on farm efficiencies. We have visited many of the farms throughout the area that have been putting together different types of pasture management; such as taking the animals off of certain areas of the pastures at certain times.

There is CIMIS, the California Irrigation Management Information System. This was developed by the Department of Water Resources using computer technology to provide information on current weather and crop water needs to the irrigation water user. Probably one of the major things we will look at is the landscape water management issue. There are many ballparks, golf courses, roadside watering, and

landscape management in our area.

Bob Singleton - The third paper we have is on the water rate options. Because water rates can be used as a water conservation tool, the higher the cost of water the more the incentive to conserve water. Currently, the District sells irrigation water as low as $10 an acre foot on the larger size purchases. As pointed out in the CH_2M Hill study, it is common practice to grant irrigation water customers a water rate to maintain agriculture in an area. The logic behind this is that high water rates price commercial farmers out of business.

The other problem in selling raw water at low rates is there is little incentive to conserve water. In fact, we calculated that using current water rates, a farmer irrigating by gravity 20 acres of pasture would increase his on-farm efficiencies by 10 per cent. This would be a water cost savings over a ten-year period of about $40 an acre. This does not give much incentive to conserve water. We have done recent studies to look at potential new water supply sources for the District. A study done in 1985 concluded that the development of new reservoir sites or enlargements of existing reservoirs would require at least $100 per acre per water sale price to break even. So providing the pricing incentives to reduce current water use would allow additional

customers to purchase raw water at more reasonable rates than trying to go into the upper country and developing some very, very expensive projects.

Next thing we did on this option paper was to identify some of the different type of uses of raw water in the District. We have what we call suburban home, commercial, industrial, recreation, public, small farm, agricultural and we divide that up into two types of farmers. We came up with some new options that we would like to discuss and explore as we put together this plan. One we call Select Rates by Customer Classes. We're actually doing this now, but we're doing it on a broad stroke approach. Everyone has the same rate, but there is a discount as you go into the higher amounts. The question is should the select rates be uniformity provided regardless of the ability of various customer types to pay higher water rates. We could have select rates by size of service which is some of what we are doing now. Rather than using customer classes in establishing rates, it would require less administrative time to utilize size of service on the basis of determining these rates. Another one that we came up with is the water allocation method. Under this option, we would take a look at how much water we expect a particular type of crop to use per acre and the rate would be based on that amount of water. If additional water above and beyond that amount was required, then the cost is going to be

significantly higher.

Then we had another one we came up with called Irrigation Season Variations. Recognizing that different crops take different time periods in terms of irrigation, we might set up a rate structure whereby the customer can select what portion of the current irrigation season water was needed. Some crops don't need the early water, some the late water. An early irrigation season might be April 15 to April 30. The basic irrigation season might be May 1 to September 14, followed by a late irrigation season between September 15 and October 14. The customer could select what season they would want to use. By doing this, hopefully, we would save water over the current concept whereby customers would buy water only in the season that water was really needed.

Cost of Service--This would be based on what the District thought it would cost to serve a customer. Based on the current studies, it would be a very drastic change in the water rates for the agricultural customer.

Quarter Miners Inch Service--This was in effect several years ago during the drought. There were a lot of problems administering that service, basically measuring the water because of the small size orifice. We did away with this service but may want to reconsider it again. We might

consider offering more increments for sale. Now we offer 1/2 M.I up to maximum of 5 M.I., then we go to even amounts 6, 7, 8, 9, and 10. We might think about 1/2 M.I. increments in the higher amounts.

Volume Purchases--Unfortunately, with the type of operations system we have right now, without some big changes which are going to be a big cost, that particular option would only be available for certain situations.

Les Nicholson - The 1/4 M.I. service will not work in every situation, especially on a raw water facility pipeline. The screen device is not efficient in order to keep them clean. On the open canal ditch services, it has been found they are not any more difficult to administer than the 1/2 M.I. The 1/4 M.I. would almost have to be on a case-by-case basis.

Sump on 1/4 M.I.--Until we got into the business of allowing services with household treatment plants, there was no requirement for sumps. Once it became necessary to provide household services for these home treatment plants during the late 60's and early 70's, we required at least 1,000 gallon storage, but there are many, many of the homes that do not have storage. We are selling all our demands; it may not be that way in the future. We will not be able to meet our demands. Now if we save water and cut down sales, we are

going to have to increase rates because we must have the revenue to operate. We are looking at probably pretty good increases next year because of the demands by the State. The State is imposing all kinds of costs on us that we have not been paying before.

Demands State is asking for - Fish and Game is going to impose fees for anything they do for us. Water Rights is going to charge us for licensing fees; it could be $100,000 or higher in some cases. State Health is going to charge fees; Dam Safety is going to charge maybe $27 a foot for the height of a dam.

Audience - The bureaucracy is so thick, it's going to cost the agricultural customer more money to raise less crops.

Jim Chatigny - There are some types of uses within the raw water industry that are not centered around agriculture. In all fairness, those rates have to be equally distributed and currently they are not. It's possible to have a customer with a duck pond that is buying 2 M.I. when all he really needs is 1/2 M.I. We are so massive in size, we have 400-500 miles canal system and hundreds of miles of pipelines, but we do not have customers every five feet or we would not be having this revenue problem. In some cases there are miles and miles between some customers, especially

in the canal system. Now even in the domestic system, we're getting ready to put in 6 to 7 miles of pipeline with 10 customers at the end of it.

The State mandates that we conserve water; so we have to show that we are conserving water.

Out of 140,000 acre feet of water delivered in our District, a total of 75% of the water is utilized by the agricultural community. City of Grass Valley and the City of Nevada City uses 1.4% of total District water supply or 1,900 acre feet of water. Treated water customers in the District use about 5% or 7,000 acre feet. We have a supply we are calling non-firm. This is water we have under contract with PG&E that we sell to South Sutter Water District. Non-firm water makes up about 11% or 16,000 acre feet, and then we have winter services which is 6.4% of total sales or about 8,000 acre feet. And the winter service falls within the people that use the water for household use year round. The greatest opportunity for conservation in any water district would be in the agricultural use, as this is the largest block of water. The Urban Water Management Plan was required by State law about five years ago, because we just updated it recently. The State has now passed a bill that requires us to do the Agricultural Water Management.

Jim Chatigny - We would like to get your written comments back by August 30, 1991. We're going to have another public workshop on August 14 in Placer County. We would be happy to answer questions on a one-on-one basis. You can see me or Dennis Sanders. We will sit down and be sure to get them incorporated. There will be another workshop later on in October.

Bob Singleton - At the next workshop, we will have some specific recommendations and see what direction we are going.

Capital Improvements: We are not doing that much capital improvements. The water increase is due to salaries to our employees, general maintenance, the cost of the equipment to do the maintenance, chemicals, the State expenses. These expenses of the State have not been encountered before, and they are tremendous costs. We also have costs from FERC and Dam Safety put on all of our dams. It will be necessary to reinforce the dams so they are more earthquake safe. There are unlimited expenses to the District that have not been there in the past.

Budget Problems: The County is collecting our taxes at an expense of $130,000. The State gave the counties approval to charge all the special districts for collecting taxes. This is a new expense. Fish and Game charges us for several

different reasons. Stream alteration, etc.

Paul Williams - This District is very fortunate. We have good water at the present time. Therefore, we don't sell all the water every year that we are capable of generating. It takes so much revenue, that if we save water, we have to increase rates.

Mel Brown - Is this a mandate they are going to put on the District?

Jim Chatigny - It is not mandated by the State, but we have to show on paper a plan for this District to save water. They are not putting us on a quota; we can continue to operate as we are currently operating.

Paul Williams - There will be a time in the future when it will be necessary for us to conserve water because we are not able to expand our water storage facilities. So the only way we can meet growing demands is by conservation. But we haven't reached that now.

Gentleman in the audience - Of course by the time you reach there, you may have income that will allow you to increase storage.

Paul Williams - As you realize, it is getting more and more difficult to build storage facilities.

Les Nicholson - Many bills, such as the Safe Drinking Act, we are going to spend millions of dollars within the next few years to upgrade the water treatment facilities to meet these mandated costs. Since this five year drought, 26 bills on water transfers, allowing farmers to sell their water, etc, and all types of issues are going to affect all of us across the state.

Bob Singleton - Again, if you would like to look at some of the material that we have given to you, we would be happy to hear comments. August 30 is not the deadline, but that is the time frame we are looking at to get the draft out to the WHO Committee the following month. There will be more opportunities to get input on the proposal plan.

Paul Williams - It would seem the most feasible possibility would be the different seasons of water. The customer would decide what months they would need the water. If we can have some ideas on what are your needs, and what seasons you would need water, we might be able to come up with a different time criteria and the length of irrigation season.

Jim Chatigny - We thank you for coming. We enjoyed the comments.

Les Nicholson - I would like to introduce Paul Bock. He is our new agricultural commissioner in Nevada County. He is from Yuba County.

Nevada County Resource Conservation District

113 PRESLEY WAY, SUITE 1 - GRASS VALLEY, CALIFORNIA 95945 (916) 272-3417

August 27, 1991

Board of Directors
N.I.D.
10836 Rough & Ready Hwy.
Grass Valley, CA 95945

SUBJECT: Agricultural Water Management Plan

Dear Sirs,

The local RCD/SCS staff has reviewed the Agricultural Water Management Plan prepared by your staff and submits the following comments for consideration.

First of all, we commend the District for taking this important first step in addressing water conservation within its area. As resource agencies that are actively promoting water conservation among landowners, we support your efforts in stressing water conservation among your customers.

As mentioned in your report, our staff has been assisting in irrigation system evaluations and irrigation water management. Through these efforts we have come to appreciate the drawbacks of the continuous flow delivery method in terms of crop demand. Because of this, we were encouraged by the inclusion of the supply on demand and rotation concepts as optional delivery methods. These options are more in keeping with crop consumptive use.

While we support these delivery options, we realize that continuous flow will be the primary delivery method. Since the canal capacity does not allow for peak flows, the District should consider building small regulatory reservoirs on the lower end of the system to store water for peak periods.

In your report, the observation was made that selling raw water at low rates does not provide incentives to conserve water. While this may be true for many people, we have found that many others will conserve when they realize that water conservation can increase their crop productivity.

One final comment is on improving on-farm irrigation efficiencies. While we assist landowners in this regard as part of our program, our limited staff cannot possibly do this on a large scale. The District should consider hiring a trained field person to do irrigation system evaluations.

Sincerely,

Andrew Lovato

Andrew Lovato, CPESC
District Manager

/bh

272,500 ACRES SITUATED IN NEVADA, PLACER, SIERRA & YUBA COUNTIES

NID Nevada Irrigation District

10836 ROUGH & READY HWY. • P.O. BOX 1019 • GRASS VALLEY, CA 95945-1019 • (916) 273-6185

AUBURN & LINCOLN: 878-1857
COLFAX: DIAL OPERATOR, ASK FOR ENTERPRISE 14293
FAX: 477-2646

IN REPLYING REFER TO FILE NO. 5/1-M

September 6, 1991

Mrs. Donna Manley
2365 Bean Road
Auburn, CA 95603

Re: Box 2652, Kemper West Canal

Dear Mrs. Manley:

Thank you for your letter and input on the Agricultural Water Management Plan. As I discussed with you by telephone on September 4, 1991, I will address your concerns.

First, if people are using water off of your private pipe without purchasing it from the Nevada Irrigation District, we will write them a letter after you have provided us with names and addresses. If it continues, you can then contact the Placer County Sheriff.

Next, you mentioned the fact that there are twenty-eight people off your line and some use more water than they purchase. The District's Rules and Regulations only allow for multiple accounts off a single outlet if the owners of the pipeline sign a Private Conduit Form allowing this to be done. Apparently, the owners of the pipeline allowed this to happen, not Nevada Irrigation District.

As to the fact that people use more water than they purchase, I have spoken to you and Mr. Norman Bethandorff, who is the contact person for the Nagle Private Pipeline, about orficing all of the outlets off of the pipeline. Orificing is the only way to correct the problem.

Last is your concern about people using this water inside their residences. The District sells this water for agricultural purposes only. It is not fit for human consumption, and it is so stated on all water applications. If you are concerned that it is being used for human consumption, you should contact the Placer County Health Department.

Again, thank you for your letter and comments. If you have any further questions, feel free to give me a call.

Sincerely,

Dennis E. Sanders
Raw Water Supervisor

DES:scg

bcc: Jim Chatigny
Bob Singleton
David Southern
Ernst Bierwagen
Robert Pierce
R. Paul Williams
Victor Beisswinger

Board of Directors
Nevada Irrigation District
10836 Rough & Ready Hwy.
Grass Valley, CA. 95945-1019

Dear Directors:

I have just returned from a trip to Oklahoma. I found upon my return that you want input from the public about a new management plan for agricultural water.

There is no doubt that agricultural water needs to be managed differently in this area. I live approximately three miles from the city limits and am on an irrigation line that serves twenty-eight households. Of these twenty-eight, probably half are using irrigation water in their houses -- some buy it, others just connect to the irrigation lines and use it without paying anything.

This looks very bad for NID. I used to think of Oklahoma as being rather primitive, particularly the rural areas. That is no longer ~~true~~ true. Almost all of the rural areas have treated water now, supplied by a public water agency. It is the people of Placer & Nevada counties of CA. who have primitive conditions.

What if there is an outbreak of hepatitis?! How can it be prevented from spreading to all users of irrigation water who are using it in their homes?! This water does come to us in open ditches.

A few months ago the Auburn Journal carried a story about a body being found in a NID ditch here in Auburn. I believe that ditch is the one who supplies us. We need to have treated water!!

Another area that needs to be managed differently are those areas like ours with multiple subscribers who get water through the same box. In the drought years of the 70's, NID told people how much water they had to buy based on how much land they owned. Now, NID lets people get by without buying any water at all, but they continue to use what they want.

Others fill their ponds and irrigate their pastures as much as they want while buying as little as possible.

All this is not fair to those of us who try to do the right thing and pay for what we want to use, but cannot get because it all goes to those who steal and cheat. This situation has caused much bad feeling between neighbors here. Many harsh words have been spoken. Someone will be injured someday..... Indeed, California has a ~~history~~ history of people being killed over water rights....

Thanks for asking for our input.

Sincerely,

Donna Menley
2365 Bean Road
Auburn, CA. 95603

APPENDIX H

BIBLIOGRAPHY RAW WATER STUDIES

NEVADA IRRIGATION DISTRICT
RAW WATER STUDIES

PL 984 Reconnaissance Report; July 1981;
Prepared by CH2M Hill Engineers.

A determination as to the applicability of the U. S. Bureau of Reclamation's PL 984 program to meet needed District raw water system improvements.

Raw Water System Master Plan, Element 1; January 1983;
Prepared by CH2M Hill Engineers.

Defines the land resources within the study area, identifies the water resources available to the District and develops the water demands for the 20-year study period, 1982 to 2002.

Reconnaissance Study of American River Water Supply;
May 1983; Prepared by CH2M Hill Engineers.

Investigates the possibility of utilizing American River water within the District boundaries for agricultural purposes.

Raw Water System Master Plan, Element 2; February 1985;
Prepared by CH2M Hill Engineers.

Assesses the existing raw water system capabilities to deliver the master plan water demands, formulates a master plan for meeting these demands, evaluates the various components of the master plan and selects a master plan based on the evaluation.

Raw Water System Master Plan, Element 3; April 1985;
Prepared by CH2M Hill Engineers.

Presents the 20-year master plan summary, the financial analysis and the implementation plan.

Water Supply Development Reconnaissance Study, November 1985;
Prepared by CH2M Hill Engineers.

Presents results of reconnaissance level studies which identify, screen and evaluate ten alternative water supply development projects. Due to the extended time necessary to develop any new reservoir sites, these projects would not provide new water supplies any earlier than the year 2000.

Rollins Reservoir Spillway Labyrinth Weir, Feasibility Report; June 1986; Prepared by CH2M Hill Engineers.

Feasibility of increasing storage at Rollins Reservoir by replacing the existing ogee spillway crest with a labyrinth weir.

Agricultural Water Management Planning Act, Information Report; December 1989; Prepared by District Engineering Staff.

Prepared pursuant to Sections 10800 through 10855 of the California Water Code. Presents basic information relating to the District's raw water supply and concludes that an Agricultural Water Management Plan should be adopted by December 31, 1991.